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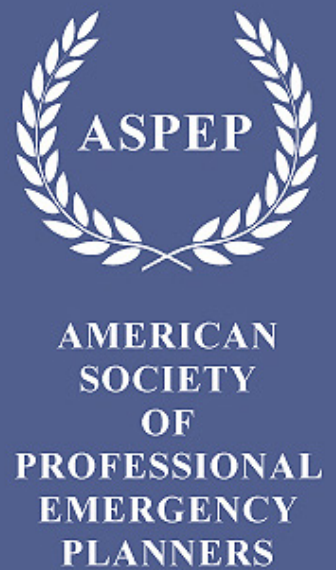
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PRESIDENT'S FORWARD

It is indeed my privilege to present to each of you the Fifth Edition of the American Society of Professional Emergency Planners 1997 Journal. I am sure that many of you are anxious to absorb its contents as much as I am. The 1997 Edition has included a variety of papers which mirror the many facets of our profession and certainly this year's Journal has "something for everyone". There are articles reflecting some personal experiences and others which describe some technological advances. The authors, who so generously shared their thoughts, are from all over the world. Some from as far away as Bangladesh and Great Britain and others from the different regions of North America.

The Officers of the American Society of Professional Emergency Planners are indebted to all of our talented authors. We are also especially grateful to our dedicated editorial staff, who have successfully arrived to make this year's Journal, with all of its diversities and challenges, an echo of the emergency management profession.

As in the past, this year's Journal is a protrayal of the American Society of Professional Emergency Planners' goals and objectives:

"The American Society of Professional Emergency Planners'(ASPEP) exists to promote Active Service and Performance through Education and Professionalism."

Happy reading!

Rosemarie Chisholm-Cohen, CEM
President, ASPEP, 1997

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THE ENVIRONMENTAL ATTITUDES OF FLOODPLAIN RESIDENTS -EVIDENCE FROM DHAKA, BANGLADESH-

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ABSTRACT

This research examines the importance of environmental factors in the choice, motivations and decision-making of the floodplain residents arising from the flood defense schemes in Dhaka, Bangladesh. It focuses on the attitudes of the floodplain residents and investigates whether there are any "trade-offs" between tolerable level of flood risk and willingness to accept environmental change resulting from structural flood defense.

From a series of structured interviews with the floodplain residents, it has been found that the perception of the floodplain residents is dependent upon the social factors, but in a complex manner. Considerable agreement with attitudinal statements suggested widespread environmental awareness and strong support for structural flood defense schemes respectively. In terms of 'risk-environment trade-off', the results have supported the importance of environmental factors in flood hazard mitigation in principal, but not at the expense of flood defense scheme.

This research concludes that the dominant 'risk-environment trade-off' syndrome has, very weak to moderate influence on the attitudes of floodplain residents in Dhaka, Bangladesh. Rather, residents are highly motivated by the introduction of proposed structural flood embankments which encourage extensive occupation by increasing perceived safety against flood risk.

Key words : Floodplains, Risk- Environment Trade-Off, Bangladesh, and GDFPP.

I. INTRODUCTION

Bangladesh experiences an almost unique environmental situation, being located on the two of the world's largest rivers and in one of the great flood and storm hazard zones in the world. While physical environmental problems merge imperceptibly into development problems, the socio-economic development of the country has been constrained owing to pressures exerted on the total environmental system and bringing in disharmony between development and utilization. In the future, a large scale modification of the environment will be very likely necessary to develop economies and improve the well being of the people. The construction of embankments and dams, the resettlement of people, agricultural development projects, and rural and urban planning have far-reaching human and environmental consequences. Attempts to predict the likely consequences of action reveal gaps in knowledge and large areas of uncertainty. These gaps in knowledge are such that in many areas the precise nature of man's effects on the environment can not be stated explicitly. Understanding is needed not only to project the complex environmental systems, but also to know and help achieve human goals; for human environment is a "built environment", a social construction. It is the social environment in our experience and expression. Environment is the carrier of human values; it is shaped to human purposes. This has been the major philosophical stance followed in this paper.

In the wake of catastrophic floods of 1987 and 1988, the then government of Bangladesh, started the "Greater Dhaka Flood Protection Project (GDFPP)[1]" as a measure to ensure flood-free life for about 10 million people and to provide opportunities for agricultural development. The implementation of the GDFPP was divided into two phases. Phase-I covered most of the urbanized area of the western part of Dhaka city while Phase-II covered the floodplain on the eastern agricultural perimeter of the city. Construction work of phase-I started in 1989 and continued until 1992 while construction of phase-II has yet to be started. Soon after the construction of Phase-I (Dhaka-West), various post-construction evaluation studies revealed that, although the flood protec-

tion scheme was undertaken for purposes of flood control, a significant land use/cover[2] change along with environmental deterioration was observed in the area enclosed by the embankment (Muhit, 1993 ; Ahmad, 1993).

In the area of Phase -II (Dhaka-East), construction of which is yet to be started, similar trends were observed. A recent study has shown that significant changes in major land uses and cover have occurred in the eastern part of Dhaka, indicating that during 1984-94, the largest loses of lands were incurred by the agricultural land use classes (decreasing sharply from 55- to 43- percent), while the largest gains occurred within the residential land use classes (9- to 17- percent) (Chowdhury and Sato, 1996). Recent residential land acquisition in both the areas lead to the conclusion that flood defense schemes influence floodplain land use/cover significantly. While Phase-I was completed on an emergency basis without an adequate feasibility study, experience from the attitudes to environmental change in Dhaka-West may, lead the people of Dhaka-East to perceive the extent to which 'trade-offs' between flood risk and environmental change are tolerable. This study is, therefore, designed to examine i) whether there exists any relationship between flood hazard perceptions and environmental perceptions that influences the decisions of floodplain residents; and, ii) to what extent 'trade-offs' are made between tolerable levels of risk and willingness to accept environmental change resulting from structural flood defense schemes.

II. HYPOTHESIS

So far, findings of natural hazards research have described seven reasons as the answer to the question, "why do people live in the floodplains" (see Chan, 1996). Among the seven reasons of persistent floodplain[3] occupation[4], reason 6 (" the floodplain resident expects to bear a loss but sees this outcome as an acceptable cost of enjoying the locational (environmental) benefits") is used as the basis for our research question. The basic assumption of this research is based on a general system model of human adjustment to natural hazards (Kates, 1971; Mileti, 1980). Only the environmental dimension, as recognized by James et al. (1971), has been included in the hypothesis. In our model of hazard perception and mitigation, the human community and its use system, linked to a physical system (e.g. a floodplain environment) define an objective level of flood hazard (see Figure 1). This level of hazard is dependent upon the chosen land use practices of the community and the geophysical characteristics of the particular en-

vironment. The model describes a dynamic system in which the objective level of hazard can be altered by changes in both the human use system and the physical system, therefore, a circulating feedback mechanism exists between these first three elements. It is the subjective perception of flood hazard; however, which determines the degree and form of hazard mitigation. Once the hazard perception threshold is reached, an adjustment search is initiated and the consequences of the possible adjustments are evaluated. This evaluation procedure is influenced by factors of the social unit and by various external influences such as contextual factors (i.e. macro government policy issues), institutional factors (i.e. nature of the flood defense authority and its policies), and access to information etc. These factors will influence the degree and form of hazard mitigation. The degree and form of hazard mitigation can change both physical and human use systems and thus create a feedback mechanism which, in turn, alters the level of hazard - both objective and subjective.

Certain environmental factors are added to the above basic model. In this parallel, but closely related, environmental system, the human use system and the physical system define a level of environmental value which can be seen as objective (in the sense of recognized designations such as 'area of outstanding natural beauty (AONB)). This objective level of environmental value is similarly linked into feedback mechanisms whereby the value can be altered by changes in the human use system and the physical system. Assumptions that will guide the research direction are as follows :

i)   The perceived level of hazard, environment, and flood defence schemes are dependent upon the social factors including previous flood experience and distance to the embankment;

ii) There exists some relationship between flood hazard perception and environmental perception that influences the decisions of floodplain residents, and "trade-offs" are made between tolerable levels of risk and willingness to accept environmental change resulting from structural flood defence schemes.

III. METHODS

An attitude is a collection of feelings (affects) and beliefs (cognition) which predispose an individual to respond in a particular way to an object. As hypothetical constructs, attitudes cannot be measured directly but must be inferred from responses - such as a number of attitude statement items in a structured questionnaire (Ajzen, 1988). While a single item is unlikely to prove

reliable in capturing such dispositions, aggregating responses over a number of items has been found to be a more reliable measure. An underlying assumption in the use of this research method is that understanding attitudes will enable us to understand, if not predict, behavior. This study is, therefore, based on a long, structured questionnaire administered by interviewers. The survey population was defined as householders living within the 50 years floodplain.

Comprehensive interviews were carried out from December 1996 to January 1997, using 300 questionnaires in three *Thanas*[5] (Area : 183.0 sq. km), i.e., *Tongi, Gulshan and Demra* (see Figure 2). Our sampling survey was limited to i) *Pucca*[6], and ii) *Semipucca*[7] houses of these three undeveloped, fully floodplain areas. The sampling error that affected the selection of study sample was 5% (sampling error at a 95% confidence level for a stratified random sample was 5%).

3.1 Data Analysis

Numerical values were assigned arbitrarily to the item and question responses, and these values were then summed to obtain total scores. These scores were then interpreted as indicating the attitude of the respondent. Two extreme values of the scale were further classified according to the degree of alienation. Finally, the data set that we obtained was categorical (continuous) in nature. Quantification -I (quantitative outside variable) and Quantification -II (qualitative outside variable) are well known and widely used in Japan for the prediction or analysis of factor-response relationships based on categorical data (Tanaka, 1980). The outside variable data in this research are qualitative in nature. Our analysis is, therefore, based on Quantification -II (Hayashi, 1950). Details of Quantification - II is presented in the following section.

3.2 Quantification Type II

Quantification-II is a method used to predict a qualitative outside variable on the basis of information concerning qualitative attributes of each subject and to analyze the influence of each attribute on the discrimination of the groups defined by the outside variable. All subjects are classified into r mutually exclusive classes or groups $\P 1, \P 2, ...\P r$ according to the outside variable, and the information concerning the attribute items is given in a row of this table. We introduce dummy variables so that

$x_{ij}(kl) = 1$, if the j-th subject in $\P i$ belongs to
category l of the k-th attribute items,
0, otherwise,

where $l = 1, 2, ..., c_k ; k = 1, 2, ...I$ (1)

for expressing a pattern of qualitative attributes of a subject. In order to analyze the relationships between an outside variable and qualitative attributes we still assign a numerical score $s(kl)$ to category l of k-th item and, as a result, assign a score

$W_{ij}(k) = \sum_l s(kl) x_{ij}(kl), k = 1, 2, ...,I,$ (2)

to qualitative attribute k of the j-th subject in $_{ij}$ and a score

$Y_{\Phi ij} = W_{ij}(l) + .. + W_{ij}(I) = \sum_k \sum_l s(kl) x_{ij}(kl),$ (3)

to the j-th subject in $\P i$. The principal of Quantification - II is to maximize the correlation ratio or the between-groups variation relative to the total variation i.e.

$\eta^2 = S_b / S_T$ max. 4)

where S_b and S_T are expressed by quadratic forms of score vector s such that $S_b = s'B_s$ and $S_T = s'T_s$ From equation 4, we obtain an eigenvalue problem

$(B - \eta^2 T) s = 0,$
(5)

and numerical scores $s(kl)$ are given by the eigenvector corresponding to the maximum eigenvalue. The scores for the categories of the outside variable are given by the mean values of Y_{ij} in equation 3 within the groups $\P 1, \P 2, ...\P r$. (see Hyashi, C. (1950,1952) ; Tanaka, Y. (1980) for more details on Quantification Type I and II).

In Quantification -II no order relation is assumed among the categories of the outside variable. In our study, however, there is reason to believe that order relation should exist among categories of outside variables. The optimal scores obtained by the ordinary method sometimes did not satisfy the order relations. We, therefore, tried several times through pooling categories with unordered scores until we obtain scores satisfying the order relations required (Tanaka, 1980).

IV. FINDINGS

Quantification -II has been applied to the analyses of effects of social characteristics (factors, category) on outside variables. Social characteristics of the study sample were measured by factors like age, education, occupation, residence period, housing type, household structure, embankment distance, income and flood experience. Outside variables were assessed from the scale/response to hazards, environment, and schemes attitudes statements (see Table 1). A Japanese version of SPSS[x] for MS Windows (Release 6.1) that can run HAYASI 2 (V2.0) were used for our data analyses. Results of these analyses are summarized in Table 1. Dis-

cussion has been limited to those significant order relation which were deemed to be of interest or importance, and also subject to logical interpretation.

4.1 Discussion of Hypothesized Relationships

i) Social characteristics with perception of flood hazard

Flood risk perception (FRP), the outside variable, describes an order relation with age and displayed that there was more agreement from the older age group with many of the risk statements (i.e. higher risk perceptions were observed with increasing age). This age group also tended to exhibit more worry (FFW), a higher level of awareness (FFA), and higher agreement with the likelihood of future flooding scale (LFF). Education maintains an inverse relation with FRP (i.e. education level increases with decreasing risk perception) but a direct relation was observed with FFW. Occupation indicated that farmers tended to show more agreement with FRP than those of others. Similar trends were observed with outside variables FFA, LFF and PLF respectively. Furthermore, people who were longer residents tended to show more agreement with FRP, FFA, LFF and PLF variables. These findings reveal the fact that the older less educated people tended to have farming occupations and longer residence periods. The household structure factor showed that those with larger family sizes with children, took a cautious view and have shown relatively higher degrees of hazard perceptions, compared to those without children. Distance from the flood defence scheme (embankment) elicited some variability response where significant inverse order association were observed with FFW, FFA followed by direct order with LFF and PLF variables.

ii) Social characteristics with environmental value

Increasing age, residence period, and household structure were found to show higher agreement with the environmental value (EV) scale (outside variable). On the contrary decreasing education level and income tended to show similar positive attitudes with the statements of the EV scale. There was considerable agreement with the majority of the statements suggesting widespread environmental awareness. The statement " I like to be in the open space of the countryside" attracted strong agreement (65.6%). Similarly statements like "we have to be prepared to accept a lower standard of living in order to protect the environment" and "we have no choice : to protect the environment or destroy human life" attracted strong to moderate agreement from 53.5 and 37.0 percentage of the respondents.

iii) Social characteristics with attitude to / change of local environment

A positive association to local environment variable was observed with the increasing age, distance, and decreasing education, residence period, and income factors. Respondents in these categories displayed agreement with the greater advantages of the living environment in their locality. Shopping facilities, country side nearby, open space, access to work, clean areas, and attractive neighborhoods have attracted strong agreement from 58.3-, 56.6-, 48.6-, 47.7-, 44.0-, 36.8- percentage of the respondents. Overall, 70.3 percentage of the study sample rated their locality as strongly advantageous for living while only 0.8 percentage took a strongly negative attitude. Similarly, increasing age, residence period, distance, income, household structure, and decreasing education level were associated with acquiescence and a high perception of environmental change (AEC) variable.

iv) Social characteristics with scheme attitudes

More agreement with the scheme attitude statements (FSA) were observed with the increasing age, and decreasing education and distance categories. These findings were further strengthened by higher agreement to the attitudes statements from the farmers, however, *Pucca* residents displayed a cautious view and also tended to show stronger support for flood defense scheme than those of others. People with flood experience tended to show similar attitudes. The statement "flood protection schemes will only bring more development in this area" attracted general agreement (83%) while statement "there is no need of a flood scheme here because flood risk is low" attracted general disagreement (55%). Respondents were uncertain about the technical statement "a flood embankment would be preferable to raised flood embankment in this area", with large numbers (75%) opting for moderate response. The statement "flood protection scheme should be carried out regardless of cost" and "anything designed to reduce flooding" attracted more than 60% of the study sample. Conversely, statements "there is no need of a flood scheme" and "spending money on flood scheme is a waste" have been disagreed with by about 50% of the study sample.

4.2 The Risk-Environment Trade-off

In the determination of a negative flood hazard mitigation attitude (as partly indicative of a risk-environment trade-off), those with a negative and positive attitude towards scheme and environment were selected

from the set of response statements. These statements were selected as showing a strongly negative/positive attitude to a flood scheme and to be indicative of those making a "risk-environment trade-off".

i) Perception of hazard with scheme attitude

Results of Quantification analyses (see Table 2) indicated that those who tended to show agreement with the hazard perception displayed stronger agreement with scheme attitude statements. On the contrary, those who displayed disagreement with hazard perception attitudes tended to display very weak to moderate disagreement with schemes attitudes; therefore, the statements "the flood embankment will remove the risk of flooding", "the likelihood of flooding is increasing", and "a flood could happen again any year" attracted general agreement from 32.5-, 57.7-, and 69.3- percentage of the respondents. In addition, statements like "anything designed to reduce flooding is desirable", "a flood scheme should be carried out in this area regardless of cost" and "I would rather have any scheme than be flooded" attracted agreement from about 70-, 70-, and 50- percentage of the respondents. Strong desire for flood schemes were further strengthened when more than 50 percent of the respondents displayed disagreement with the statements "spending money on flood protection scheme is a wastage, nature will always win at the end" and "there is no need for a flood scheme here because flood risk is too low".

Both flood worry (FFW) and awareness of future flooding (FFA) lead to support for schemes. Those who are aware of future flooding were more likely to support flood schemes regardless of cost, however, our results show that people unaware of future flooding were divided into two categories, a majority of which tended to show support for a flood scheme. People with higher expectation of future flooding (LFF) displayed support for schemes and, interestingly, those who were more prepared to live with floods (PLF) of varying risks tended to show similar support for a flood scheme. These findings are partly indicative of the internal validity of the "risk-environment trade-off" of this research. As observed, respondents with higher perceptions of hazard have displayed more support for flood defense schemes. On the other hand, similar scheme support was observed from those who were more prepared to live with flooding. Findings are, therefore, that there is a strong desire for proposed flood embankment despite wide variations in socio-economic background. "Flood-risk" is the key perception of the respondents and, therefore, tended to show a general agreement for

flood defense schemes as a measure of mitigation.

ii) Attitude to local environment with scheme attitude

Those who rated the local living environment as advantageous displayed agreement with the scheme attitude statements. Statements like "flood protection scheme can enhance the environment" and "flood protection scheme will only bring more development" attracted 50 and 80 percentage of the respondents respectively. Disagreement (50 percentage of the respondents) on the statements "flood protection will have terrible impacts" and "flood protection spoils the view" further verified strong desires for flood protection schemes. Our results show that those who believed the local area to have undergone a lot of changes during the last 10 years tended to agree with the flood defense scheme attitude statements, and showed a strong desire for embankments (see Table 3). On the other hand, those who displayed disagreement with the environmental value scale also tended to show similar agreement with scheme attitudes. As long as the environment was concerned, our study sample was found to display a positive awareness, but as soon as there was a question of "trade-off", a reluctant attitude from the same study sample were observed. Findings indicated that their attitudes were rather highly motivated by the proposed flood schemes that tend to increase safety against perceived flood risks.

V. CONCLUSION

It was hypothesized that the flood hazard perceptions were dependent upon the social factors of the social unit. The expected pattern was that those with high flood hazard perceptions would agree with the more negative aspects of flooding suggested by the statements. Results of Quantification analyses showed social characteristics (as defined by the model) to be related to perceptions of flood hazards but in a complex manner; many factors are interrelated. Residence period and family structure factors were consistently dominant like those of other natural hazards research findings, whereas age and education offered marginal, or even contradictory, roles when compared with traditional hazards research.

How people perceive the environment was hypothesized to affect their attitude to proposed structural flood defense schemes. There was considerable agreement with the majority of the statements suggesting widespread environmental awareness and concern; however, certain statements showed a divergent response when respondents had to choose between industrial growth and environmental preservation.

Scheme attitudes statements attracted similar attention from the study sample.

In terms of 'risk-environment trade-off' relationship, as hypothesized in the model, which guided the basic research design, the findings have supported the importance of environmental factors in flood hazard mitigation in principal but not at the expense of a scheme. Floodplain residents were indeed reluctant to make a 'trade-off' between flood risk and environment. Rather, their attitudes were highly influenced by the introduction of proposed structural flood embankment which increased perceived safety against floods.

The case study, focusing at the individual level, has suggested that the model of flood hazard perception and mitigation is too simplistic, although support was found for the importance of environmental factors and the existence of a nominal 'risk-environment trade-off'. The influence of personality factors on beliefs about, and attitudes to, flooding and the environment were not examined empirically in this case study, partly because they are difficult to operationalise but also because there was a need to keep the length of the survey to a minimum. These analyses did suggest, however, an underlying optimism in some floodplain residents influenced by their beliefs and attitudes.

NOTES:

[1] The Greater Dhaka Flood Protection Project (GDFPP) consists of 30.0 and 29.0 km embankments in Phase-I (Dhaka-West) and Phase-II (Dhaka-East) respectively. In this research 'Flood defense scheme' and 'flood protection scheme' refers to 'proposed flood embankment' of Phase -II.

[2] Land use reflects human activities such as the use of land (i.e. residential, agricultural zones) while land cover is the physical condition of the ground surface (i.e. forest, grassland).

[3] A floodplain is the lowland that borders a river, usually dry but subjected to seasonal flooding.

[4] This occupation refers to encroachment in the floodplains without any formal approval. In the floodplains of Bangladesh, the regulations, and severe penalties for violators, are rarely enforced. Inadequate municipal planning, corruption, and, most of all, extreme housing shortages are responsible for these violations.

[5] *Thana* is the second lowest administrative tier in Bangladesh. There are several unions under one *Thana*. As the study area is partly divided into three *Thanas* i.e. *Tongi, Gulshan* and *Demra*, and adminis-

trative boundaries of each of these *Thanas* covers both urban and rural sectors, our sample survey was limited to the rural sector only.

[6] *Pucca* houses are multistoried in nature, constructed on proper basement and footings. All the walls are 24 cm. thick and made of brick. The main structure is made of reinforced concrete. Roofs are made of reinforced cement concrete (RCC).

[7] *Semipucca* houses are constructed on weak footing. Roofs are made of Cast Iron. Internal walls are made of brick (usually 12 cm thick), but relatively lower quality cement concrete is used.

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ILLUSTRATIONS

FIGURE 1:
MODEL OF FLOOD HAZARD MITIGATING ADJUSTMENT
(after Kates, 1971; Mileti, 1980).

FIGURE 2

90° 20′   90° 25′   90° 30′

Tongi Khal (Channel)

Scale:

1   5 km

N

Zia Airport

Tongi

23° 55′

DHAKA WEST

DHAKA EAST

Turag River

Balu River

Gulshan

Demra

23° 45′

Legend:

    Built-up area

    Embankment Site

△ △ Floodplains (Study Area)

DND
Irrigation Project

26°

Bangladesh

Buriganga River
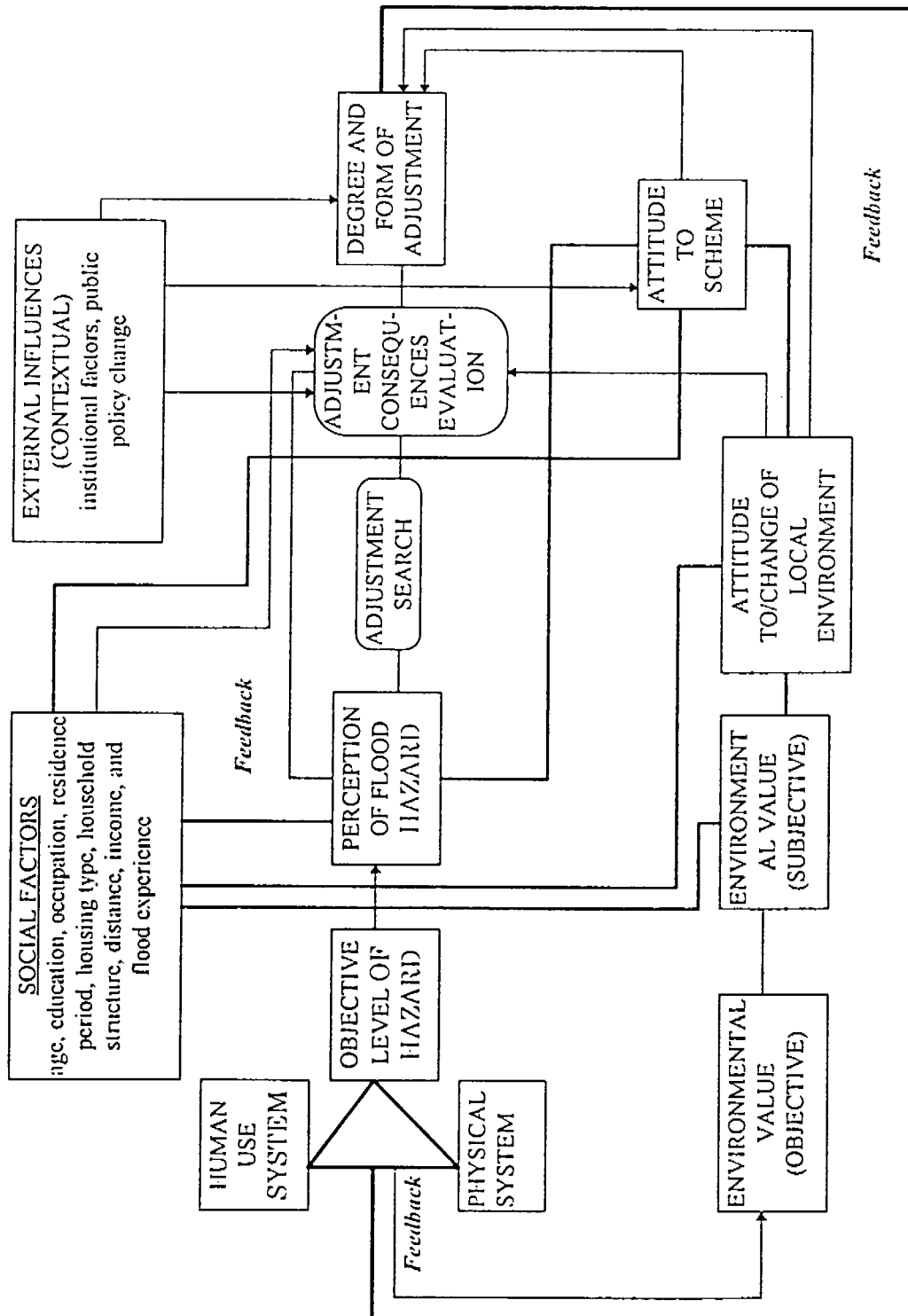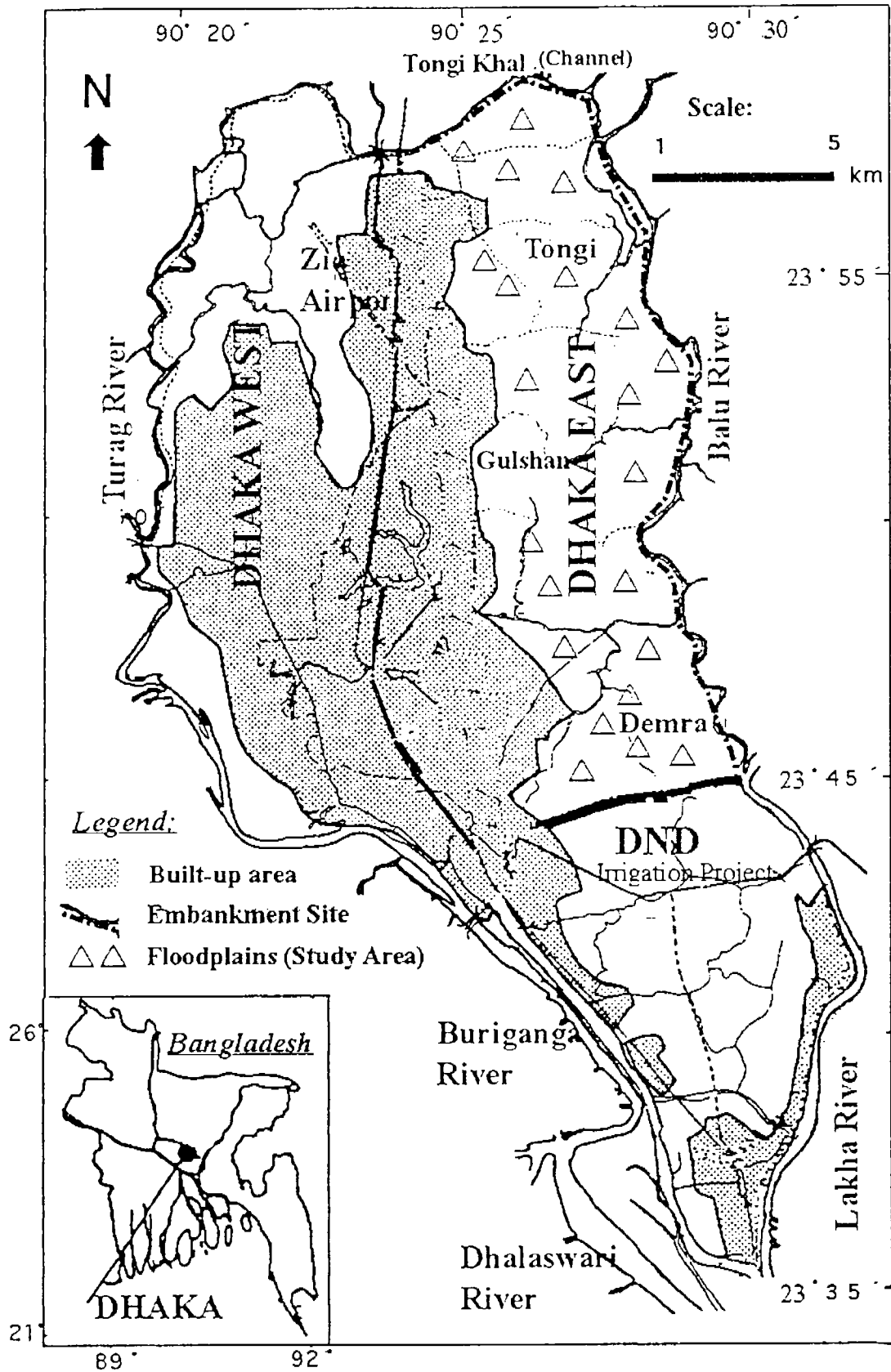
Lakha River

Dhalaswari River

23° 35′

DHAKA

21°

89°   92°

TABLE 1:
APPLICATION OF QUANTIFICATION-II TO THE ANALYSIS OF ASSOCIATIONS BETWEEN SOCIAL FACTORS AND OUTSIDE VARIBLES

Factor[1]	◄— Outside Variables[2] —►								
	FRP*	FFW	FFA	LFF*	PLF*	EV*	ALE*	AEC	FSA*
Age	+	+	+	+	-	+	+	+	+
Range	0.903	0.261	0.648	0.749	0.206	0.786	0.476	1.115	1.468
PC♀	0.145	0.111	0.083	0.194	0.095	0.109	0.085	0.163	0.214
Education	+	+	-	-	-	+	+	+	+
Range	1.482	0.302	0.531	0.320	0.195	0.543	0.518	1.629	1.125
PC♀	0.231	0.115	0.104	0.084	0.070	0.097	0.076	0.101	0.172
Occupation	+	-	+	+	+	-	-	-	+
Range	0.512	0.235	0.481	0.328	0.421	0.736	0.423	0.237	0.417
PC♀	0.104	0.108	0.077	0.097	0.166	0.117	0.089	0.041	0.084
Residence	+	-	+	+	+	+	+	+	-
Range	0.925	0.561	1.038	0.702	0.681	0.815	0.357	0.187	0.614
PC♀	0.163	0.150	0.101	0.169	0.156	0.108	0.051	0.026	0.072
Housing type	+	+	+	+	+	+	+	+	+
Range	0.528	0.209	1.064	0.172	0.426	0.177	0.348	0.392	0.292
PC♀	0.122	0.105	0.195	0.055	0.178	0.276	0.081	0.081	0.059
Structure	-	-	+	+	-	+	-	+	-
Range	0.811	0.098	0.258	0.473	0.325	0.116	0.725	0.920	0.341
PC♀	0.177	0.048	0.040	0.144	0.146	0.035	0.159	0.146	0.072
Distance	-	+	+	+	+	-	+	+	+
Range	0.882	0.510	1.951	0.301	2.410	0.046	1.060	1.916	1.011
PC♀	0.114	0.186	0.303	0.069	0.562	0.021	0.197	0.282	0.164
Income	-	+	-	+	-	+	+	+	-
Range	2.391	0.903	0.572	0.638	0.248	2.402	1.315	1.238	0.125
PC♀	0.305	0.212	0.140	0.101	0.051	0.008	0.184	0.134	0.024
Flood exper.	+	+	+	+	+	+	+	+	+
Range	0.998	2.108	0.343	2.102	1.531	0.231	2.079	1.401	0.223
PC♀	0.154	0.615	0.043	0.446	0.416	0.369	0.337	0.211	0.033
η^2†	0.485	0.764	0.401	0.618	0.705	0.431	0.493	0.450	0.444

Notes :   + : significant order relation, - : no order relation,

*Scale values, ♀PC : Partial correlation, † η^2: Correlation ratio (0 ~ 0.5 : weak, 0.5 ~ 0.8 : moderate, 0.8 ~ 1.0: strong.(Tamio, 1993)).

[1]Social factors were categorized as i) age in years (25-34, 35~54, 55~), ii) education (primary, secondary, university), iii) occupation (farmer, salary man, business), iv) length of residence in years (< 10, 10~19, 20~), v) housing type (*Semipucca, Pucca*), vi) household structure in persons (< 5, 5~8, 9~), vii) distance to embankment in km (< 5, 6~10, 10~), viii) income in Taka (< 2000, 2001~5000, 5001~) (1 US $ = 43.50   Taka), ix) flood experience (not serious, serious).

[2]Outside variables were grouped as   i) FRP: flood risk perception (1 : disagree, 2 : moderate, and 3 : agree), ii) FFW : future flood worry (1 : don't worry, 2: moderately worry, 3 : worry), iii) FFA : future flood awareness (1: yes, 2 : no), iv) LFF : likelihood of future flooding (1: no, 2 : moderately yes, 3: yes), v) PLF : prepared to live with floods (1: yes, 2: no), vi) EV : environmental value (1 : disagree, 2: moderately agree, 3: agree), vii) attitude to local environment (ALE) (1: disadvantage, 2: moderate advantage, 3: advantage), viii) AEC : attitude to environmental change (1: same, 2: changed, 3: significant change), ix) FSA : flood scheme attitudes (1: disagree, 2: agree).

TABLE 2:
APPLICATION OF QUANTIFICATION-II TO THE ANALYSES OF EFFECTS OF HAZARD FACTORS ON SCHEME ATTITUDES

Factor[1]	Category	Frequency	Category weight	Range	Partial correlation
FRP	Disagree	46	0.6650	0.829	0.0752
	Agree	193	-0.1640		
FFW	Don't worry	25	0.571	0.629	0.332
	Worry	235	-0.058		
FFA	Yes	69	-0.2254	0.306	0.0302
	No	185	0.0822		
LFF	No	5	-4.1743	4.265	0.1238
	Yes	255	0.0912		
PLF	Yes	196	-0.3101	1.567	0.1224
	No	47	1.2575		
FSA[2]	Disagree	[3]Mean 1	0.4179	$\eta^2 =$	0.521
	Agree	Mean 2	-0.1210		

[1]Hazard factors were categorized as strongly positive and negative
[2]Outside variable was grouped as disagree and agree
[3]Mean values of Group1 and 2 respectively

TABLE 3:
APPLICATION OF QUANTIFICATION-II TO THE ANALYSES OF EFFECTS OF ENVIRONMENTAL FACTORS ON SCHEME ATTITUDES

Factor[1]	Category	Frequency	Category weight	Range	Partial correlation
ALE	Disadvantage	41	1.3795	1.622	0.1431
	Advantage	226	-0.2426		
AEC	Same	19	2.5535	2.713	0.1611
	Changed	245	-0.1602		
EV	Disagree	3	-1.8333	1.854	0.0442
	Agree	256	0.0216		
FSA[2]	Disagree	[3]Mean 1	0.4685		
	Agree	Mean 2	-0.1325	$\eta^2 =$	0.512

[1]Hazard factors were categorized as strongly positive and negative
[2]Outside variable was grouped as disagree and agree
[3]Mean values of Group1 and 2 respectively

COMPREHENSIVE DISASTER PLANNING FOR EARTHQUAKES

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ABSTRACT

California is not just "Disneyland" - it is also "Disaster land" with earthquakes, tsunamis, floods and fires. California is the largest in population of the 50 states with more than 30 million residents. It also seems to have experienced more disasters than any of the other states in recent years. Because of these numerous disasters, a system of comprehensive disaster planning for earthquakes and other disasters has been developed and implemented in California. "Comprehensive" means disaster preparedness planning by: individuals, families, neighborhoods, schools, cities, counties, the State, Federal agencies, non-governmental collaboratives of community based organizations, businesses and industry. Planning for large earthquakes requires a worst-case scenario with no warning, the chaos of damaged highways, damaged or collapsed buildings, no electricity, no gas, no telephone, no water, and no sewer systems. Fires usually add to the damage.

Pacific Grove is a small city but would serve as a well defined model for comprehensive disaster planning for earthquakes. First, the City has a disaster preparedness education program for individuals and families through local organizations and civic clubs, homeowner associations, local newspapers, and radio and television stations. Second, the local schools have active educational programs for disaster preparedness. The Fire Department has an educational trailer for teaching elementary children, and the Middle School has earth science courses to teach preparedness for earthquakes, oil spills and hurricanes. Third, the Fire Department has a training program for neighborhoods called "Volunteers in Preparedness" which organizes neighborhood emergency response teams including amateur radio operators. Fourth, all city employees are being trained in the State of California's new "Standardized Emergency Management System", adopted in December 1996. This new system is designed to facilitate one city providing mutual aid to another city, and one county providing additional resources to another county, with further

backup from all over the State. Fifth, the Federal Response Plan will marshal the resources of 26 government agencies to help a state in a Presidentially-declared disaster. Sixth, non-governmental community-based organizations will be increasingly important. The American Red Cross not only has its key traditional role in providing mass care and shelter for earthquake victims, but here in California, is also assisting in the formation of collaborative associations of community-based organizations for disaster services. Seventh, California businesses and industries have learned the value of cost-effective business-continuity planning for efficient business recovery the hard way from past earthquakes.

The purpose of this paper is to provide a concise update on these evolutionary and revolutionary disaster management activities in California. There may be lessons learned from past earthquake disasters in California and the resulting development of our comprehensive disaster preparedness planning which might be interesting and appropriate for other cities.

INTRODUCTION

Individuals and Families

California has experienced two earthquakes and a variety of other disasters such as floods and fires during recent years. A system of "comprehensive" disaster planning evolved which starts with individuals. Ideally, individuals should take responsibility for their own mitigation and preparedness. They should consider what is feasible, prudent and cost-effective to do to prepare for disasters. Earthquakes provide a convenient scenario - no warning, damage to highways and buildings, no electricity, no telephone, no gas, no water, no sewer system, etc. Individuals should consider disaster preparations they might do at home, at the office, or en route in a automobile. Next, individuals should consider what disaster preparedness measures would be appropriate for their families. The Disaster Coordinator at the Fire Department gives disaster preparedness talks to local organizations such as the Rotary Club, Lions, Kiwanis, Pacific Grove Chamber of Commerce,

Meals on Wheels, senior citizen groups, mobile home parks, and homeowner associations. Earthquake preparedness is taught at the Pacific Grove Police Department's Citizens' Police Academy. Public education efforts also include articles written for the local newspapers, radio and television public service announcements, and special programs. The Pacific Grove Public Library has free earthquake preparedness literature in English, Spanish, Tagalog, Cambodian, Laotian, Chinese, Hmong, and Japanese.

Schools

The Pacific Grove Fire Department has a comprehensive program for teaching earthquake preparedness and fire safety to elementary school children in the first, second, and third grades. The American Red Cross' Northern California Disaster Preparedness Network gave a grant to the Fire Department to purchase an earthquake and fire safety trailer. This trailer is available for all the fire departments in the tri-county region of Monterey, Santa Cruz and San Benito counties to use at elementary schools. The trailer is actually a two story house built to scale to the height of the average six-year old child. The 1st, 2nd, and 3rd graders are taught how to telephone 911, the basic principles of earthquake preparedness, and how to "duck, cover and hold-on" under a table or desk. With one of the pupils upstairs in bed, the firefighter-instructor releases smoke simulating a fire. This activates a smoke alarm. The child is taught how to crawl, not run, to the bedroom door and how to always touch a door before opening it. The instructor can make the door warm, simulating a fire on the other side, so that the child does not open it, but finds an alternate escape route through a window. The children thus learn fire safety and are given appropriate coloring books and preparedness literature to take home for their parents to read to them.

Children in grades 6-9 in Pacific Grove are able to study disaster preparedness through a program called Event-Based Science. The National Science Foundation funded the Montgomery County (Maryland) Public Schools with a million dollar grant to develop event-based middle school science projects (Wright, 1995). The Exxon Valdez oil spill, the 1989 California Loma Prieta earthquake, and Hurricane Andrew are the focus events for the initial units called Oil Spill!, Earthquake!, and Hurricane! Each unit begins with about ten minutes of CNN news coverage of the disaster and *USA Today* news articles. The students carry out hands-on scientific experiments, complete challenging real-world tasks in cooperative groups with associated English, math, so-

cial study and technology aspects, and prepare comprehensive reports.

Neighbors

The Los Angeles Fire Department, and later the San Francisco Fire Department, decided to approach neighborhood associations to train neighborhood emergency response teams (NERT). The reason is that the Fire, Police and Public Works Departments will probably be overwhelmed in any large scale disaster. There may not be enough fire fighters to try to put out numerous simultaneous fires or rescue disaster victims trapped under earthquake rubble. There are 74 cities in central California now with training programs for neighborhood emergency response teams taught by instructors trained by the San Francisco Fire Department. There are 6000 trained neighborhood emergency response team members in San Francisco organized to report to 11 fire stations. In the city of Pacific Grove, we call our program "Volunteers in Preparedness". The program consists of six classes:

Class 1 Earthquake Preparedness in the Home

Class 2 Utility Control and Hazardous Materials in the Home

Class 3 Disaster Medicine

Class 4 Search and Rescue

Class 5 Volunteer in Preparedness Team Management and Amateur Radio

Class 6 Fire fighting training with fire extinguishers and training in rescue operations

The cost of materials for each student is $30 for a hard hat, identification vest, and firefighting materials. The volunteers use amateur radio operators who live nearby to pass information to the City's emergency operations center. (Coile, 1997)

Cities

In October 1991 there was a disastrous fire in Oakland and Berkeley. This "East Bay Hills" fire caused 25 deaths and 150 injuries. There were 3,354 houses and 456 apartments destroyed. This was the worst urban fire in the history of the United States with an estimated cost of $1.5 billion.

According to the official "lessons-learned" report prepared by the East Bay Hills Fire Operations Review Group, a number of factors contributed to poor performance by the Oakland and Berkeley fire departments. The weather made firefighting almost impossible with high temperatures of 92 degrees Fahrenheit, low relative humidity of 16 percent, and strong winds of 30 knots

gusting to 50 knots. The streets were narrow and clogged with the burned-out hulks of a thousand automobiles.

There were also important organizational problems. The Oakland Fire Department did not use the Incident Command System and had no formal mutual aid agreements. The Fire Department moved its command post to three different locations during the fire, while the Police Department established two different command posts. It was difficult for the Governor to find out who was in charge and what was going on. Furthermore, the Oakland Fire Department had a different size fire hydrant coupling from other California cities so that mutual aid engines from other cities needed to use an adapter which was in short supply. The Oakland Fire Department's budget had been cut so much in the preceding ten years that about 40 % of the personnel had retired without replacement, and there had not been money for wildland fire-training. With little money for modernization, the fire engines had antiquated four-channel radios instead of more modern sixteen-channel radios. This made it difficult to communicate with the 300 mutual aid fire engines which had arrived to try to help.

State Senator Petris, whose home in Oakland had been burned, prepared the draft of Senate Bill 1841 which was approved by the state legislature and signed by the Governor. This law is found in Section 8607 of the Government Code. The intent of the law is to improve the coordination of state and local emergency response in California. The new "Standardized Emergency Management System" (SEMS) was effective December 1, 1996.

SEMS Training

Because this is a new system, a comprehensive training program was developed for all emergency personnel. Four courses were developed by the Governor's Office of Emergency Services and all city, county, and state employees were to get appropriate training.

Basic Components of SEMS

The new Standardized Emergency Management System was based on improvements to existing systems and some new concepts. These components are:

- The Incident Command System (ICS) - The ICS as developed by FIRESCOPE will be used at the field level by all responders.

- Multi-Agency Coordination - Multi-agency coordination is the coordination among different agencies within a jurisdiction, such as Fire and Police. Inter-agency coordination takes place between different levels, such as city police, county deputy

sheriffs, state police and California Highway Patrol officers.

- A Master Mutual Aid Agreement - State, counties and cities originally signed a master agreement in 1950. This has been further developed to cover fire, law enforcement, coroner, emergency medical and search and rescue systems.

- Operational Areas - An operational area consists of a county and all political subdivisions within that county's area.

- The Operational Area Satellite Information System (OASIS) - A satellite communications system with a high frequency radio backup installed at each of the 58 counties, the regions, and the State.

Counties

California is divided into 58 counties and each county with all of its cities and special districts became an operational area for disaster purposes on 1 December 1996. SEMS organizes mutual aid so that one county may provide a city in distress with mutual resources from other cities.

State

The Governor's Office of Emergency Services at the State level established three Regional offices for disaster administration. The Coastal Region emergency operations center in Oakland can request resources from other counties to help the counties surrounding Pacific Grove.

Federal Government

The Federal government has a Federal Response Plan to coordinate the disaster activities of 26 agencies. The Federal Emergency Management Agency (FEMA) is in charge of these efforts and will coordinate federal assistance with the State.

Non-governmental community-based organizations

The American Red Cross provides mass care and shelter to disaster victims and Red Cross volunteers have raised money to pay for providing temporary shelter, meals, clothing, and essentials to earthquake victims to help them recover from disasters. Now, the local Red Cross chapters in California have been given grants to help organize the numerous non-profit organizations such as food banks into community collaborative associations for coordination of disaster activities. There are more than 400 such non-governmental organizations in Monterey County. The Red Cross chapters are assisting them in writing disaster plans and preparing for collaborative activities.

Business and Industry

Cost-effective and prudent disaster preparedness mitigation activities are underway in many businesses and industrial organizations. What started with an emphasis on contingency planning for computerized accounting systems by off-site storage of backup computer files has blossomed into thorough business recovery disaster planning.

Training

The State of California has an annual statewide earthquake exercise scheduled for the first Tuesday of April each year. For example, the announcement for the 1997 exercise in the City of Pacific Grove was as follows:

STATEWIDE EARTHQUAKE EXERCISE, 10:30 A.M., APRIL 1, 1997

1. The City of Pacific Grove will participate in the State of California's earthquake exercise scheduled for Tuesday, April 1, 1997. The City's emergency operations center will be activated at 10:00 a.m. at the Community Center, 515 Junipero Avenue.

2. The exercise will proceed in the context of a "BIG" earthquake. It will be assumed that the following conditions will prevail after 10:30 a.m.:

> No electrical power
>
> No gas
>
> No telephone service and cellular service is overloaded
>
> Water pipes broken
>
> Sewer pipes broken

Earthquake damage to local highways, to bridges over the Salinas River, and to overpasses and underpasses on Routes #1 and #68 has resulted in access problems. Earthquake damage to PG&E power generating stations at Moss Landing and other locations, and to switching facilities and transmission lines has resulted in a lack of electrical power for Pacific Grove (scenario assumption - loss of power for one week.) Earthquake damage to telephone switching facilities and telephone lines has resulted in an initial lack of regular telephone service. (scenario assumption - no telephone service of any kind for one week). Earthquake damage to water, sewer, and gas pipe lines has been widespread in Pacific Grove (scenario assumption - no resumption of services for two weeks). Earthquake damage to unreinforced masonry structures has been extensive. Earthquake damage to housing has resulted in approximately 17% (Kobe, Japan experience) of the population of Pacific Grove displaced from their homes and 10% of these requiring temporary shelter and feeding, (scenario assumption - Residents needing shelter 274). Earthquake damage has resulted in 0.35% of the population (Kobe experience) in Pacific Grove dead, and 2.34% injured (Kobe experience), requiring first aid and/or hospitalization, (scenario assumption - Dead: 57, Injured: 377).

3. Preliminary planning for the exercise includes the following events:

- 10:00 a.m. Activation of the City's emergency operations center at the Community Center, 515 Junipero Avenue, based upon an earthquake prediction message received from the State OES.

- 10:30 a.m. Earthquake !

- The City of Pacific Grove's Damage Assessment Team may be activated under the direction of the Chief Building Inspector and begin damage assessment surveys.

- The following organizations may conduct an earthquake evacuation exercise after the 10:30 a.m. earthquake:

    Hopkins Marine Station, Stanford University

    Monarch Pines Homeowners Association

- The Monterey County Chapter American Red Cross in Salinas will send a shelter management team and an emergency response vehicle (complete with amateur radio station) to Pacific Grove. The team has a Red Cross trailer which contains cots, blankets and comfort kits. Monterey County Red Cross may need to request mutual aid assistance from the cluster of nearby Red Cross chapters, such as Carmel-by-the-Sea and Santa Cruz.

- The Monterey Bay Search Dogs, Inc. will be requested to provide urban rescue search dogs to find survivors buried alive in (pretend) earthquake rubble of collapsed buildings. The search operation will be conducted at the City's Corporation Yard, 2100 Sunset Drive at 11:00 am

- Radio station KOCN will set up a portable remote facility at the emergency operations center so that the Mayor and City Council members can make live broadcasts to residents of Pacific Grove.

- Pacific Grove amateur radio operators will set up amateur radio stations at the emergency operations center, at evacuation sites, at the search dog operation site, at Community Hospital, and

at Red Cross shelters.

- The Salvation Army will activate its headquarters amateur radio station in Seaside and send its emergency canteen vehicle to Pacific Grove to provide coffee and lunch to disaster workers at the emergency operations center.

- Troop 90, Pacific Grove Boy Scouts will provide scouts for duty as pages at the EOC to deliver messages, run errands, escort visitors and assist with security.

- The Volunteers in Preparedness (VIP) neighborhood emergency response teams who are registered disaster service workers will be activated in their respective neighborhoods. These teams, assisted by assigned Boy Scouts and amateur radio operators, will collect preliminary damage information in their neighborhoods and report by amateur radio to the EOC. The VIP teams will conduct search and rescue operations in their neighborhoods as well as provide emergency utility control, disaster medical attention, and assistance to earthquake victims.

CONCLUSION

The State Geologist has estimated a 67% probability that a large earthquake of the magnitude that damaged San Francisco in 1906 will occur in California within the next 30 years. Many residents take this prediction seriously and have undertaken prudent disaster preparedness activities. In our small city, a comprehensive program has been adopted. Children are shown the basics of earthquake preparedness and hopefully carry the messages back home to their parents. Middle school students are old enough to carry out student projects and learn important facts for themselves. The Volunteers in Preparedness training program for adults and high school students teaches them fire fighting and rescue techniques. Residents learn how to organize their neighborhoods and work with the amateur radio operators who live nearby.

These evolutionary and revolutionary developments in California are based on honest efforts to remedy shortcomings in mitigation, preparedness, response and recovery revealed in past earthquakes, fires and floods. The State of California has used the introduction in 1996 of the new Standardized Emergency Management System to emphasize the importance of disaster preparedness, planning, and training for all state, county, and city employees

REFERENCES AND NOTES:

Wright, Russell G. (1995). Event-Based Science -Earthquake! ISBN 0 201 490900 Student Edition, ISBN 0 201 494 159 Teacher's Guide. (Other units in this series include: Oil Spill!; Hurricane!; Asteroid!; Toxic Leak!; Flood!; Volcano!; and Tornado!) Scott Foresman - Addison Wesley Publishing Company, 1 Jacob Way, Reading, Massachusetts 01867 (800) 552-2259, fax (800) 333-3328 (http://www.awl.com)

San Francisco Fire Department, Neighborhood Emergency Response Team Training Office, 260 Golden Gate Avenue, San Francisco, CA 94102-3706 (415) 558-3456 fax (415) 928-3130

Nert Student Manual and other information. (http://www.slip.net/~nertsffd/)

American Red Cross earthquake preparedness literature at local Red Cross Chapters: Are you ready for an earthquake, ARC 4455; Your family disaster plan, ARC 4466; Emergency Preparedness Checklist, ARC 4471; Your Family disaster supplies kit, ARC 4463; Emergency Management Guide for Business and Industry, ARC 5025 (http://www.redcross.org)

Earthquakes: a Survival Guide for Seniors. California Governor's Office of Emergency Services (OES), Coastal Region Earthquake Program, 1300 Clay Street, Suite 400, Oakland, CA 94602, (510) 286-0895 (http://www.oes.ca.gov)

FEMA Publications Catalog, FEMA-20. Federal Emergency Management Agency, P.O.Box 70274, Washington, DC 20024 (http://www.fema.gov)

Coile, Russell C. (1997). The Role of Amateur Radio in Providing Emergency Electronic Communication for Disaster Management. Disaster Prevention and Management, Vol. 6, No. 3 (http://www.sp.nps.navy.mil/npsarc/k6ly.html)

Amateur Radio Emergency Service - information (http://www.arrl.org)

Emergency management information (http://www.disasters.org/emgold)

Standardized Emergency Management System (SEMS) Regulations. Chapter 1, Division 2, Title 19 California Code of Regulations, Government Code Section 8607 (a)

THE ATLANTA-FULTON COUNTY EMERGENCY MANAGEMENT AGENCY'S AUTOMATED DATA COLLECTION SYSTEM

A System Developed By:

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One of the many "challenges" faced by the Atlanta-Fulton County Emergency Management Agency for the 1996 Summer Olympic Games was to develop a system that would collect information, twice a day, on the availability of beds from the 40 hospitals in the Atlanta metropolitan area that participate in the National Disaster Medical System. During a mass casualty incident, emergency medical and fire personnel, as well as hospital coordinators, could then have this information on-hand to quickly determine which hospitals would handle specific types of cases.

The Emergency Management Agency is a long-time user of the PhoneMaster 2000 (PM2000) system developed by US Telecom International, Incorporated. This system, used for many years, delivers emergency telephone notifications to selected city and county department personnel and provides voice bulletin-board type information to the public. The system configuration consists of eight telephone lines connected to expansion cards supplied by US Telecom and installed in a dedicated 486 class PC with 16 meg of RAM.

After discussing our requirements for a data collection system with the US Telecom staff, they suggested we develop a system around their File-Based Interactive Voice Response (IVR) Module that would meet our needs while also beta testing their new faxback module. The File-Based IVR Module enables the PM2000 to write and transfer ASCII data files between connected parties. Callers use their telephones as input/output "terminals". The dialog which prompts the caller for information is controlled by predefined "scripts" developed by the end user. These scripts match the format of the data files they support. The scripts also define the fielding used to retrieve or insert data. With the scripts editor an end user can easily create or edit a script. The editor takes an end user through the process, line-by-line, helping them enter the required in-

formation. The PM2000 executes the text scripts, outputting data from the file and writing the results of any collected data to a response file. No special programming skills are required.

Twice a day, at 0600 and 1800 hrs., during the 17 days of the Olympics, each of the 40 hospitals telephoned into the PM2000 system to enter their unique identification number and bed availability for each of ten categories. At 0800 and 2000 hrs., each day a compiled report, created by the PM2000, was ready for distribution by fax-on-demand to any agency needing the information (Attachments 1 & 2). For security reasons the caller requesting the hospital report had to enter a unique password to retrieve the document.

Within moments of the explosion that rocked Centennial Park the morning of the 7th day of the Olympics, the PM2000 was telephoning area hospitals to advise them of the situation and to warn them to expect patients. Two hours following the incident, when all patients had been evacuated from the scene, the PM2000 was again activated to telephone area hospitals and advise them that the incident was over and to request that the hospitals report the number of casualties they saw, or were seeing, from the incident via the automated reporting system. It is important to note that whenever you have a major incident involving multiple casualties and the Triage and Transportation Officers on the scene advise that patients were only sent to two area hospitals, you can bet that additional hospitals saw, or will see, victims from the incident. If it is your job to know the status of who was seen at what hospitals you had better contact *all* the hospitals that *may* have seen people from the incident.

Following the Olympics, when everyone else was relaxing on the beach sipping margaritas, Emergency Management was again called to provide its "unique services" to the community. The Georgia Mutual Aid

Group, composed of some 14 metro area fire departments was interested in using our data collection system to compile a daily report of fire equipment available from metro departments to respond under a mutual aid agreement. Jim Cook created a script to not only accept the exact data needed by the Georgia Mutual Aid Group from each of the 26 Mutual Aid Resource Units but also added a new capability which would automatically fax the report created by the system to those same 14 departments each day at 1000 hrs (Attachment 3.) He also wrote a script to automatically reset the report at 0200 hrs. each day making the system *totally* automatic and not requiring daily operator interaction.

ATTACHMENTS

Attachment 1 - Example of Automated Hospital Bed Report

Attachment 2 - Operational Instructions

Attachment 3 - Example of Fire Service Daily Report

Attachment 4 - Vendor Information

ATTACHMENT 1

To: ATLANTA EOC USER   From: ATLANTA EOC   10-24-96 12:08 p. 1 of 1

ATLANTA-FULTON COUNTY EMERGENCY MANAGEMENT AGENCY
AND
V.A. MEDICAL CENTER - ATLANTA

OLYMPIC BED REPORT

HOSP	DATE	TIME	ADLT	PSY	OB	PEDS	ICUA	ICUP	TELE	OTH	TOT	ED
24	08-05-19	05:26:56	3	8	1	1	3	0	3	0	19	2
14	08-05-19	06:23:02	47	4	20	12	21	0	26	0	130	2
17	08-05-19	06:46:03	18	0	10	10	2	0	4	0	44	2

ATTACHMENT 2

To: ATLANTA EOC USER   From: ATLANTA EOC   10-24-96 13:02 p. 1 of 1

INSTRUCTIONS FOR USING THE ATLANTA-FULTON COUNTY
EMERGENCY MANAGEMENT AGENCY
HOSPITAL BED REPORTING SYSTEM

1.   Phone into the PM2000 system by dialing (???) ???-????.

2.   At the "Enter your selection." prompt, select 6.

3.   Answer each of the questions with the appropriate information, following
      each entry with the pound (#) button.

TO REQUEST A REPORT BY FAX

1.   Phone into the PM2000 system by dialing (???) ???-????.

2.   At the "Enter your selection" prompt, select 7

3.   At the opening menu, touch 2 to request a document.

      Available documents:

            1000   Bed availability report
            1001   Instruction for Bed Availability (this document)

4.   Follow each document with the pound (#) key.

5.   When finished selecting documents, touch 3 to submit the order.

6.   The system will prompt you for your name.

7.   Press the # key to skip the name input.

8.   The system will prompt for your fax number.

9.   Enter your fax number, including the area code if outside of 404.
      Do not enter a "1" if dialing long distance. The "1" will be entered
      for you by the computer.

10.   After entering the above information, the documents you ordered will be
      faxed.

NOTE: The Bed Availability Report is printed with the most recent entries
      towards the END of the report.

ATTACHMENT 3

GMAG AUTOMATED OPERATIONAL PLANNING REPORT

Explanation of Codes

MADO=Mutual Aid Duty Officer   MARU=Mutual Aid Resource Unit

M STAT = Mutual Aid Status
=========================
5=Available - All MARU's available for assignment (100%)
4=Available for Branch assignment only (100%)
3=Limited - 60-99% of MARU's available
2=Assigned - MARU on assignment
1=Not Available - Less then 60% of MARU's available

O STAT = OPCON
==============
5=Normal (Green)
4=Advisory (Blue)
3=Watch (Yellow)
2=Alert (Orange)
1=Warning (Red)

Resource Types
==============

1 = Engines	2 = Truck Company	3 = Water Tender	4 = Brush Patrol
5 = Rescue Medical	8 = Hand Crew	9 = Air Crash	11 = Foam/Carrier
17 = Breathing Apparatus	18 = Communications	30 = HazMat	99 = Overhead

GEMAG AUTOMATED OPERATIONAL PLANNING REPORT

Date	Time	Agency I.D.	MADO Telephone#	MADO Pager#	M STAT	O	Resources by Type 1	2	3	4	5	8	9	11	17	18	30	99
10-24-19	08:20:58	32012201	7707855918	4046553854	5	5	1	0	1	1	1	0	0	0	0	0	0	0
10-24-19	08:28:00	17503303	7705280709	7705280747	5	5	2	1	0	0	1	0	0	0	10	1	0	3
10-24-19	08:30:00	17503304	7704346667	7703793786	5	5	1	1	0	0	1	0	0	0	5	0	0	2
10-24-19	08:32:00	17503301	7705288000	7704222121	4	4	1	1	0	0	1	0	0	0	8	0	2	4
10-24-19	08:34:00	17503305	7709194840	7703793786	5	3	1	0	0	0	1	0	0	0	6	1	1	1

ATTACHMENT 4

The PhoneMaster 2000 sub-system, consisting of expansion boards and software, presented in this paper was purchased from:

U.S. Telecom International, Incorporated

P.O. Box 1905

Joplin, MO 64802

1-800-835-7788

MENTAL HEALTH DISASTER COPING TECHNIQUES FROM THE KHOBAR TOWERS, DHAHRAN BOMBING INCIDENT

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Overview In June 1996, in Dhahran, Saudi Arabia, 19 American airmen, including two U. S. Air Force captains, were killed in a terrorist bombing on their barracks in Khobar Towers. The bodies of all 19 airmen were brought to Dover Air Force Base in Delaware for identification, processing of remains, and return to their families and loved ones. The author participated for four days in the incident, stateside at the Dover Air Base Port Mortuary.

A mass fatalities incident is any situation where there are more bodies, and/or victims' next of kin, that can be handled with local resources. The severity or scope of the incident is not as important as the community's resources to handle all aspects of the situation—including the ability of responders to effectively ward off the stressors of disaster work and complete their assignments in an effective manner. What happens in a mass fatalities incident is known, and has been researched, perhaps moreso that with other declared disasters. What is known, however, is that large scale disasters generate critical incident stress — impacting emergency responders. Such events, including mass fatalities incidents leave life changed. They are impersonal. They cause a crisis that creates a need for teamwork. In every community or jurisdiction, these events — Multiple Victim Incidents, Critical Incidents, or Mass Fatalities Incidents—are inevitable.

Disaster Responders: A Need To Be Prepared It is important for responders to understand the dynamics of the incident to which they will be exposed. One's own reactions to earlier life experiences — including perceptions of victims, trauma, or even death — are factors in the reaction to a disaster or Multiple Victim Incident. Likewise, the things one has heard, read or viewed in the media about critical incidents or mass fatality incidents are factors in reactions that a responder will have.

Disaster Stress

Stress is a natural reaction to a critical incident. Stress or grief happens in disaster work. Stress can cause ineffective work during disaster response or response to

Multiple Victim Incidents. Stress reactions are natural reactions in which one's mind and body protect themselves from overload. It is crucial to pay attention to these reactions in yourself and your co-workers. Planning to handle stress, proactively — and in a pre-planned, methodical way before an incident will lessen the impact of disaster stress. Perhaps,most importantly, one's attitude about death will partly determine how one responds to a mass fatalities incident or disaster that involves multiple victims.

Grady Bray, an authority on mass fatality stress— in writing about the effects of mass fatality stress on funeral service workers who respond to emergencies—has noted that "for half these workers, the most significant problems emerged in the first month after their on scene response with recurring thoughts, dreams and or flashbacks about the event" . It is important to note that Bray references professionals who are trained to work with (and deal with) catastrophe and death on an everyday basis. Bray has further noted "the potential for psychological trauma is greatly increased when disaster responders encounter critical situations for which they have been poorly prepared."

Len Murray, a FEMA mass fatalities instructor (and a fire chief— and also with funeral home experience) has written that in disasters, response personnel may have to act in varying roles and capacities, some of which they are unsuited for. It is the role of the incident commander to determine which responders are fit for this type of duty assignment.

Dead Bodies and Disaster Stress: Lessons The sudden appearance of numerous dead bodies is, indeed, a feature of manydeclared disasters. For one non-U.S. example, albeit in the extreme, in the earthquake that devastated Tangshan China in 1976, official documents were leaked indicating at least 655,000 killed. Researchers have indeed looked into mass disasters, and death— and their impacts, in a scientific manner. Vanderly Pine, a sociologist and licensed funeral director, wrote (in "Responding to Disaster", 1974) about the social con-

text of disasters and pointed to the significant differences between responding to "natural individual deaths" and "unnatural collective deaths" resulting from disasters.

The use of coping strategies or "Disaster Mental Health Techniques for Emergency Responders", is important for the maintenance of clear thinking, rational decision-making, and effective performance during a disaster or a mass fatalities incident. The techniques and strategies for what could be referred to as "preventive, proactive mental health insulation" could, however, be used for deployments to activity other than a critical incident — such as an activation to an EOC for a week or more, or an assignment to a disaster field office for a prolonged period. Based upon the practical application of research— and based upon first hand experience with the Dhahran Khobar Towers, Saudi Arabia bombing, working stateside at the Dover Air Base Mortuary, in June, 1996, it may be concluded that there is reasonable anecdotal evidence that a well-planned and thought-out-in-advance repertoire of preventive disaster mental health techniques is indeed very effective in minimizing the impact of disaster stress and maximizing performance on- scene.

Mental health coping techniques, based essentially upon the work of Diane Myers, R.N. M.S.N.; Myers' work with Leonard M. Zunin, M.D.; and the work of Jeffrey T. Mitchell, Ph.D.— coupled with this author's own observations and application (—as a responder to one moderately long-duration critical incident as a body handler and disaster mortuary worker, and for two deployments during declared disasters) would be what sociologists refer to as "modes of individual adjustment".

An effective "mode of individual adjustment" is essential for all those responding to disaster situations, and particularly for key decision makers — those involved with any facet of incident command.

A Few Anecdotal Items From the Dover Port Mortuary: June, 1996 This author's approach to deployment to assist with body handling and mortuary service at Dover AFB during the stateside response to the Khobar Towers bombing was both deliberate and methodical. The following summarizes just a few of a series of many techniques and strategies used during this deployment, and others. Care and time were taken to develop and assemble — in a somewhat short time frame — what could be best described as a "disaster mental health 'go-kit' ": Children's art work , it appears, is particularly useful. The levity and whimsy of pictures, cartoons and

drawings by children may serve as a sharp contrast to the often grim reality of on-scene disaster response. Displaying (or keeping handy) photos of loved ones and children is, perhaps, an essential activity — as a reminder of the world (and feelings) beyond the disaster scene that a responder may be tied to for days —if not weeks. Familiar objects from one's residence, likewise, preferably those which are family related or connected to children or loved ones, are useful as well. Exercise, particularly vigorous and sweat- inducing exercise, appears to be significantly important on a daily basis — as well as a planned pattern for re- hydration (perhaps even in excess) to flush or otherwise impact the accumulation of stressor chemicals that the body produces. Comfortable clothing, familiar (or favorite) clothing, loose fitting clothing, and also comfortable footwear add a significant "comfort dimension" to one's daily routine. In addition, it is possible that newly purchased clothing that is both comfortable and "fresh out of the wrapper" may be of use also as both a novelty as well as a comfort item. In the existing literature on disaster mental health and stress, Myers and Zunin describe a series of stress reducing stretching exercises and other stress reduction physical activities as being valuable with disaster response workers deployed in California— as well as myriad other techniques.Myers' work is most of the existing body of knowledge on this subject, to-date. Dr. Robert Ursano suggests that identification and feelings of knowing the victims or deceased of an event are tend to heighten the trauma of a disaster experience. Whether certain individuals are more prone to this perceptual style or whether it represents a basic biologic mechanism that all individuals activate to a various degree, appears unknown. What is known is that, identification or emotional involvement with the deceased of any type of event produces a high degree of distress. Ways of decreasing identification and emotional involvement may be effective preventive measures for those who must be exposed to this traumatic stressor. One way may be to impose a "media blackout" on oneself during the response phase — literally bypassing television, newspaper, and radio accounts of the incident one is responding to. Beyond the essential functions of public information officer and incident commander— the value of media portrayals of the event one is working (and the accompanying "media details") is questionable, if not distracting, for responders during a critical incident or disaster.

One can perhaps conclude that each responder's proactive intervention and techniques may work best if they are "customized" and based upon individual prefer-

ences and likes. Search and rescue workers, for example, who diligently and heroically worked at the Murrah Federal Building in Oklahoma City have attested (anecdotally) to the value — as well— of back massage as a stress reduction mechanism.

Lastly, upon demobilization and return home, feedback from youngsters and children appears to be of significant value. Within limits— and of course within the confines and boundaries of individual "family etiquette" and norms— discussion of one's role, activities, and subsequent feedback through the naive eyes of innocents such as children and teenagers may be an important activity as a responder returns home from an event and reunites with the everyday world.

There is plentiful research on mass fatalities incident management— and much of it is conveyed to emergency managers via Federal and local training courses in planning and response for this type of critical incident. The research on the impacts of mass deaths is more limited, however. Quarantelli and Hershiser's work and another study by D.L. Jones, indicate that "despite the widespread acceptance of exposure to dead bodies as one of the major stressors in disasters, few data are available on the psychiatric effects of exposure to dead bodies and body parts". We know subjectively what the effects of mass disaster may potentially be on responders— but not all of what we know (anecdotally) or expect has been proven by research.

Major traumas and emergency situations are, often, an opportunity for responders to relieve stress through action— particularly for uniformed services personnel, according to Dr. Paul D. Fisher, who has written on stress in law enforcement. In law enforcement, for example, many who chose this profession are often "individuals who prefer to deal with stress with action rather than with deliberation", according to Fisher. Perhaps this propensity that some of our co-workers in the uniformed services have for action (rather than deliberation) could be valuable as a model or lesson for those of us not in the uniformed services— but who respond to and work in stressful environments such as disaster management. We can take action— direct action — to provide for our own mental, as well as physical, well being when deployed.

There are many findings published in professional journals and elsewhere related to research on a proactive and prophylactic approach to mental health for disaster responders— particularly for critical incident stress and multi- victim fatalities. Much of it can be used — pre-deployment, on-scene, and post deployment- -

to insure that responders can return from an incident with minimum disaster stress and be able to quickly reunite with family and community in a healthy way.

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THE PROFESSION, ITS STRENGTHS AND RESPONSIBILITIES

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Disaster management and emergency planning, in the wider sense, are still in their infancy in the United Kingdom. They are viewed in many academic establishments as not demanding great intellectual endeavour. Several university departments which deal with disaster management were only established following a local tragedy and depend for their survival upon the reputation, or even the personality, of an individual head of department or researcher. This person is then often required to expend his or her energy upon fund raising or gaining respectability rather than upon that for which they are more qualified, ie. further academic investigation of emergency management issues.

The subject is not seen as one which is deeply and rigorously investigated nor as one from which major truths emanate. Therein lies the difficulty, as there are no absolute values or laws of behaviour in disaster management, and this will often confound colleagues from other disciplines.

But there are incisive observations, sound judgement, hypotheses, recommendations and an extensive body of knowledge.

It is true, however, that the body of knowledge concerning factors such as levels of toxicity and radiation, safe practice and emergency procedures, is based upon information gleaned, for the most part, from accidents and hence, as a consequence, the recommendations made by emergency management practitioners, are usually based upon data which is event-specific. In other words, such recommendations are often based upon opinions, judgements, observations and reports of specific events in specific places.

The lessons learnt from an incident and the subsequent recommendations, it could be argued, fit in with the philosophy of determinism insofar as they would only apply if the same thing happened in the same place, at the same time, under the same set of circumstances and following the same series of events.

Just after 0800 hours on Monday, December 12, 1988, a passenger train from Poole (on the south coast of England) collided with the rear of a stationary passenger train on the same line. Both trains were crowded with commuters on their way to Waterloo Station in London. The collision resulted in the Poole train striking a third, but empty, train going in the opposite direction on the adjacent track.

The police force, ambulance service and fire brigade combined with the local authority and voluntary organisations, to bring about an effective rescue of the survivors and an efficient recovery of bodies of those who had died. However, an officer, who was involved in this operation, recently commented upon the way in which the location, the ease of access and the weather favoured the rescue work [1]. We must assume, therefore, that we can only extrapolate on the lessons learned from this incident in order to determine the effect of a different location, limited access and poor weather conditions upon a similar incident and then make recommendations based upon our judgements.

Unlike researchers and academics in other disciplines, we are not in a position to carry out real-life experiments, in order to study the effect of all possible variables. We can only wait for a disaster to happen and then make recommendations which would minimise the effect of any repeat of the incident under different conditions.

Consider the situation in which we had, at least, six days notice of an impending disaster. In other words, enough time for us to move in cameras and recorders as well as instruments for measuring structural vibration, blast, temperature, radiation, wind speed, water flow, gas levels, weather conditions etc. Given that warning period, however, we should not be observing a disaster as we should also have had time to evacuate people, dig trenches, build barrages, bring in earth moving equipment and emergency personnel, shore-up buildings, create fire breaks etc.

By properly performing our job we would not have a disaster but a major emergency whose effects would be mitigated by our planning. Disasters are events for which there are no plans because of the scale, nature, location, timing and probability of the events or because of the way in which they developed. Disasters do not

occur if the event is covered by our plans. Such incidents are major emergencies.

Our observations and judgements combined with our experience and accumulated knowledge may lessen the number of disasters by more accurately taking account of scale, nature, location, timing, etc., thereby reducing them to major emergencies which will be more ably dealt with by our constantly improving planning. And that is the strength of the profession of disaster and emergency management.

In applying the solutions dictated by our planning, we must never lose sight of the other causes of disaster which might demand alternative avoidance mechanisms. We often refer to 'natural' disasters and we lay the blame for such events at God's door, or we cite the precociousness of Mother Nature. But are we always correct in doing this?

There is a need to highlight the short-sightedness of such a view and point out the limitations and actual error of a blanket application of the term 'natural disaster'. Such incidents would be more accurately described as natural phenomena which take place in areas where people are forced to live under conditions dictated by the prevailing social, political, or economic circumstances of the region rather than by any personal choice.

Comparisons must be made, and conclusions drawn, concerning the relative effects of earthquakes and cyclones, for example, of the same intensity but occurring in areas of the world which have widely varying socio-economic groupings. Dwell for a moment on the relative effects of similar earthquakes occuring in the San Francisco Bay Area and in Armenia and the relative effects of similar cyclones in the West Indies and in Darwin, Australia.

The economic situation, and subsequent freedom of choice, of the people living on the mud slopes outside of Rio de Janiero and of the people who live on the flood-prone plains of Bangladesh must also be considered.

As a profession, we must never lose sight of these issues. We should never subscribe only to the application of technical solutions. We also need to be aware of the social and humanitarian responsibilities of our findings and publicise them. Remember we are the experts and should speak out on these issues.

We must also be aware of, and constantly publicise, the long term aspects of disaster. The suffering does not end when the media and the cameras go away. The victims and the bereaved of Bhopal and Chernobyl are still coping with disability and pain while the sorrow due to a missing generation in Aberfan (a Welsh village in which the waste-tip of a local coal mine moved and engulfed a local primary school killing 116 children aged between 5 and 10 years and 28 adults) remains ever-present. No immediate deaths were attributed to the floods of Towyn, a small town in North Wales in which the sea-wall was breached, but were there no premature deaths due to the effects of the trauma on a population with a large percentage of aged residents? And what of the long term effects on young people whose studies were disrupted by the subsequent destruction and evacuation or the damage done to people who were unable to make career moves because of the difficulties in selling properties which had been submerged in polluted waters?

We have come a long way from the days when the sum total of emergency preparedness consisted of painting windows white to reflect the heat of a nuclear explosion and of using mice and canaries to detect dangerous levels of toxic fumes. But we still have a long way to go in terms of improving others' perception of our work and in terms of becoming a profession prepared to comment forcibly on the political and economic factors contributing to disasters and on the ongoing responsibilities of society for the victims of disasters. Only when we make such stands will we be seen as a professional body with recommendations and views that should be respected rather than mere practitioners slavishly following layed down plans and procedures.

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MUTUAL AID: NOT JUST ANY DUCK WILL DO

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PREFACE

Although the development of mutual aid agreements in the fire service is the focus of this material, the same rationale is applicable in the preplanning of mutual aid for medical emergencies and hazardous materials incidents.

MUTUAL AID : NOT JUST ANY DUCK WILL DO

The fallacy of composition, or the fact that what is true of the whole is not necessarily true of the parts, is a very serious pitfall to be avoided by emergency managers when arranging mutual aid agreements. The general capabilities of one department or response organization may be almost equal to that of other departments or response organizations. However, the capabilities of an engine company, special response unit, or medical unit from one jurisdiction (even one district within a jurisdiction) compared to the same type of unit from another jurisdiction cannot be assumed to be the same. One may find differences in their onboard equipment, communications gear, capacity, and/or training of their crew.

The adage, "If it looks like a duck and sounds like a duck it must be a duck," does not apply to emergency response equipment. This is especially true regarding mutual aid response agreements which cover an area that includes occupancies (1) storing or using toxic or hazardous materials or (2) involved in the storage, treatment, or disposal of hazardous wastes.

The varied capability of community emergency management systems is not unlike that of the damage control systems of a naval task force at sea. Each element of the task force operates routinely in close relative proximity to the other elements. Each element, like neighboring cities in a metropolitan area, maintains a response capability tailored to its specific needs.

The oilers in the naval task force are provided with equipment and trained crews to handle petroleum fires, spills, and associated injuries. The industrial neighborhood first-in emergency response units are prepared to deal with the hazards of the resident industries of their district. However, the crew of the oiler is no better equipped or trained to handle an emergency on an aircraft carrier flight deck than is the industrial area emergency response crew prepared to be first-in to a high-rise apartment fire.

Many firefighters can relate to stories in which the mutual aid units arrive in the nick of time to prevent a real worker from really spoiling their day. Unfortunately, many can also relate to stories in which arriving mutual aid units were not equipped with hard suction hose and unable to draft water, or that their hand-me-down hose from the navy had the wrong thread. Other stories involve the mutual aid response of a cascade unit incompatible with the self-contained breathing apparatus cylinders to be refilled, or the inappropriate response to an alarm from a multi-story building by a brush truck with a two-person crew without structural firefighting personal protective equipment or training.

Local emergency planners must, therefore, be aware of the ramifications of the fallacy of composition when developing mutual aid response agreements. To be sure that a mutual aid response folds into that of the protecting agency as seamlessly as possible, in-depth preplanning is absolutely necessary. The primary planning tool should be the product of an objective and practical hazards survey program. Such a program coupled with a built-in iterative "what-if" process will enable planners to more accurately and definitively identify exposure/response requirements. The resultant assessment will provide the technical basis for a mutual aid agreement.

Using this structured survey program will not only identify exposures requiring mutual aid consideration, but also identify specific aid requirements. The "what-if" review process irons out the kinks and allows elimination of any possible difficulties in the planning phase rather than during response operations.

The extent of the hazards survey should correspond to (1) the type and scope of hazards present in the district and (2) the potential consequence of accidents or events associated with or involving these hazards. This

process will also identify constraining interlocks due to possible jurisdiction commitments; i.e., the possibility of a special unit assigned on paper for a mutual aid run being already committed to a response within its own district. Using such default assumptions that maximize the potential incident and minimize the time available for response action ensures a higher degree of match of a mutual aid response to the known exposure.

Surveys should be as broad in perspective as practical. Much of the information required for surveys will already exist in other documents such as response procedures, local hazardous materials emergency response plans, etc., and can be extracted and summarized in the survey documents.

The survey should identify the tactical area to be covered by the agreement. The generic emergency conditions that may be encountered on a response into the mutual aid tactical area should also be developed. In addition to a compilation of emergency conditions; i.e., structural fire, environmental releases, hazardous materials release, natural phenomena, etc., the desired response should also be indicated. For example, if the structural fire condition indicated is a single family dwelling, the desired response would be a pumper. If on the other hand, the structural fire is a multi-storied tenement, the desired response might include multiple pumpers and a ladder company. Therefore, the response requirements scale must be variable, and the response be flexible enough to protect the magnitude of the exposure.

The hazards survey may reveal opportunities to decrease the likelihood or magnitude, or improve recognition and management, of possible emergency conditions by modifying existing response procedures. Personnel conducting a hazards survey should be made aware of this potentially valuable byproduct of their efforts and encouraged to identify likely improvements.

Since it is imperative that mutual aid support be available on short notice, mutual aid agreements must be put in writing. These written agreements should outline available resources and responsibilities, thus ensuring their response to a call for aid. In addition, all participating jurisdictions must have a clear understanding of their responsibility and coordination requirements with the Incident Command System during an emergency.

Mutual aid agreements that involve several different agencies or jurisdictions should clearly define the unique capabilities of each, both in terms of the expertise of personnel and in specialized equipment. This is especially important if the agreement includes provisions for a hazardous materials incident response.

Tasking of participating agencies/departments/organizations is also important. This section might appropriately include a provision for participants to develop, maintain, and distribute standardized response procedures.

Another item that must be clearly defined is the responsibility for expenses and losses. An example of a broad generalized statement applicable to a state- or county-level agreement might be as follows: "Each participating agency shall bear and pay all of its own administrative and operational costs and expenses of whatever nature and type including, but not limited to, salaries, retirement, workmenÕs compensations, etc., incurred in performing emergency assistance pursuant to this agreement. Any repair or replacement costs and expenses incident to loss of property or equipment belonging to a participating agency shall be borne and paid by such agency."

The above statement may be appropriate if all of the participating organizations are located in the same state. However, an agreement involving organizations for two or more states may place a heavier share of the expense on the protecting jurisdiction. The same may be true in the case of participation by a private hospital and/or privately operated emergency medical transportation company.

If the protecting agency is to reimburse supporting agencies for the cost incurred, the fiscal provision of the agreement should include specific and detailed billing instructions. As an example, billings submitted by each party to the other might include the total amount incurred by category:

a. Cost of regular time and overtime, including fringe benefits, of all personnel directly assigned to the response.

b. Cost of emergency (call-back) personnel assigned to the response.

c. Travel costs of personnel assigned to the response.

d. Charges for equipment owned or under contract used during the response, including repair and/or replacement.

e. All other direct expenditures, including costs of replacing or reconditioning property loaned under the agreement for a particular response, less the cost of any material supplies, or property returned at termination of the response.

f. Overhead costs, if applicable.

g. Should a response extend onto a third protecting jurisdiction, separate cost figures will be kept for each agency's involvement.

h. Costs incurred by a contractor of a supporting agency when directly involved in the response as long as this service had been requested through proper channels.

There should be no attempt to include a response by private sector heavy equipment and specialty service companies in mutual aid agreements. Such services should be prearranged and provided for in contracts with such companies.

The agreement should also include specific protocols which will minimize confusion for requesting assistance. Finally, legal counsel representing the jurisdictions involved should review the draft prior to execution.

The spectrum of agreement formats is infinite and the need to grant preparers license in developing an appropriate format should be recognized. The following outline may be considered as a point of departure for determining and addressing required agreement content:

I. Purpose/Objectives

II. Responsibilities and Authorities

III. Duration and Modification of the Agreement

IV. Definitions

V. Response

   A. Structural

   B. Rangeland

   C. Hazardous Materials

   D. Command and Control

   E. Dispatch and Criteria

VI. Loaned Equipment

VII. Fiscal Provisions

VIII. Special Provisions

IX. Approval and Acceptance

Once the agreement has been clearly written, thoroughly reviewed, and approved, all personnel with action assignments in the agreement should participate in a documented orientation session. Such training will help to ensure that all personnel understand their individual authority and responsibilities under the agreement.

Remember, when you have a real emergency and request mutual aid, not just any duck will do if you want all the threads to match.

VIRGINIA'S VOLUNTEER PROGRAM TO STAFF A MEDICAL EMERGENCY OPERATIONS CENTER

Walter G. Green III, Ph.D., CEM

Virginia's emergency response organization parallels the Federal Emergency Support Functions, with state agencies being assigned the same general areas of responsibility as their Federal counterparts. In keeping with this philosophy, the Virginia Department of Health is assigned as lead agency for the Commonwealth's Health and Medical Function. Within the Department of Health, the Virginia Office of Emergency Medical Services has been designated by a succession of Commissioners of Health over the past 18 years as the lead office for disaster response (COVEOP 1997).

To help manage response operations the EMS office established a rudimentary Emergency Support Center[i] (ESC) in 1995. This facility has grown in sophistication into a full-featured command center with redundant communications systems, complete computer support, and survivability measures to allow continued operation through the full spectrum of disaster effects. However, at the same time that operational capabilities were expanding, the office faced the challenges for increased productivity from a right-sized staff and better service to the public that most governmental agencies at any level are now experiencing. The office's management staff has been fully involved in meeting primary customer service needs, with little time for dedicated disaster operations training. How then could the office of EMS be able to effectively operate a medical disaster command post?

The solution chosen was to recruit and train a volunteer Health and Medical Emergency Response Team (HMERT) specifically to staff the Emergency Support Center. Starting in October 1996, this team has met monthly for training and staffed the ESC during exercises and actual events. In the process, the office and the volunteer HMERT have both learned lessons that may be of value to others interested in a similar approach to providing trained staffing for their EOCs.

The first difficult question was to determine the level of authority and responsibility that logically could be given to volunteer staff members during emergencies. At the same time, the proper role for the office's paid Program Manager level staff had to be resolved. The staff in the ESC must prioritize assignments and make resource commitments having both a public safety and a budgetary impact. Should volunteers be placed in this role? The solution to both paid

and volunteer roles was procedural - a paid Program Manager staff member will be assigned to the Virginia EOC as the in-person liaison representative. This person receives requests for assistance, coordinates assignments with other agency representatives, determines priorities, and addresses public policy issues. Volunteers will staff the ESC. They receive mission tasks from the paid Program Manager staff member at the EOC and coordinate and dispatch the resources to meet the mission taskings. And the two talk - the HMERT's <u>Standard Operating Procedures</u> manual specifically requires that volunteers receive paid staff approval prior to resource dispatch or prior to taking any action that expends state funds or commits state equipment. To date, experience has shown that better decisions result from these procedures . The volunteers bring current training and expertise in plans and procedures to the decision process; the paid staff understands the political, bureaucratic[2], and financial aspects of decision making.

The next issue was to determine what sort of volunteers were needed and how they should be recruited. To some degree this remains an unresolved element of the program. The HMERT currently has 20 volunteer members, recruited largely by word of mouth from emergency medical services providers, volunteers in the office's administrative volunteer program, an Explorer Post the office sponsors, and students in the University of Richmond's Bachelor's degree program in Emergency Services Management. The initial cadre of volunteers brought significant field experience to the program, including a clinical manager for an emergency medical service, an expert in dam and water resource management, a hazardous waste manager, a hospital safety manager, and nuclear power plant emergency planners.

Unfortunately, the type of people who would find working in an EOC environment interesting and challenging are also people who have other real responsibilities in the emergency services. Therefore, the next step was to broaden the recruiting base to people with management, but no emergency services, experience. Even if the experts are not available in an emergency, their background is vital to training the less experienced volunteers that the program is beginning to attract. Although 20 volunteers seems like a lot of people, the experience of the Federal Emergency Management Agency's Reservist program indicates that only one third to one quarter of a volunteer group will be available

for any particular emergency response (Cogan 1997). To staff the ESC's five duty positions for three 8 hour shifts a day would require between 45 and 60 volunteers in the pool of trained personnel (DSOP 1997). As a result, the five year goal for HMERT strength has been set at 70 members.

Initial plans called for the volunteers to be screened through a criminal background check conducted through the Department of State Police. However, this proved to be very difficult to do because of the financial controls process and the long time delays to get a payment processed (state agencies are required to pay for the background checks, and this is very much a cash-in-hand process). This was not a problem with the initial cadre of volunteers because of the selective nature of our recruiting process. However, as the pool is widened, more extensive reference checks, driver's record checks, and background checks will become necessary.

In planning for volunteer staffing, the office of EMS had to address three areas significant to the volunteers themselves: training, support, and recognition. Each of these areas also posed various management issues that had to be resolved. Identifying training needs was considerably simplified, as the office has a well established four module Mass Casualty Incident Management training program used to train emergency medical service providers statewide. Module IV of the program is specifically designed to train persons who will be representing the health and medical function in an EOC. By adding exercise requirements and Emergency Management Institute Independent Study courses to the 47 classroom hours in Module IV, the HMERT was able to provide a structured four level progression that provides clear individual training goals and qualified members to fill increasingly more demanding jobs. The use of progressive training levels was successful in motivating the volunteers to complete all Four levels by spurring friendly competition among them.

However, the training program suffers from two major problems, both centered around scheduling. Because volunteer training time is limited, the HMERT does its training on weekday nights - this considerably prolongs a six day course into a two year training rotation. With this comes all the problems of trying to train members who are at different stages in the program. At the same time, skills training in the actual mechanics of posting status boards, following checklists, using message forms, and the other minutiae of EOC life, has to be worked into the training cycle.

The other training problem is exercises. The number of available exercises is not a problem, as the Emergency Support Center staff will participate in one form or another in an average of 17 exercises a year. The problem is that most

of these are daytime, weekday events, which means that volunteer participation is limited to one or two persons at most. This severely limits the amount of integrated team training that can be accomplished. To some degree this is being addressed by the use of internal exercises and joint participation with the other large state-level volunteer resource, the Emergency Medical Services Task Forces. In addition, lessons learned from exercises are printed in the HMERT's monthly newsletter making them available to all HMERT members.

HMERT volunteers provide their services without pay. However, the office of Emergency Medical Services has been able to address a number of related support issues successfully. The Virginia State Government Volunteers Act establishes several categories of volunteers, including Regular Service Volunteers. Regular Service Volunteers are defined as those that perform volunteer work on a recurring basis. Regular Service Volunteers can be reimbursed for mileage, meals, and lodging while engaged in state business. The Act also provides that they can be extended the same liability coverage available to paid employees. While this does not provide workers compensation coverage, it does ensure that HMERT members will not have to meet most direct costs of their services out of their own pockets. If the situation is severe, ESC duty crew members can remain on the premises, using folding cots and state supplied MREs (training does include Meals Ready to Eat(MRE) gourmet cooking); if it is just merely bad, crew members can be billeted in local motels on a direct billing arrangement and use restaurants within three blocks of the ESC.

Recognition has proven to be a significant component of the volunteer program. HMERT volunteers who serve for at least six months are provided a distinctive, practical work uniform by the office, with identifying patches and name tags. Not only is this an incentive to making the first gate in a sustained service program, but it also identifies HMERT members when they participate as part of the medical evaluation team for local disaster drills.

A series of awards recognize sustained service. At 100 hours the Director of the office writes a personal thank you letter to the volunteer. At 500 hours the volunteer receives an enameled metal recognition bar, with a certificate awarded for each 500 hour increment beyond that. Members who participate in five disaster responses during states of emergency declared by the Governor are awarded a recognition bar and a medal - the same medal is awarded to members of the volunteer Virginia Emergency Medical Services Disaster Task Forces. The recognition bars and medals are unique in Virginia's Emergency Medical Services system and were chosen to avoid confusion with the myriad

pins and patches already in wide use.

Surprisingly, one of the most important recognitions has been the establishment of a policy on who is issued a key to the office. Standard administrative policy is that part time and contractor employees may not be in the building without a full-time paid staff member supervising them (Brown, 1997). However, if the same policy was extended to the HMERT, a full time staff member would have to come in and open up early or stay late to lock up (the ESC usually closes between 11:30 pm and 5:00 am - Virginia experience is that there is almost no demand for services in most disasters in this time period). That would defeat the main advantage of volunteer staffing, that a paid staff member is not needed to operate the ESC. The decision to designate HMERT members who had at least one year's service and had completed the second major training level as eligible to be issued an office key was a major recognition of the value of the program and the trust accorded its participants.

As the program approaches its one year anniversary, there is general acceptance that it is successful. The added staffing has taken a burden off the managerial level paid staff of the office. The volunteers, including an increasing number of members of the general public, are more informed citizens with a better understanding of what their state government does. And the experienced emergency services providers have broadened their technical knowledge and developed skills that will be valuable to them regardless of where they are working when the big one hits.

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BIOGRAPHICAL INFORMATION

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FOOTNOTES

[1] The name Emergency Support Center was chosen to avoid confusion with the three existing state level emergency operations centers - the Virginia EOC operated by the Department of Emergency Services, the Transportation Emergency Operations Center which the Department of Transportation operates on a 24 hour basis, and the State Area Command Emergency Operations Center of the Department of Military Affairs.

[2] The term use of the term "bureaucratic" does not imply criticism. Almost all governments in the United States are bureaucracies in that there are established administrative procedures and practices for doing the government's business. On a day to day basis these procedures work (perhaps not as well as we would like, but work nonetheless). In emergencies we do well those things that we do every day - that is the reason we constantly stress not inventing new procedures that only apply to emergency response. The same concern applies to administrative procedures. If we follow normal administrative practices to the greatest extent practical, the system will work more smoothly and we will have less of a paperwork nightmare at the end.

"EVACUATE YOUR STUDENTS!" OR "HOW TO CONDUCT EFFECTIVE SCHOOL EXERCISES"

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THE SCENARIO

"Attention, a simulated earthquake has just occurred! This is a test! Please react as if it were real. Drop, Cover, and Hold! Teachers may now open your envelopes, while in a drop and cover position."

After 20 seconds...

"The simulated earthquake has stopped. Teachers read appropriate envelope contents to students and react accordingly. There will be no more PA communications until the exercise is over."

When students and staff hear the above announcements over their public address system, they know another school earthquake drill has just begun. The weeks of pre-planning and emergency training are about to be tested. With an emergency plan in place and emergency jobs assigned, the exercise continues as each teacher reads the contents of their envelopes to their students:

> "At 9:45 a.m., April 27th, an earthquake of 7.3 magnitude hit the area. Your system has been disrupted. Phones are not working. The electricity in the school is not working. There have been numerous injuries. The city is overloaded with emergency service requests, and will not be able to respond quickly. You are on your own!"

THE OBJECTIVES

The staff, simulators, and observer/evaluators know the objectives of the exercise. They include:

* Practice drop and cover procedures
* Evacuate buildings in a variety of conditions
* Account for and report the condition of all staff and students
* Assess the emergency response and handling of injured
* Exercise emergency custodial duties
* Evaluate policy on student release from school

THE INJURIES

In every classroom, four to five students have received a 3 X 5 card on a string describing their assigned injury. These were in the envelopes the teachers opened in the classroom and are placed around the student's neck. The child is encouraged to "act" as if they had a real injury. The rest of the class and the teacher begin to assess the injuries and any other room damage. Some doors are "blocked" with barrier tape and in one classroom, the teacher has been designated "unconscious." Injuries range from broken arms and legs to glass in eyes and head injuries.

THE ORIENTATION ASSEMBLY

An orientation assembly was held earlier in the week. All the students and staff heard a speaker from the city describe the effects of earthquakes in the world and what will probably happen in their own community. Preparedness tips were shared. "Creative first aid" was demonstrated on stage by selecting students to bandage and splint other students using items they would normally find in a classroom (rulers, jackets, masking tape, and towels). Evacuation routes were reviewed and the principal gave detailed instructions on how the exercise would be conducted.

RESPONSE TEAMS

Pre-assigned and trained response teams have begun their tasks. The principal and administrative secretary have set up the command center outside near the main office. The search and rescue team has assembled after their own classes were evacuated and were turned over to another teacher out on the playing field. In teams of two, they systematically sweep the corridors and bathrooms looking for trapped or injured people. They find several "hidden" students. They carry a walkie talkie and wear protective hard hats, gloves, and flashlights that were stored in exterior metal bins. Those staff members who have been trained in first aid have set up a first aid station on picnic tables away from the school buildings. A barrel of first aid equipment is being unloaded when the first injured student arrives on an old

civil defense stretcher. The custodian has gone to shut off the water and gas valves and has found a card hanging on the pipes that says, "Remove this sign and take it to the command center. The gas/water will be considered turned off."

EVALUATORS

Evaluators from other schools, the city, and the school district are watching closely for areas of success and improvement. They will share their observations at the debriefing immediately following the exercise during the regularly scheduled recess. A communication connection has been made with the district office through the district radio system. A student amateur radio operator has turned on the school's ham radio set and has called for any needed help through the ham network. They will communicate throughout the exercise.

FRANTIC PARENTS

PTA volunteers are simulating frantic parents running around the school looking for their own children and generally causing chaos. They have been told that unless they are redirected by someone in authority to help, they should just cause trouble. Some parents have told to "capture" children, and walk off campus without checking them out through the student release gate. Several "get away". The city staff are barraging the school with telephone calls simulating parents and the media. Despite all the challenges, the principal and staff are performing their duties with cool confidence.

INFORMATION COLLECTING

As student runners report damage, missing students, and injuries back to the command center, fire engine sirens are heard in the distance coming towards the school site. The wail of sirens echo through the corridors adding a heart-stopping realism. A reporter is recording the scene in words while a photographer is snapping pictures. A map of the school has been taped on a board and an assistant principal is marking off with a colored felt pen the classrooms searched, the damage assessed, and the injured still needing to be transported to the first aid station. Uninjured students are sitting out on the playing field, cared for by teachers that did not have pre-assigned jobs. They are entertaining themselves with games and books found in each class's emergency backpack . A large card, found in the backpack, is posted on a stick at the front of the class indicating: green—OK, yellow—need some assistance, red—need help now!

THE DEBRIEFING

In less than forty minutes after the initial announcement, the school has been completely evacuated. All injured students have been moved to the first aid station. The unconscious teacher was gently carried by eight of her students to the casualty collection area. They never left her side. She later was heard to say that she never felt so pampered and cared for in her entire life. When the bell rings indicating the end of the drill and the beginning of recess, all of the adult participants gather in the teacher's lounge to evaluate the exercise.

The principal leads the discussion, getting reactions from teams, volunteers, and evaluators. A recorder captures all the comments for an after-action report that will be distributed to all the participants. The exercise reminded the staff that they may not be in their usual room when a disaster strikes, so they must adapt to the situation. There was a lively discussion on whether a teacher should stay with an injured student, or evacuate the class to the field, report the injury, and go back to the student. Concerns about corridor overhangs, blocked doors, and broken glass lead to a re-evaluation of some of the evacuation routes. More stretchers were definitely needed! Everyone is asked to fill out the one page evaluation checklist and hand it in before leaving the lounge. The participants leave on a high, exhilarated by the drama and excitement of the event. Many teachers plan on using classroom time tomorrow to review the lessons learned by the students. The principal mentions that she will summarize the drill for the parents in the next school newsletter. This will become the basis for the next exercise. While enthusiasm for the exercise is still fresh, volunteers are solicited for an exercise design committee for next year, and so the cycle begins anew.

SCHOOLS EXERCISED

The first school that used this model exercise plan was **Columbia Community School** in Sunnyvale, California. It is an elementary school with 1,200 students in kindergarten through sixth grade. Red Cross shelter supplies are stored on the campus in an ARK (semi-trailer container). The principal took it upon himself to open the ARK during the exercise and use the supplies. This gave the city a chance to review the proper procedures for using Red Cross supplies.

This event was followed by another elementary school exercise at **Hollenbeck School** in Sunnyvale. Ham radio operators were vital to this exercise, and the principal was an amateur radio operator himself. A substitute custodian was on duty that day. Since it rained that

day, it became obvious that emergency position checklists with site maps in zip lock bags were necessary for all staff members, but were especially helpful for substitutes.

Cupertino Junior High presented a different challenge because they had older students. Of all the exercises conducted, these students showed the most creativity. Students were splinted with flutes in the music room and flag poles in classrooms. They carried victims out to the field on tables. This is the school where the teacher was so tenderly cared for by her students. A bullhorn out on the field was very effective in controlling the mass of students. The orientation assemblies really prepared the students in "creative first aid" at this school.

Kennedy Junior High in Cupertino, California focused on search and rescue teams and the first aid station. The principal learned it was more important to stay in one place instead of wandering around the school where nobody could find him. Excellent computer printouts on the student's locations during the day helped track missing or absent students. Overhanging roofs were a concern to the staff and evacuation routes were changed.

Homestead High School in Cupertino was a full-scale exercise complete with the press, fire engines, ham radio operators, and *bloody* injuries painted on by the drama department. This exercise was initially scheduled for the week of October 16, 1989. Inservice meet-

ings had been held the week before with the staff. Every classroom held discussions and handouts had been given to the students to take home.

This exercise was postponed due to the *real thing* on October 17,1989! Many of the staff and the principal felt that the preparations for the earthquake drill planned for that week had prevented extensive damage and injuries and had prepared them mentally for the shock of the real disaster. There was some discussion as to whether it was necessary to have an exercise after the Loma Prieta earthquake, but the principal felt "what better motivation to continue with the exercise!" So it was held in November with a seriousness born of real-life experience.

COMMUNITY SUPPORT

None of the schools described in this paper conducted their exercises in a vacuum. The cities of Sunnyvale and Cupertino assisted in writing the scenario, training the staff, and holding the assemblies. Emergency plans were reviewed by city staff and suggestions were made for improvements. Connections were made with the amateur radio clubs and local Parent Teacher Associations. Public Safety agencies supported the exercises with firefighters and rigs to provide realism and with evaluators. Amateur Radio Operators practice monthly and look forward to participating in real drills. Every September, the community re-commits itself to preparedness planning. With this level of preparation, these schools will be ready for the next California earthquake!

LESSONS LEARNED FROM DEVELOPING AN EMERGENCY MANAGEMENT COUNCIL

Colleen Kinney

She graduated from Oregon State University in 1995 with a Master of Arts in Interdisciplinary Studies (Political Science, Geography, and Anthropology). This paper is based on research from her master's thesis, entitled "New Directions in Disaster Planning: A Case Study of Community-Based Emergency Preparedness in Benton County, Oregon." She is a member of the Benton County Emergency Management Council and the Oregon Emergency Management Association.

KEY WORDS:

Community-based disaster planning, citizen involvement, networking, and case study methodology

ABSTRACT:

In April 1991, a citizen-initiated community coalition (comprised of public, private and volunteer representatives) was formed in Benton County, Oregon. This informal, intergovernmental network coupled with a bottom-up organizational structure differed from the past organization where disaster planning was undertaken by a few individuals (primarily trained in civil defense) who tended to exclude the public, private industry, city and county agency personnel. This paper examines three key elements the Benton County Emergency Management Council (BCEMC) used to create and maintain an on-going community-based disaster program. As the BCEMC develops a constituency at the local level, it relies not only on local commitment, but also on an organizational structure that invites discussion, information exchange, networking and subsequently, implementation of community-based disaster-related objectives.

INTRODUCTION

By law, counties in Oregon are mandated to plan for disasters (Oregon Revised Statutes, Chapter 401.015-401.990, 1993). How counties across the United States choose to implement disaster preparedness programs varies (Quarantelli, 1988). Benton County has spent the past seven years developing plans to meet its vision of a self-sufficient community-based emergency preparedness program. This is in contrast to reliance on one individual or a few individuals who had sole responsibility for all aspects of emergency management. How these changes came about stems from one community activist whose influence altered the paradigm for emergency management in Benton County. The purpose of this paper is to describe the three key elements that led to the formation of the Benton County Emergency Management Council (BCEMC). The first element was moving Benton County from a solitary to a participatory emergency management program. The second element was moving from a reactive to a proactive planning process, which has been slow and continuous. The third element was moving from governmental dependency towards self-sufficiency and accepting presonal responsibility for emergency management tasks. BCEMC seeks to create a dynamic disaster planning process that reflects community values and ensures accountability. This is consistent with activities, practices, interactions, and relationships Quarantelli (1985) maintains may improve the response pattern during times of disaster. Preparedness planning elements include:

- convening meetings for the purpose of sharing information;

- holding disaster drills, rehearsals, and simulations;

- developing techniques for training, knowledge transfer, and assessments;

- formulating memoranda of understanding and mutual aid agreements;

- educating the public and others involved in the planning process;

- obtaining, positioning, and maintaining relevant material resources;

- undertaking public educational activities;

- establishing informal links between involved groups;

- thinking and communicating about future dangers and hazards;

- drawing up organizational disaster plans and integrating them with overall community mass emergency plans; and

- updating continually that which becomes obsolete (1985: 6; 1988: 11).

By providing a forum for emergency personnel, private and public entities and others to discuss and share information, BCEMC appears to be a model for other communities to follow. This paper indicates the direction the BCEMC appears to be going, and cites the difficulties it faces. For now, the process of building a con-

stituency among various community groups in Benton County slowly continues.

METHODOLOGY

This paper features the findings of a case study that describes the establishment and organization of the BCEMC and how it works to reduce future disaster losses and improve emergency response capabilities. The case study describes strategies the BCEMC members used to involve others and to develop an emergency management constituency. The study covered a period from April 1991 to May 1997. Data were collected from three sources: semi-structured interviews, documents, and participant observations.

BACKGROUND

Information Since 1960, Oregon has experienced 74.25 percent increase in population. Benton County has grown by 92.5 percent (Oregon Blue Book 1995: 296-301). Corvallis, the county's largest city, has experienced a 123 percent increase in population during the past 34 years (ibid.; see Figure 1).

YEAR/ AREA	1960	1970	1980	1990	1994
Corvallis	20,669	35,056	40,960	44,757	46,195
Benton Co.	39,165	53,776	68,211	70,811	75,400
Oregon	1,768,687	2,091,533	2,633,156	2,842,321	3,082,000

Source: Oregon Blue Book 1995: 296-301.

As the population and economy of the Pacific Northwest continues to grow, more people are moving into areas that are vulnerable to hazards such as flooding, wildland fires, landslides, hazardous materials spills, and earthquakes. Hence, the population growth of Benton County was one signal that the community needed to pay attention to emergency planning and mitigation strategies. As the need for planning and preparing for disasters became evident, three main shifts were seen in the BCEMC's emergency management program.

SHIFT FROM SOLITARY TO PARTICIPATORY SYSTEM

The first shift was exemplified by the realization that one person cannot do emergency planning alone. Like other jurisdictions throughout the U.S., one individual traditionally has done emergency planning, training, exercising, search and rescue, and other disaster preparedness tasks in Benton County. Until 1989, Benton County's Emergency Services Coordinator (ESC) was trained in civil defense. Other than the planner, few

knew what the Emergency Operations Plan (EOP) contained. Planning was mostly a paper exercise wherein only one person understood what would happen during a disaster (community activist interview, July 8, 1994). Scholars cite the need for participation and coordination from other agencies involved in emergency response and preparedness. This is often difficult to achieve due to turf battles and the fact that pre-disaster tasks are usually additional responsibilities with a lower priority than the day-to-day tasks. The situation changed in 1989, when a Benton County citizen, the community activist of this case study, determined to make disaster planning a higher priority in Benton County. She began by investigating the level of disaster preparedness in Benton County. In a 1994 interview, she said:

> ... I wonder how prepared are we for disasters? I have this idea. What would happen if we called all emergency response personnel together in the community? Somebody from the fire department, police department, county and city public works, hospital, university, school district, and all these people who need to know what to do if we had an emergency, and talked with them about how prepared we are?" (community activist interview, July 8, 1994).

Because of asking the right questions, the citizen activist initiated the steps leading up to the formation of a coalition group. In April of 1991, the BCEMC was formed. The sheriff appointed the community activist as chairperson of the BCEMC. She has remained in that position for the past six years. Throughout these years, members discussed emergency management issues and coordinated tasks. The BCEMC's grassroots efforts, combined with an effective Emergency Services Coordinator (ESC) who has a participatory leadership approach, have guided Benton County's public, private, and volunteer groups to share responsibilities for disaster planning. Who makes up the BCEMC? A cross-section of the BCEMC reveals diverse representation. Members come from non-profit traditional emergency relief organizations, such as the American Red Cross and Salvation Army to public agencies like the Benton County Public Works, local fire departments and public school districts. Elected officials also belong to the BCEMC. Among the non-traditional groups on the BCEMC are representatives from Corvallis Gazette-Times Newspaper, League of Women

Voters, The Corvallis Clinic P.C., CH2M-Hill Environmental Consultants, Barker-Haaland Insurance, Cellular One, and local citizens. As shown in the BCEMC's organizational chart (See Figure 2), many players are involved and have clearly defined roles. In addition, there are representatives from adjacent communities outside of Benton County which also belong to the BCEMC. This approach is a more participatory approach than in the past.

SHIFT FROM REACTIVE TO PROACTIVE PLANNING

Planning is a slow and continuous process. The BCEMC has made some progress towards implementing a community-based disaster planning approach that is proactive rather than reactive. For instance, they no longer have an Emergency Operations Plan (EOP) that involves only one person. Instead, the ESC has managed the EOP revision process with a participative leadership style. The ESC has developed a framework in which public, private, and volunteer organizations are involved in the planning process. Moreover, this study found that these groups have become "stakeholders" and have "ownership" in the community planning program. Although planning is taking longer to complete, more individuals and agencies have been involved during this process.

These participants are establishing active networks, communicating about their roles, and assuming responsibility for pre-disaster related tasks. This is quite different from the past, when the plan sat on a shelf. One example is the "Violence in the Workplace" exercise conducted in December of 1994. One business that participated in this functional exercise donated a fax machine, scanner, and color computer monitor. This can be seen as involving private industry, especially when the county has limited financial and technological resources. The ESC referred to exercises as "lessons learned" for future disaster response.

This proactive planning approach is unique in that private businesses not only organized exercises, but also participated in writing the new EOP. These groups can benefit the community during disasters because they provide other resources besides computers and fax machines. They can provide sand bags, bulldozers, temporary shelters, and a variety of expert, professional skills.

In addition to exercising for emergencies, another strategy that is proactive is organizing and providing training for emergency personnel, volunteers and citizens. Benton County personnel and officials are taking advantage of courses put on by Oregon Emergency

Management (OEM) and the Federal Emergency Management Agency (FEMA), while networking with other local, state, and federal emergency services personnel. During one program, the citizen activist met and later invited a firefighter from St. Petersburg, Florida, who is experienced in urban search and rescue to do a training session for Benton County. It appears that local government and private industry have exchanged information by cooperative training efforts, informal visits, attending the BCEMC meetings, and participating in exercises.

Since its formation, the BCEMC has developed several community outreach programs to inform the community about disaster planning and preparedness. For example, the BCEMC sponsored and organized an Earthquake Preparedness Seminar in 1994 that drew over 600 people (Gazette-Times, April 27, 1994: A2; Participant observation, April 26, 1994). The purpose of this event was to inform the public about seismic hazards. Representatives from FEMA, OEM, private insurance, American Red Cross, Benton County Emergency Services, fire and law enforcement described their roles and responsibilities, and then answered the audience's questions. Furthermore, independent vendors displayed emergency-related services and products such as homeowner insurance and first aid kits. They also educated local residents on how to use a fire extinguisher, secure water heaters, and turn off gas lines.

SHIFT FROM DEPENDENCE TO SELF-SUFFICIENCY

The third key finding in this study was the shift from government dependency to a emergency management program that educates its communities to be self-sufficient. The Sheriff mentioned the importance for individuals, families, businesses, and neighborhoods to become self-sufficient during disasters. He said:

> "We need to get out and involve the community and engage them on an educational basis so that they can hold their own and make them understand that we can't be all things to all people in the middle of a disaster. They're going to have to depend upon themselves and they're going to have to depend upon their neighbors."

(Sheriff interview, Sept. 1, 1994).

This was not always the case. Ever since the community activist began to question the county's emergency response capability, education in emergency preparedness has been conducted. This was not an easy task. The citizen activist confronted a closed environment that assumed that the public was unable to grasp sophisticated disaster planning and response procedures (community activist interview, March 30, 1995). Hence, the

public had been trained to be apathetic.

Now the BCEMC acknowledges that many resources exist in the community. The BCEMC's Vision Statement outlines this strategy towards self-sufficiency:

> The key to our preparedness is an aggressive 72-hour family preparedness program that provides instruction to all segments of our society from preschoolers to senior citizens. The cornerstone of the program is active public participation through established neighborhood groups, with neighbors helping neighbors. Citizens are repeatedly reminded of the importance of preparedness and self-reliance through awareness education presentations in the schools, professional and social groups, employee training and through media and public service announcements (See Appendix 1).

One strategy that the BCEMC's public education subcommittee uses to increase self-sufficiency is the Linn-Benton Neighborhood Emergency Training (LB-NET) project. A Corvallis police department representative said:

> The Emergency Services staff trains neighbors how to take care of themselves for 72 hours in the event of a disaster. This period of time is generally thought to be when response resources may be most taxed and therefore, possibly not available to everyone. Twenty-three trainers have been prepared throughout Linn and Benton counties to present this information to neighborhood groups. The curricula and materials will be presented to a limited number of groups to begin with, and then evaluated and modified as needed, then presented widely to already organized groups such as Neighborhood Watch groups (Participant observation, Nov. 13, 1996).

Community outreach events organized by the BCEMC are the primary methods to encourage citizens to become educated about disasters. They have generated support in both public and private sectors of Benton County.

It is significant to note that leadership played an important role in this shift towards self-sufficiency. This study verifies Foster's (1980) argument that coordinators "must have sufficient stature in public service and in the community to command the respect and obtain the cooperation of those with whom he/she will deal" (pg. 7). In Benton County, the ESC and community activist have central leadership roles in disaster planning. First, the ESC is a participative leader who considers others' opinions, and has delegated tasks to others to

rewrite the county's EOP. In this way, emergency services personnel, school district representatives, hospital officials, businesses, and others are informed of their responsibilities and discuss how to accomplish those tasks prior to disasters.

Secondly, the community activist has become a leader in emergency preparedness, and has influenced elected officials and community leaders to take disaster planning more seriously. It was accomplished through networking and by organizing informal community meetings and seminars.

Benton County is still in transition from reliance on government to becoming more self-sufficient. Members on the BCEMC note that challenges exist with getting "buy in" to preparedness and planning. Emergency preparedness tasks take a back seat to other duties because they compete with other priorities. The ESC noted that the BCEMC, headed by a citizen, has been effective for motivating and informing emergency planning participants. During regularly scheduled meetings, BCEMC participants were reminded of how vital their involvement is in the disaster planning process (Participant observations, May 18, 1994; Aug. 24, 1994; Oct. 19, 1994; Nov. 16, 1994; Jan. 18, 1995; March 15, 1995; Nov. 13, 1996; April 16, 1997). The ESC described the BCEMC as a "vehicle" to accomplish disaster planning tasks. The ESC also mentioned the community activist's role in this process. This citizen has been instrumental in keeping emergency preparedness on the leaders' agendas.

SUMMARY

A shift in three key elements in emergency preparedness in Benton County are evident from this case study: a) solitary to participatory approach; b) reactive to proactive process; and c) dependency to self-sufficiency. These shifts have contributed to continuing development of a community-based emergency preparedness program. Other communities and jurisdictions can benefit by adapting the processes implemented by the BCEMC. The BCEMC does not appear to focus on the EOP as an end product for disaster planning. Rather, it seeks a continuous planning process, which is consistent with Quarantelli's (1988) model. Thus far, it has taken about seven years. Benton County has only begun a process that the entire community can agree upon. Participants of the BCEMC are concerned with more than assessing hazards, and formulating, exercising and evaluating EOPs. They are concerned with developing networks, maintaining discussions, and educating themselves about their tasks as they complete planning objectives.

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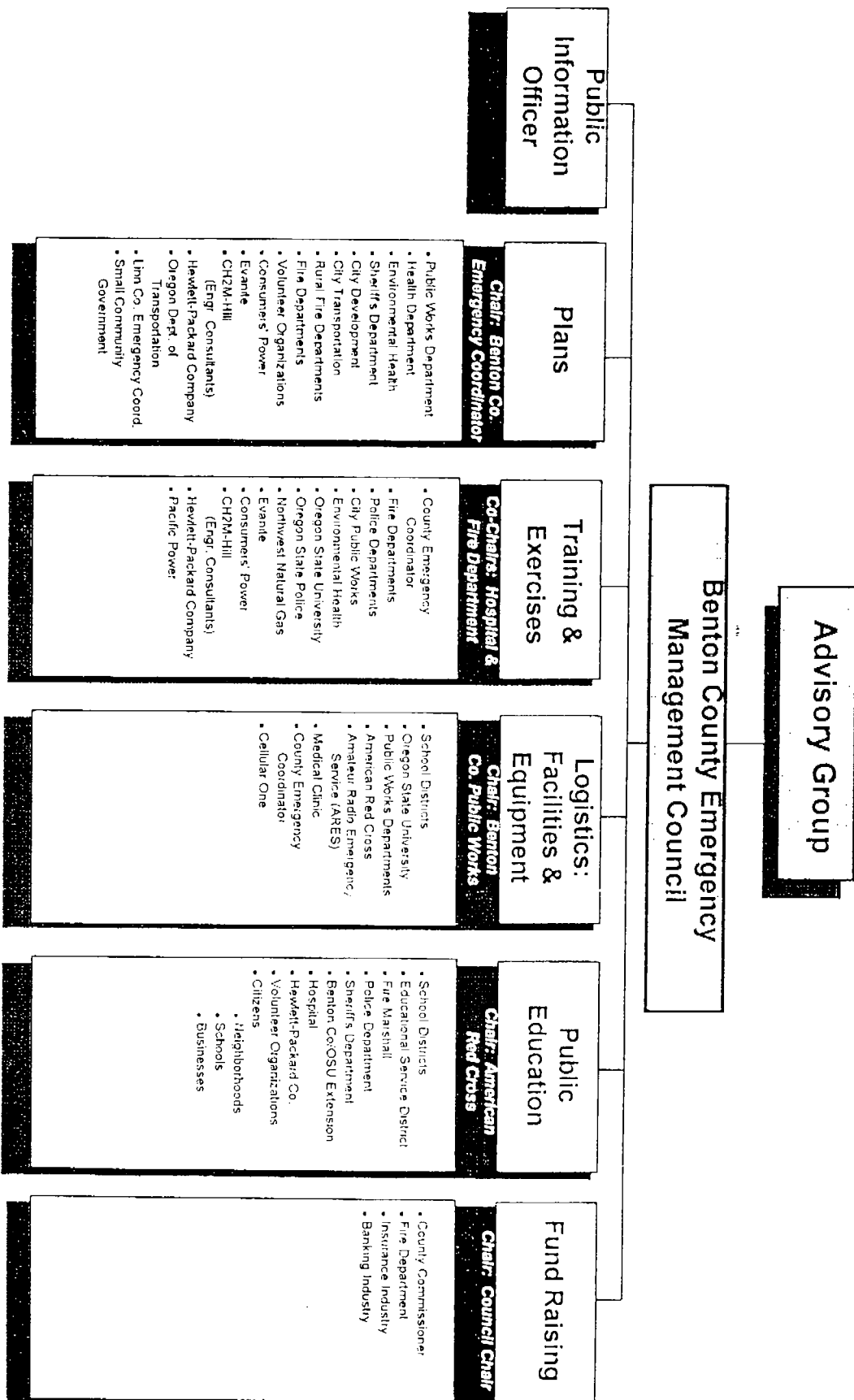
ACKNOWLEDGMENTS

APPENDIX 1

The BCEMC's Vision Statement The Benton County Emergency Services Management Council and the citizens of the mid-Willamette Valley celebrate our outstanding success in the planning and preparing for natural and man-made disasters. The concept of "our" problem, "our" plan, "our" solution has fostered a sense of community and cooperation that serves as a model to other areas of public policy formulation. The issue of emergency response is viewed as a total system that recognizes the inter-relationship and importance of each and every part. All decisions and actions are on behalf of the citizens and their needs with no regard for political or jurisdictional boundaries. This systems approach to planning ensures an integrated response to emergency events which maximizes the effectiveness of the combined public and private resources. Clear concise lines of authority have been established in our plans to cover all known threats; our numerous drills and exercises have tested these relationships and they have proven extremely effective. The success of our program is directly attributable to the solid financial support we have received from a number of sources. Federal, state, and local governments have recognized the magnitude of the growing threat of hazardous materials and other man-made disasters in our communities, as well as the continuing danger posed by natural hazards. This growing awareness has been translated into significant investment in emergency services/public safety infrastructure and readiness. Oregon State University and private industry are also full partners in our campaign. OSU and local businesses, both large and small, have taken active roles in all aspects of emergency preparedness, generously supporting the program with either monetary grants, facilities, services, and/or professional expertise. The key to our preparedness is an aggressive 72-hour family preparedness program that provides instruction to all segments of our society from preschoolers to senior citizens. The cornerstone of the program is active public participation through established neighborhood groups, with neighbors helping neighbors. Citizens are repeatedly reminded of the importance of preparedness and self-reliance through awareness education presentations in the schools, professional and social groups, employee training and through media and public service announcements. Significant effort has also been given to preparing the families of our emergency responders so that these trained professionals can focus on their job with the knowledge that their loved ones are secure in a time of crisis. Community preparedness is richly enhanced by the highly motivated, well-trained personnel in our response agencies. In every case their training surpasses the state accreditation standard. The responders regularly exercise their capabilities through formal and informal events; the exercises involve volunteers, local citizens, as well as state and federal agencies. Mutual aid agreements exist as only a formal reminder of our inter-reliance and commitment to mutual cooperation and success.

FIGURE 2: ORGANIZATIONAL STRUCTURE

Advisory Group

Benton County Emergency Management Council

Public Information Officer

Plans

Chair: Benton Co. Emergency Coordinator
- Public Works Department
- Health Department
- Environmental Health
- Sheriff's Department
- City Development
- City Transportation
- Rural Fire Departments
- Fire Departments
- Volunteer Organizations
- Consumers' Power
- Evanite
- CH2M-Hill (Engr. Consultants)
- Hewlett-Packard Company
- Oregon Dept. of Transportation
- Linn Co. Emergency Coord.
- Small Community Government

Training & Exercises

Co-Chairs: Hospital & Fire Department
- County Emergency Coordinator
- Fire Departments
- Police Departments
- City Public Works
- Environmental Health
- Oregon State University
- Oregon State Police
- Northwest Natural Gas
- Evanite
- Consumers' Power
- CH2M-Hill (Engr. Consultants)
- Hewlett-Packard Company
- Pacific Power

Logistics: Facilities & Equipment

Chair: Benton Co. Public Works
- School Districts
- Oregon State University
- Public Works Departments
- American Red Cross
- Amateur Radio Emergency Service (ARES)
- Medical Clinic
- County Emergency Coordinator
- Cellular One

Public Education

Chair: American Red Cross
- School Districts
- Educational Service District
- Fire Marshall
- Police Department
- Sheriff's Department
- Benton Co/OSU Extension
- Hospital
- Hewlett-Packard Co.
- Volunteer Organizations
- Citizens
  - Neighborhoods
  - Schools
  - Businesses

Fund Raising

Chair: Council Chair
- County Commissioner
- Fire Department
- Insurance Industry
- Banking Industry

TASMANIAN ENGINEERING LIFELINE PROJECT

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KEY WORDS

Risk, Essential Services, Engineering Lifelines, vulnerability, recovery, prevention, consequences, dependence, interdependence

ABSTRACT

During the course of research, I identified the loss of essential services, such as power, water reticulation, sewerage, road infrastructure and communications as being a major inhibitor to the recovery of a community following an emergency event.

Examples of this include the City of Newcastle after the earthquake on 28 December 1989, still in the midst of its ten year recovery plan. (damage and insurance claims for property and buildings of some $1.2 billion and an estimated total loss of some $4.0 billion.) In the United States of America following Hurricane Andrew, about five years ago, some of the essential services have still not been restored to the level that they were before the event. As part of the Tasmania State Emergency Service's commitment to enhancing this State's capacity to recover from emergencies, I developed a 'Lifelines' project to enable the various organisations involved in providing the communities' essential services, to come together to consider the risks and to develop strategies that would enhance the recovery capability of the State.

The risk of major emergencies occurring in some locations may appear less than in other parts of the world, but the Hanshin earthquake of Kobe Japan,the earthquake in Neftegorsk on the Russian island of Sakhalin, and the situation in Bosnia remind us of the vulnerability and importance of essential services. As far as I am aware the 'Lifelines' project that I developed was a 'first' for Australia, although I took cognisance of the projects undertaken for Wellington and Christchurch in New Zealand & Los Angeles and San Francisco in America.

Very simply the outcomes of the project are decreased vulnerability of communities and enhanced recovery capability, through the increased safety of the essential services by the prevention of damage or the minimisation of the consequences.

The aspects of this project that have had the most impact are the concepts of:

•   dependence, and interdependence where organisations are asked to identify the key elements of their systems, how they might be safeguarded, and specify the interdependencies that exist between their systems and other systems and how these might be sustained.

    •   decreasing vulnerability by increasing the resilience of a system and its key elements

PROJECT BACKGROUND

As part of the Tasmania State Emergency Service's commitment to increasing the emergency preparedness of the State, I looked at some recent research which considered the increasing trend of urbanisation and the effects of earthquake on the cities of San Francisco, Los Angeles, and Tokyo.[1]

It is important at this stage to mention that recent earthquakes have increased some myopic studies of hazards and their effects. But we do not need to focus on earthquakes. We are more interested in managing the harm and damage whatever the cause.

I will, however, reproduce some of the figures from the research I have cited.

If a repeat of the 1906 San Francisco 8.3 Richter scale earthquake were to occur today it is estimated that the bay area would experience the following losses in US$:

$115 - $150 billion total economic loss

$45 - $60 billion insured losses

2,000 - 6,000 deaths

8,000 - 18,000 injuries

engineering lifelines damage $10 - $17 billion

If the Newport - Inglewood fault in Los Angeles were to experience a 7.0 earthquake it is estimated that the following losses would occur:

$120 - $180 billion total economic loss

$50 - $75 billion insured losses

2,000 - 5,000 deaths

5,000 - 15,000 serious injuries

engineering lifelines damage $15 - $20 billion

In Tokyo, if the Great Kanto earthquake of 1923 were to occur today, the losses are estimated to be:

$2.0 - $2.7 trillion total economic loss

$35 - $45 billion insured losses

40,000 - 60,000 deaths

engineering lifelines damage $300 - $900 billion

If we believe that these are overly pessimistic figures and that we also need to modify the indicators for the size of our cities; the implications are still that protection of our essential services is not only very desirable, it is essential. I considered the work that had been done in New Zealand, particularly the work undertaken at a workshop held in Christchurch in October 1994. The Project Manager for the Christchurch project was Mr John Lamb and he was kind enough to give me the opportunity to view the working papers from that workshop. The methodology used in Christchurch was used as a foundation for the methodology that I developed. I was assisted by Mr Merrick Chatfield from the Australian Emergency Management Institute whose suggestions on detail and enhancements were gratefully included. The methodology provided us with a philosophical basis or concept of what we wanted to do. As we have found over many years, lots of people can tell you what needs to be done but the ones who can tell you how to do it are very thin on the ground. I then reflected back on work that we had started in 1988 that included a Hazard Analysis Process[2]. This work has been integrated with other work that we did and now forms the major part of a Bachelor of Social Science (Emergency Management) which we provide in collaboration with Charles Sturt University, Wagga Wagga, New South Wales. One of our staff, a Mr Bevis Dutton, was also part of a national working party that were considering the then draft Australian Standard on Risk Management. I found that it was very easy to adapt our proven Hazard Analysis Process to become a Risk Assessment Process for my Engineering Lifelines project. Bevis Dutton assisted me to show that our Risk Assessment Process was also consistent with the principles of the draft Australian Standard on Risk Management. We also believe that feedback from Bevis to the Australian Standards working party about the Lifelines project provided some useful enhancements to their work and the current published version of the Australian Standard on Risk Management. I still believe that the Australian Standard on Risk Management

is too generic to be of much use to a specific industry and it needs to be interpreted for one's own purposes. I think that I have done that in parallel with the work that was being done to produce the Australian Standard on Risk Management. I have now tested the process on three workshops,[3] (the project managers were as follows: Launceston ,Mr Ian Manock; Hobart, Mr Geoff Marsh; North West, Mr Bevis Dutton) and each one has proven the process and also yielded better understanding of application enhancements. The greatest accolade for me was after the Launceston workshop when one of the City of Launceston engineers said "After the workshop we took the process you gave us and decided that we could develop a better process. We developed a different process and started to gather all of the necessary data; and it all fell apart and would not work. We went back to the process you gave us and it all worked very smoothly; we are most impressed with the logic and rationale of your process."

I have therefore included the methodology and the process in this paper with a brief explanation of each step in the process.

A key factor to the success of this project is obtaining appropriate sponsorship of the project. In Tasmania, I was given the support of the Chairman of the State Disaster Committee. In Tasmania, this person is also the Police Commissioner and therefore in overall control during times of declared emergency or disaster. The Chairman wrote to the Chief Executive Officers of all of the essential service providers seeking their commitment to the project. I am sure this was important to the success of the project.

PROJECT METHODOLOGY.[4]

INTRODUCTION

Today most communities depend for their survival on their engineering lifelines. This paper details an innovative method of improving their survivability or reinstating damaged or destroyed engineering lifelines. This method can be applied at national, provincial or local level. and can accommodate the most sophisticated or most simple infrastructures.

BACKGROUND

Tasmanian cities and towns have emergency plans that have been developed using internationally-accepted processes. The plans describe a set of arrangements for dealing with emergencies that could arise from a number of identified hazards, and are based on descriptions of the hazards, the community which they could affect and the type of consequences/results that

could occur should they impact.

The arrangements described in the plan provide for a management structure that will oversee and coordinate the combined activities of all agencies in the event of an emergency. The plan does not deal in detail with the nature of essential services, the combinations of organisations required to provide the essential services or the requirements for managing an emergency from the perspective of single agencies and their essential services. This would entail, among other matters, a consideration of the extent that one agency relies for its function on the resources of one or several other agencies. It is clear, however, that there are a number of fundamental services without which a community cannot function effectively, and which will be a necessary priority for restoration following an emergency.

Identification of the requirements for restoration of these services and the interdependence between services for and during restoration, is therefore a necessary supporting activity to the process of planning. It should lead to strengthening of organisational plans and implementation of vulnerability-reducing works where appropriate. Without these changes, the emergency event may be unduly serious or prolonged, and lead to increased levels of hardship in the community.

Some other communities, most recently Christchurch in New Zealand, have undertaken this type of study on what has come to be called "Engineering Lifelines". Many benefits have flowed from earlier studies, and Tasmanian cities have gained from undertaking this study.

The following methodology was based on that used by the City of Christchurch, but in the context of the planning process still existing in Tasmania. Limitations are discussed, and parameters of the project are identified. The significant assistance given to us by the Christchurch project organisers is gratefully acknowledged.

INITIATION OF THE PROJECT

Tasmania State Emergency Service (TASES) has a charter to promote and support emergency management activities throughout Tasmania. As a consequence of this role it has referred to the Wellington project[5] and monitored the progress of the Christchurch Lifelines project and concluded that aspects of these projects could be applied to Tasmanian communities to enhance existing levels of preparedness.

The Christchurch model has been improved and modified to suit the emergency management policies

in Tasmania and Australia and is adaptable to any international setting.

EMERGENCY MANAGEMENT

Emergency management is a necessary consideration for all providers of essential services. Emergencies can arise from all aspects of the provision of essential services, and can result in death or injury to members of the public, death or injury to staff, increased running costs, increased borrowing, partial or total loss of service, environmental damage, loss of confidence, feelings of insecurity, media scrutiny, job losses and loss of reputation.

Decisions on the management of emergencies within each essential service are the preserve of the management of each service. However some of the information required to make those decisions is not readily available within all the relevant organisations, and the operation of these organisations may depend at least in part on the activities of other organisations. This project addresses this information gap by examining in detail the interdependence between organisations. The outcomes of the project can then be incorporated in the emergency management activities of each organisation, and appropriate adjustment programs can be identified, costed and implemented to suit the needs and priorities of each individual organisation.

Specific quantitative risk assessment is not undertaken as part of the project. This project, however, identifies areas of concern which could warrant further examination by individual organisations. Risk assessment may be meaningful and appropriate in this context, but not in the joint organisational environment of the project. To enter into a debate on risk and probability, where different organisational practices and cultures are involved, would take valuable time and effort away from the areas where real benefits can be obtained.

As was anticipated, participating organisations to date have used the outcomes of this project to:

- initiate or further develop emergency management policies and strategies;
- recognise that events will impact on the organisation in variable ways;
- initiate quantitative risk assessment or other analysis, as appropriate

Although organisations providing essential services may use different approaches to emergency management there will probably be at least the following common elements:

1. definition of the services including operational scope;

2. identification of the hazards that may affect the system;

3. description of the types and levels of damage which may be incurred by the system;

4. description of the system using appropriate characteristics;

5. analysis of the vulnerability of the system;

6. identification of appropriate emergency management measures.

These lead to implementation of emergency management measures which include:

- prevention;
- mitigation;
- response planning;
- recovery planning;
- education;
- training.

PROJECT STRUCTURE

Key lifelines systems were identified as:

- electricity
- fuel
- gas
- sewerage
- storm water
- telecommunications
- transportation - road, rail, sea and air infrastructures
- water

Representatives from each of these lifeline areas attended a workshop with persons invited from the following organisations:

- Chamber of Commerce & Industry
- City Council
- Community Emergency Planning Committee
- Regional Emergency Planning Committee
- Community & Health Services
- Department of Premier and Cabinet
- University
- Bureau of Meteorology
- Emergency Services

Lifeline work groups are identified during the workshop and meet afterwards to produce a report on vulnerability, interdependency and improvement options. Another workshop is conducted for all participants six months after the first to review, coordinate and adjust draft reports as a preliminary to producing a final report. The combined report is published within six months of the second workshop.

A key part of the project is the identification of hazard management strategies in relation to lifelines. This will be accomplished in two stages - the first during the workshop when the process will be explored and an overall picture will be determined, and the second during the on-going work group activities when considerable detail is produced

At the first workshop, participants are asked to:

- examine the outcomes of previous lifelines projects
- apply the methodology required to undertake the project
- review the effects of a recent major Australian emergency
- identify credible hazards
- analyse identified hazards
- compare the potential effects of each hazard on each lifeline
- describe the relative vulnerability of each lifeline and or it's elements
- compare typical lead times for undertaking repairs
- describe the interdependence of each lifeline
- identify options for preventing or mitigating the effects of the hazards on the lifelines
- identify appropriate work group memberships

Subsequent to the first workshop, work groups then undertake in detail the following activities for their particular lifeline:

- examine the potential effects of each hazard on the lifeline
- identify specific lead times for undertaking repairs
- describe the interdependence of the lifeline with each of the other lifelines
- specify options for mitigating the effects of the hazards on the lifeline
- recommend areas where further action is required

The final report is used by agencies in their emergency management processes. The report highlights areas where action may be required and provide an initial justification to take further action should this be decided.

IMPROVEMENT OF HAZARD MANAGEMENT

Where it is decided to initiate or improve levels of hazard management, then a total emergency management approach could be used across all functions of the organisation. The following actions are an example of an organisation-wide approach:

Locational - **such as:**

- siting and land use controls;
- safety separation distances;
- control of population densities and their surrounding land uses;
- selection of less hazardous locations.

Technical - **such as:**

- the design and layout of plants and equipment;
- planned redundancy of equipment;
- incorporation of 'fail safe' design of critical components;
- compliance with appropriate standards and codes;
- protection for critical components;
- back-up facility for critical components.

Operational - **such as:**

- planned maintenance of equipment;
- provision of safety and environmental protection procedures;
- systems monitoring;
- response planning;
- training in procedures and practices;
- regular performance audits.

VULNERABILITY ANALYSIS

The process of vulnerability analysis begins with an identification of key effects parameters of each hazard. Key hazard information is drawn from the Emergency Plan, and from the participant's knowledge and experiences. Effects include losses and damage that could be due to the following:

- explosion or overpressure
- electromagnetic surge/strike
- excessive wind loading
- ground subsidence or slide (including snow, mud etc)
- heat
- lateral ground movement
- loss of load capability of foundations/ground
- structural collapse/failure

- vertical ground movement
- water ingress or inundation

Discrete lifeline elements are then determined and assessed for vulnerability. The following scale is used to assess the **susceptibility** to damage for each element against each hazard.

SUSCEPTIBILITY INDICATOR

Consequences of failure of each element and the ability of the community to function, its **resilience** can then be determined according to the following scale:

RESILIENCE INDICATOR

The relative **vulnerability** of a lifeline and its component parts may then be indicated by consideration of the susceptibility indicator and the resilience indicator using the following matrix.

VULNERABILITY CHART

(produced by John Lunn of the Tasmania State Emergency Service 17 May 1995 with input from the following people: Merrick Chatfield, Allan Dodds, Bevis Dutton, Peter Koob, Ian Manock, & Garry Muldoon)

The financial resources of any community are finite and therefore decisions need to be made about where the limited funds may be invested for the most benefit. The purpose of the vulnerability chart is to display the relative vulnerability of the various elements. If any element has a High rating for Susceptibility and a Very Low rating for Resilience then it would appear to warrant more urgent consideration than that which had a Very Low rating for Susceptibility and a High rating for Resilience.

The vulnerability indicator may be obtained from the following scale:-

Susceptibility rating	Resilience rating	Vulnerability indicator
Very Low	High	2
Very Low	Medium	4
Very Low	Low	16
Very Low	Very Low	256
Low	High	3
Low	Medium	9
Low	Low	81
Low	Very Low	6561
Medium	High	4
Medium	Medium	16
Medium	Low	256
Medium	Very low	65536
High	High	5
High	Medium	25
High	Low	625
High	Very low	390625

The vulnerability indicator numbers have no special pseudo scientific basis. They are just squared each time to indicate that the importance of each factor increases dramatically as a situation of high susceptibility and very low resilience is approached. The numbers only indicate the relative vulnerability that you ascribe to the elements that you have considered.

TASMANIA ENGINEERING LIFELINES PROJECT

RISK ASSESSMENT PROCESS

Project Defined.

The identification and appointment of an appropriate project manager is a key element of the success of this process. The definition of the aim, objectives, scope, authority and resource requirements are as vital for this as any other project.

Working Groups Formed

Working groups
- Electricity
- Fuel
- Gas
- Sewerage
- Storm Water
- Water Supply
- Telecommunications
- Road Transportation
- Rail Transportation
- Air Transportation
- Sea / River Transportation

Working Groups Membership

- Identify individual lifeline working group
- Identify appropriate chairperson
- Identify agencies with vested interest
- Identify interdependent lifelines working group, and appropriate chairperson
- Identify appropriate workgroup membership
  - knowledge
  - skills
  - experience
  - specialist ability
  - commitment to project
  - agency approval

Hazards Identified

These may be identified in a number of ways as long as the working groups are satisfied that the list reflects those things that they wish to see included. One source which might save a lot of work and a reinventing of a wheel is the appropriate municipal emergency management plan, eg.
- Municipal Emergency Management Plan Identified Hazards
  - Flooding
  - Fire / Explosion
  - Bushfire
  - Major Traffic Accident
  - Aircrash - City Area
  - Building Collapse
  - Storm / Tempest
  - Landslide / Mudslide
  - Earthquake
  - Terrorist Activity
  - Civil Disturbance
  - Industrial Action
  - Human Epidemic
  - Food Supply Contamination

- Water Supply Contamination
- Animal Disease
- Chemical Spillage

Engineering Lifeline Identified

This step in the process is just a simple listing of those essential services that are to be included in the project; eg.

- Electricity - power supply
- Fuel
- Gas
- Sewerage
- Stormwater
- Telecommunications
- Transportation
  - Road
  - Rail
  - Sea
  - Air
- Water Supply

Credibility & Acceptability Determined

With limited resources, it is neither possible nor desirable to provide extensive detail on all of the hazards that have been identified. This next step in the process is a way of prioritising your list of identified hazards by considering the political, social and economic impact. This is the context in which you have to use your limited resources for the most effective hazard management.

The criteria which are used to sort out the priorities are:

- **Political Importance**
- **Social Importance**
- **Economic Importance**

Obviously those hazards with the least acceptable political, social and economic impact are those that you will give your attention to first.

Hazards Described

The appropriate description of any hazard may vary and there is no one right way for any given hazard but the following are some examples:

- Intensity (*how big, fast, powerful*)
- Frequency/Likelihood (*number of times a hazard is likely to cause an event of a given magnitude*)
- Extent (*area that it covers*)

- Time Frame, (*Warning time, duration, time of day, week, year*)
- Manageability (*Can anything be done about it*)
- Tables / Figures
  - Beaufort Wind Scale
  - Modified Mercalli Scale
  - Dangerous Goods Classes
- Anything else that will enable other people to get a picture of the hazard.

Engineering Lifeline Described

Again the appropriate description of any system/essential service may vary and there is no one right way, but some examples are:

- Location
- Construction
- Size
- Capacity
- Area of Coverage
- Key Elements
- Owner / Operator
- Redundancy / Backup Systems
- Maintenance
- Dependence on other services
- Lead time for repair
- Anything else that will enable other people to get a picture of the lifeline.

Interaction Consequences Described

This is a description of what are believed to be the consequences if a given hazard were to impact on the system or its key elements; eg

- Effects of the impact of hazard on lifeline
- Damage to lifeline elements
- Key dependencies
- Disruption to lifeline elements
- Social disruption
- Economic disruption
- Vulnerability Assessment is a consideration of Susceptibility and Resilience
- High Susceptibility and Low Resilience = HIGH VULNERABILITY
- Low Susceptibility and High Resilience = LOW VULNERABILITY

The financial resources of any community are finite and therefore decisions need to be made about where

limited funds may be invested for the most benefit. The purpose of the vulnerability chart is to display the relative vulnerability of the various elements. If any element has a High rating for Susceptibility and a Very Low rating for Resilience then it would appear to warrant more urgent consideration than that which had a Very Low rating for Susceptibility and a High rating for Resilience.

The sequence one would use is:

*   Description of elements
*   Description of credible threats
*   Specification of Susceptibility rating
*   Specification of Resilience rating
*   Determination of Vulnerability indicator

The vulnerability indicator numbers have no special pseudo scientific basis. They are just squared each time to indicate that the importance of each factor increases dramatically as a situation of high susceptibility and very low resilience is approached."

The numbers only indicate the relative vulnerability that you ascribe to the elements that you have considered. There is no absolute right or wrong answer it is just a way you have indicated your relative priority.

Risks to Engineering Lifeline Described

Having completed all of your descriptions, analysis and vulnerability assessments you are now in a position to describe the risks to your system.

*   Is the lifeline at risk?
*   Which particular elements of the lifeline are at risk and to what extent?

Risks to Engineering Lifeline Prioritised

Now you are faced with the dilemma how do you decide which ones you address first. None of us has the resources to fix everything at once so again some sort of overall priority needs to be sorted out; e.g.

Prioritisation Process using:

S M A U G

Seriousness

Those risks that will affect most people and / or will cost most money will be given a high rating. Those risks that will affect least people or cost least dollars will be given a low rating.

Manageability

Those risks that could be most affected by intervention will be given a high rating. Those which we can do little to affect will be given a low rating.

Acceptability

Those risks that are the least acceptable in terms of the political, social, economic impact will be given a high rating. Those which will have little political, social or economic impact will be given a low rating.

Urgency

Those risks that we believe need to be fixed urgently will be given a high rating. Those that could be fixed next year will be given a low rating.

Growth

Those risks which will increase quickly will be given a high rating. Those that will remain static will be given a low rating.

Identification of Emergency Management Measures

You have sorted out which you want to fix first. The last step in this process is a rational approach to the specification of appropriate preventative and contingent actions.

Potential Problem Analysis

*   Identify potential problems
*   Identify likely causes
*   What preventative actions can be taken
*   What contingent actions can be planned
*   Identify trigger events for contingent actions

CONCLUSION

I do not claim that this is the one and only process that will achieve the desired results for your Engineering Lifelines. It is a process that has been applied successfully in Tasmania and I would be happy to see it adopted or adapted in other places so that more people and communities achieve the same outcomes that we are now enjoying.

Further information on the outcomes that have been achieved to date may be obtained by contacting the author:

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FOOTNOTES

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INTRODUCTION

The Emergency Information Infrastructure partnership (EIIP) is the result of the collaborative efforts of several organizations over the past three years: Congressional Fire Service Institute (CFSI), Federal Emergency Management Agency (FEMA), National Emergency Management Association (NEMA), National Coordinating Council on Emergency Management (NCCEM), National Volunteer Fire Council (NVFC), and State and Local Emergency Management Data Users Group (SALEMDUG). The mission of each agency and organization relates to emergency management and emergency services. Each group sees the "emergency lane" of the information superhighway as a global tool that unifies and profits the entire emergency professional community if we pursue the effort in a united and coordinated manner. By working together in partnership, the EIIP hopes to impact an emergency information system that meets the needs of global emergency professionals.

In the present climate of downsizing and reinvention of government, business and organizations, the Emergency Information Infrastructure Partnership (EIIP) provides a forum that is as flexible and broad-based in its concept as the global emergency management community. The EIIP gives each Partner an equal voice as it attempts to bring all the players into the world of information technology. It also provides for better understanding of the various partner constituencies and requirements while providing opportunities for networking and individual growth for all involved. Any partner representative or individual with email and Internet access can voluntarily participate in EIIP activities. Interaction through online discussions, forums, chats, or other technology-driven means of communication is possible regardless of location, time zone, or area of expertise or interest. This paper will demonstrate the progress and benefits of the EIIP and its hopes and plans for interaction with and service to the global emergency management community.

EIIP ORGANIZATION

The EIIP is a partnership of the emergency management community to support and provide input into the concept of a broad-based emergency management information system. The partnership provides a forum for the discussion of ways to improve performance through cooperating, sharing, and accommodating information needs and requirements across organizations and special interest boundaries. The FEMA Preparedness, Training and Exercises Directorate (PTE) has the lead role in supporting the EII partnership and provides an Internet web site (http://www.emforum.org) to support partnership efforts; FEMA's Information Technology Services Directorate (ITS) also supports the EIIP. The goals of the partnership are accomplished through consensus building via working groups of emergency management community volunteers who are interested in specific programmatic or technical areas.

Representatives of the organizations that originated the EIIP along with the work group Facilitators make up the EIIP core group. The EIIP core group and work groups share information, products, and lessons learned through conference calls, email, the Internet, and attendance at an occasional partnership conference or called meeting. The EIIP is structured to focus on issues of concern to each specific constituency represented while building a community-wide focus. The representatives of the various groups serve as the points of contact for their respective organizations and are responsible for reporting to and receiving feedback from their organizations to ensure ongoing awareness of the partnership's progress and continual input and sharing of organizational perspectives. The volunteers are sponsored by their respective organizations and the participation costs for EIIP activities are generally borne by the sponsoring groups or individual participants. The partnership represents all levels of government as well as academia, the private sector, and volunteer organizations.

EIIP MANAGEMENT AND COORDINATION

The National Coordinating Council on Emergency

Management (NCCEM) supports the EIIP through a cooperative agreement with FEMA to manage and facilitate the activities of the partnership. NCCEM provides coordination, communication and administrative support as required by the EIIP work group process. To strengthen and coordinate the EIIP, NCCEM ensures an open dialogue between the EIIP core group and all work groups on a regular basis. NCCEM sustains information flow through documented milestones and accomplishments. The organization also works with FEMA PTE and ITS directorates to ensure facilitation and formal reporting to meet the needs of the EII partnership and utilization of the EIIP web site .

The initial part of NCCEM's management of the EIIP was a 6-month pilot project. With continuation of the project, NCCEM presently performs work in four major areas: (1) EIIP administrative tasks; (2) EIIP work groups; (3) EIIP electronic newsletter; and (4) Scheduling and monitoring EIIP online events.

The EIIP Administrative tasks include maintaining contact and working with FEMA staff to establish email accounts for timely communication and sharing of data and reports related to EIIP work. This involves establishing and testing electronic file transfer capabilities, reporting and financial procedures between NCCEM Administrative Staff and the EIIP Coordinator. NCCEM also drafts correspondence and guidance documents for dissemination to organizations and individuals involved in the EIIP. Additionally, NCCEM participates in numerous conference calls and physical meetings with the FEMA project officer, FEMA staff, the EIIP core group and the work groups.

The EIIP work groups meet monthly. Each group has a facilitator and a specific mission. Email and Listserv are the means of notification of the meetings. Electronic reminders and agendas ensure meaningful group sessions. Highlights of all work group activities on the EIIP web site serve to document and track work efforts. All work groups agreed early on that the EIIP web site is the key to the success of the EIIP. Each work group monitors and continually inputs to the enhancement of the web site format. work groups also use and test new online features with the goal of moving the conduct of work group business to the EIIP web site .

NCCEM is responsible for the production of a monthly electronic newsletter for the EIIP. The newsletter, *Emergency Partner Postings*, reports on EIIP activities and solicits submissions on any subject related to information technology. All issues of *Emergency Partner Postings* are on the EIIP web site (http://www.emforum.org).

Scheduling and monitoring online events for the EIIP is a very exciting prospect as the "Virtual Forum" evolves. This is the area of interactivity in which any and all emergency personnel should participate. Depending on the nature of discussions, analysis of responses may play a role as the "Virtual Forum" strives to serve the emergency management community. As more and more professionals come online and use the various telecommunications technologies, the interactive feature of the "Virtual Forum" should generate meaningful and thought-provoking dialogues.

In addition to the regularly scheduled activities, the EIIP is flexible and takes advantage of various conferences and other opportunities to publicize the Partnership and promote the use of technology. For example, EIIP representatives worked with SALEMDUG, the NCCEM Science & Technology Committee, FEMA PTE and ITS directorates, the State of Alaska Division of Emergency Management, and Internet Alaska to provide Internet demonstrations for the NCCEM conference in Anchorage, Alaska last October. The demonstrations allowed attendees to experience first hand some of the vast amount of information available through current technologies. Experienced Net-users were present in the demonstration area to assist conference participants. While conference participants enjoyed the demonstrations, EIIP members not in attendance at the conference accessed the EIIP web site from home. They interacted in various forum areas and watched for online updates of NCCEM Conference activities on EIIP web site .

THE FUTURE — THE VIRTUAL FORUM:

With pilot project activities as a background, the EIIP core group met in a 3-day planning session in March 1997 to draft a strategic plan to guide the partnership into the future. From the beginning of the EIIP, the EIIP web site was critical as the most visible tool for the partners. The planning meeting was instrumental in distinguishing the EIIP site as more than just another home page with links to a multitude of resources related to emergency management. Passive links and resources are available on the web site and serve an important function. However, the EIIP Virtual Forum, as envisioned, will allow the emergency professional access to and dialogue with other professionals. The "Virtual Forum" will provide a mechanism to bring all aspects of the emergency management community into an interactive forum that serves the profession and the individual professional. The Virtual Forum will serve as a means of unifying and standardizing programs, train-

ing and terminology as never before. Imagination and willingness (or lack thereof) to participate are the only limitations to the "Virtual Forum". With emerging technologies, there is no way to predict what the "Virtual Forum" may offer for the emergency professional in the not-too-distant future. As we prepare for this challenging adventure, the following vision and mission statements are critical to the future progress of the partnership.

- EIIP Vision: To be the "Virtual Forum" for dynamic exchange of emergency management information.

- EIIP Mission: To provide innovative solutions to emergency management challenges by exploiting the information infrastructure.

According to the EIIP Strategic Plan, each work group is busy with interrelated tasks and activities to move the partnership toward its vision—the "Virtual Forum". Presently, the EIIP web site is the main focus for all work groups. The server is in FEMA Headquarters and is subject to constant monitoring, upgrades, and improvements as the EIIP grows and matures. The EIIP work groups are responsible for essential developmental activities that determine the overall success and achievement of partnership goals. The types of activities and scope of work involved are indicative of the formal names of the work groups below.

- Discussion Forum Work Group

- Outreach & Coordination Work Group

- Resources: Information & Professional Development Work Group

- Architecture & Content Work Group

- Requirements & Vision Work Group

- Technology & Evaluation Work Group

The nucleus of the EIIP effort is the EIIP web site (http://www.emforum.org). The server provides the electronic newsletter, Listserv and File Transfer Protocol (FTP) capabilities, news groups, and live chat sessions. Various pages reflect partner activities, professional development opportunities, and a multitude of resources with links to many informative web sites. The EIIP maintains a schedule of special events on the EIIP web site to encourage active participation and interaction in the "Virtual Forum" while sharing information and developing an extensive networking capability with the global emergency management community.

The progress of the partnership and the EIIP web site are exciting and visible evidence that the EIIP is alive and well. NCCEM continues to coordinate and manage the EIIP but hastens to point out that the partnering

process drives the work and accomplishments to benefit the emergency management community and build stronger and more creative partnerships. Other organizations, groups, and individuals interested in the broad-based field of emergency management and emergency services are welcome to work with us as new partners in the accomplishment of EIIP goals.

For additional information about the EIIP, please contact Avagene Moore, EIIP Coordinator (amoore@emforum.org).

ABOUT THE AUTHOR:

Avagene Moore served as the local director of emergency management for 16 years in Lawrence County, Tennessee, USA. Avagene worked four years (1991-1995) as an Emergency Management Project Manager for the Emergency Management Laboratory, Oak Ridge Associated Universities. Responsibilities included the coordination of the Occupational Safety Special Interest Group (OS SIG) for TRADE. She currently runs her own company, Avagene Moore/Professional Management (AM/PM), and serves as Vice President of TEAM Simulations, Inc., of Tallahassee, Florida.

Avagene is a Past President of both the National Coordinating Council on Emergency Management (NCCEM) and the American Society of Professional Emergency Planners (ASPEP). The field of emergency management knows Avagene through her speaking engagements, published articles and papers, and testimony before various congressional committees on behalf of NCCEM and the emergency management profession.

BACKGROUND SUMMARY

Avagene Moore/Professional Management (AM/PM), 10/95 - present: Consultant

- Write Video Scripts, Training Manuals and Guidance Documents

- Manage Emergency Information Infrastructure Partners (EIIP) — NCCEM/FEMA

- Manage and Develop Projects for TEAM Simulations, Inc.

- FEMA Region IV Disaster Assistance Employee (DAE), Community Relations

- Consultant to Science Applications International Corporation (SAIC)

Oak Ridge Associated Universities, Oak Ridge, Tennessee 6/91-9/95:

Project Manager for the Emergency Management Laboratory; Group Coordinator & Project Manager for Training Resources and Date Exchange (TRADE)

ERP&M, Inc., Princeton, New Jersey 1/91-6/91: Personal Services Contractor

City of Lawrenceburg, Lawrence County, Tennessee 1975-1990:

Emergency Management Director; Chaired Local Emergency Planning Committee (LEPC) and 911 Emergency District Board

Professional Affiliations:

- National Coordinating Council on Emergency Management (NCCEM)
- American Society of Professional Emergency Planners (ASPEP)
- National Association of Female Executives (NAFE)
- American Management Association (AMA)
- Toastmasters International

EDUCATING THE COMMUNITY -
BUILDING AWARENESS AND COOPERATION DURING ENVIRONMENTAL DISASTERS

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ABSTRACT

This paper outlines a model for comprehensive community awareness, education, and resource identification that builds community support for disaster response and recovery at the individual, business, and public organizational levels. Particular attention is paid to community education that for all age groups including such harder to reach groups such as the infirm and non-English speaking. The model program includes awareness, self-help, and surveying for resources that can be used to prevent environmental impact or to assist in recovering from such a disaster.

INTRODUCTION

Disasters, whether natural or technological, not only impact citizens in the affected communities, but also citizens who are connected to the people in that community. Issues of shelter, transportation, health care, trauma counseling, financial support, feeding, preparing for severe weather, evacuation, and related concerns must be planned for and carried out during disaster management. How emergency managers set about educating the community - individuals, businesses, volunteers, and public organizations - has much to do with how successful citizens are at cooperating during a disaster and how aware they are of what steps to take to help themselves and others. This in turn may assist with lessening environmental impact, benefiting the community both in reduced cost and long-term community health.

What is a community? Traditional emergency planning is done within defined borders; we plan by county, district, region, state. This is community as defined by geography. Communities are now brought closer together by nearly instantaneous communication networks, encroaching physical boundaries due to population growth, and faster and more accessible transportation. Our concept of a geographically defined community is giving way to a newer concept, that of the linear community. Linear communities have relationships even though they are physically removed from

each other. As we work as emergency professionals to mitigate the environmental impacts of disaster, we must educate ourselves to a broader definition of community.

Let's look at a few examples of linear communities. Think of a coastal town hit by a hurricane. The hurricane moves on and response operations gear up. But the people in that coastal town are connected to the communities 50 or 100 miles away which are also hit by the same hurricane. Disaster response may be strained at the regional level, businesses which serve both communities are asked to support operations in two locations, friends and relatives who live in the two towns cannot assist each other with temporary housing or food, volunteers cannot move from one geographical town to the other to provide additional assistance.

Consider a mid-sized city in the middle of the United States which is hit by a severe flood, resulting in losses of power, communications, and transportation. In the city, a small warehouse and shipping concern which ships pharmaceuticals for a large California company cannot operate for several weeks. There is a linear community link with the California firm, which has no weather disaster. There is also a linear community with several hundred pharmacies and hospitals which are expecting pharmaceuticals to arrive. Is there then a crisis in these communities? Probably, at least in the short term, while plans are put in place to ship from another location - assuming the California firm has another warehouse, the pharmaceuticals are available, and the data about orders can be somehow obtained.

Think of a small Florida town with a large Greek-American community which suffers from a chemical fire, requiring evacuation of a portion of the town. Nearly all the citizens in this community immigrated from a larger Greek American community near New York; the communities are "sister cities" and ties are strong. Communication is snarled as the New Yorkers aggressively try telephone, cellular phone, e-mail, ham radio and fax to get information about their extended family members. Emergency workers are surprised

when within 24 hours 200 New York Greek-Americans arrive to help out - requiring shelter and food in an already strained community.

The concept of linear community is important; as emergency professionals it pays to ferret out the links that will be enacted when a disaster occurs in your geographical community. The unknown and unexpected can increase the severity of impact because people will always act in community whether the link is physical or linear.

Identifying linear communities. Simple as it may sound, the most effective way to identify such links is to ask. Ask regularly and widely. Ask such questions as:

- If you are required to evacuate your home, where would you most likely try to go?

- Who do you think would come to assist this community should it suffer a disaster?

- How would you try to find your family members during a day you are all away from home if a disaster occurred?

- How would you attempt to communicate with friends and relatives who want information about your whereabouts and safety during a disaster?

- How would your business seek to fulfill its customer's needs while impacted by disaster?

From the answers to these questions one can obtain a sense of public behaviors during a disaster, something we often overlook, even though case after case tells us that citizens often do not blindly and obediently follow instructions during a disaster. From the answers to these questions one can also begin to build a community education program that is tailored to citizen and business concerns, also a program that informs what actions to take, and equally importantly what actions not to take, and why. People are far more likely to cooperate if they know in advance what you will ask them not to do and the adverse impacts of those actions. Otherwise, people will act in their own best interests first and foremost.

Setting goals for community education programs. Given that one understands linear community links and anticipated public behavior, one can plan a comprehensive community education program. It is possible to educate and inform in the same breath, getting more use out of resources spent on community education. It is also possible to include the entire community. Here are examples of behavior patterns fostered by a community education program which seeks to shape behavior and inform all citizens.

- Given regular and consistent education, citizens will take action during a disaster as directed by emergency communications.

- Given regular and consistent education, citizens will refrain from behaviors which impede response and recovery.

- Given regular and consistent education, citizens will share by word of mouth the importance of their actions in an emergency and how specific behaviors impact the entire community.

- Given regular and consistent education, citizens will know how best to communicate with friends and relatives outside the geographic area to provide news.

- Given regular and consistent education, appropriate actions will be taken by all age and ethnic groups.

- Given regular and consistent education, business will demonstrate willingness to share in community education costs as a way to lessen environmental and economic losses during a disaster.

These goals are ambitious, but certainly achievable. Since funding for community education is often limited, emergency professionals are wise to set specific goals before spending resources. This also assists in recognizing where one can ask for additional private resources.

Building a comprehensive education program plan. A model program for building comprehensive community education begins with identification of community groups. (Remember, one may find through questioning that not all community groups are geographically intact. Think linear!) One useful way to think of community is to use four large categories, which are:

- Individual citizens and citizen groups

- Business - home-based, small, mid-size, large

- Volunteer organizations

- Public organizations

The task is to generate a comprehensive listing under each of the four categories. Just as in rescue operations, seek and search thoroughly. Ask individuals, clubs, churches, hospitals, police, schools, advocacy groups, and business owners. Think of transient populations such as seasonal tourists and immigrant workers. Remember home-bound populations. Think of ethnic groups who may be living in areas that are less accessible and who have less access to communication technology. Plan for those with special needs, such as deaf or otherwise disabled, and those who speak a different

language. Check for religious or other cultural groups who may not use modern communications or energy at all. Consider the very young and the very old. Make the listing under each of the four categories as comprehensive and complete as possible. Realize that the list will be alive; plan to review and update it annually.

A benefit of building such a comprehensive list is that your community education program is already under way. Why? You've been out asking questions and letting people know that the public policy is to take disaster planning seriously and to be inclusive of all citizens. That builds reputation and gets attention. The first step is actually assisting to meet your goals before the model is even complete!

Identifying education topics. After completing and analyzing the comprehensive target list, one can begin to identify specific topics needed by each audience. Some topics will be pertinent to everyone, some not. In order to keep track of what's needed by each audience a training matrix can be developed. Along one side of the matrix, list the target groups. Along the other, list all the topics for community education programs. Such a list might include the following:

- Shelter in place
- Emergency shelter
- Evacuation routes
- Emergency transportation
- Building security
- Medical assistance
- Meeting elder needs
- Meeting infant needs
- Obtaining emergency assistance in other languages
- School closings
- Communication for hearing-impaired
- Types of severe weather
- Community specific hazards
- Trauma counseling
- Emergency financial support
- Obtaining money when financial institutions are closed
- Energy conservation and rationing
- Communication rationing
- Use of cellular phones in an emergency
- Obtaining food supplies
- How grocery stores operate in emergencies
- Family plans for meeting when away from home

- Basics of shelter from chemical and fire
- Basics of shelter from severe weather
- What law enforcement does in emergency
- Actions that impede disaster response
- Communication updates and when to expect them
- Protecting and caring for pets in emergency
- Volunteer groups and what they do
- Education for volunteer groups active in emergency
- Business resources - what banks, schools, public offices, law enforcement, search and rescue, and private businesses can do

The list will of course be tailored to meet individual community needs since every community has specific and special needs. Once the topics are listed against the target groups it is possible to check which target group needs which topic, and the target-to-topic matrix is complete.

Delivery of the program. With a community-specific matrix that identifies targets and topics, it is much easier to generate creative ideas for delivering a comprehensive community program. Emergency professionals may limit their scope because the budget is small, but with a comprehensive matrix in hand, it's not hard to go back to the groups one already knows and clearly show what the community needs. Be open to offers of help, and don't be shy in asking for public/private partnerships to achieve your stated goals. What are community groups and businesses already doing that could be expanded just a little to include parts of your program? It may be possible to piggyback onto existing activities for very little or no financial resources, especially once the public and community groups understand that the end result is to help stem economic loss and recover quickly. For instance:

- Newborn education for parents can include infant care in an emergency, where to listen for instruction, what to take in case of evacuation.
- Home health care staff can offer distaster education to elders who live alone.
- Churches can offer curricula for youth and adults in protecting the environment and the community, as stewards of the earth.
- Teens can view brief videotapes, after helping to make them in their high school arts classes.
- Advocacy groups for the homeless, mentally impaired, and transient populations can be educated to share information as they counsel these citizens.

- Schools can include information in parent-teacher organization meetings, in printed materials sent home with students, and in registration information at beginning of terms.
- Grocery stores can print information on sacks.
- Veterinarians can provide flyers to pet owners along with annual pet injections.
- Businesses and community groups who have Web sites can add information about their operations during a disaster.
- Telephone and cellular phone companies can provide emergency communication information in monthly bills and in new customer information.

These are a just a few of many creative ideas to enact a community education program. Networking is key. Remember to stick to the goals and show the need. When citizens, community groups, businesses, and volunteer organizations have signed on to help, review the matrix to identify what is still lacking. Where there are "holes" in your matrix (unmet needs) use budgeted resources to fill in the gaps.

Document what's been done. Another component of this model is to ensure careful documentation of the program. Show what's been done. Gather data. Thank citizens, community groups, and businesses who have been of assistance. Get local media to recognize these people and groups. Talk about the cooperation often, both out in the community and in the emergency organization. Review and update the comprehensive education plan annually. Share successes with other communities, especially those that have linear links to yours. Ask other communities what they've done and copy it; remember that imitation is the sincerest form of flattery! Assess what did not work well and go back to the drawing board; try another tactic next time around.

SUMMARY

The key components to a successful comprehensive community education program are:

- Stress why - Awareness and cooperation save dollars and prevent disasters from having worse-case economic and environmental effects.
- Think broadly - Community is defined as relationships both in and out of a specific geographical location. People act in community whether the link is physical or linear.
- Set written goals after consultation with citizens, community groups, volunteer organizations, and businesses, both small and large.
- Identify as comprehensively as possible target audiences, grouping them into individual and citizen groups, businesses of all sizes including home-based, volunteer organizations, and public entities.
- Identify education topics and develop an educational program matrix showing target-to-topic needs.
- Be creative and aggressive in program delivery. Show the needs by sharing the matrix. Be open to offers of help and ask for what is needed. Stress again the economic and environmental benefits of a cooperative, active community program.
- Document what's been done and publicize it well. Assess the program annually and change what doesn't work.

Building awareness and cooperation during disaster is an ongoing and key component of effective emergency planning and response. The payoff can be seen in decreased economic impact, less strain on the environment, and improved community health. With this in mind, what's to lose?

LOCAL EMERGENCY MANAGEMENT: A TALE OF TWO MODELS

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The intergovernmental paradox for emergency management is that the governments least likely to perceive emergency management as a key priority – local governments – are at centerstage in terms of responsibility for emergency management. Beverly Cigler-1984.

Emergency management is the process of making public officials think about things they don't want to think about, spend money they don't have, preparing for something they don't believe will ever happen! Mike Selves-1996.

ABSTRACT

In emergency management, two problems have become axiomatic — the pivotal role of local government in emergency management and the difficulty of "selling" emergency management to senior officials. We all talk about them and use them to emphasize the importance and difficulty of our jobs; however, we often fail to take a critical look at the underlying philosophical bases upon which local emergency managers operate and at the practical implications which result from these philosophical bases. The premise of this article is that this failure accounts for a good deal of the misunderstanding of our roles – especially by local government executives.

Nearly ten years of experience in emergency management – all of it working with and in local government – has led me to the observation that local emergency managers operate primarily from two philosophical models and that the selection of one of these models has a significant impact on the perception (and, therefore, the effectiveness) of the local emergency management program. The purpose of this article is to describe the models, to set forth potential policy implications involved with their use, and to suggest approaches which may help local practitioners integrate the models for a more powerful and effective program.

INTRODUCTION

The philosophical models under which most local emergency managers operate (either intuitively or consciously) fall into two general categories – "emergency services" (ES) and "public administration" (PA). There was a time when a third, "military", model was common. Changes in the world scene and national policy, however, have made this model virtually obsolete at the local government level.

There is, I believe, a rationale for this philosophical dichotomy. During the first seven decades of this century, Emergency Management was primarily "Civil Defense"; its model was the military; its emphasis was national defense. The Civil Defense "niche" was well defined, and both the practitioners and those outside the field had a fairly clear idea of what the job entailed and the role of the Civil Defense program. That operative model could be described as "military". A large percentage of CD practitioners were ex-military; they viewed their jobs as an extension of the military and their credibility was determined by their experience and knowledge concerning national defense issues.

In the late 1980's, three major factors changed all that dramatically. The first was the passage of Title III of the Superfund Amendments and Reauthorization Act (SARA), which dealt with a community's right to know about hazardous chemicals and with the local jurisdiction's responsibility to plan and train for emergency responses to hazardous chemical incidents. The second was the end of the Cold War and the disintegration of the Soviet Union which significantly reduced the already waning (at least at the local level) emphasis on national security issues. The third factor was a significant increase in catastrophic disasters in the late 1980s and early 1990s which dramatically focused the nation's attention on emergency/disaster management, especially at the state and local levels.

Wthin any profession there are always competing philosophies, and the two models dealt with in this article have significantly different perspectives which are readily observed in the organization and culture of a local E.M. program, in the nature of the interactions with other agencies, and in the general assumptions and perceptions which persons, both within and outside the program, have regarding the role of E.M. within the lo-

cal community. These different perspectives make it imperative that anyone responsible for leading a local E.M. program have a firm grasp of what model they are following and, most importantly, why.

While it will become clear that I am concerned about the general lack of a public administration perspective and the pitfalls of a strictly emergency services approach; the primary purpose in setting forth both models is to encourage emergency managers to engage in serious introspection and to examine their programs and operating philosophies rather than to advocate one model and criticize another. Perhaps the most important competency in good management/leadership is self-awareness, that is the ability to examine our beliefs, values, attitudes and styles and to honestly assess the impact they have on our organizational effectiveness. It is toward the development of this self-awareness that this article is dedicated.

DESCRIPTION OF THE MODELS

Emergency Services (ES): The first model is based on a view of Emergency Management as being primarily concerned with the coordination of emergency services' response to major emergencies and disasters. While such areas as mitigation, public awareness, continuity of government, and other such "non-emergency" issues are usually addressed, it is clear that the Emergency Services model views the response functions as primary. While there has been no major scientific inquiry as to the relative percentage of programs operating under this model, empirical evidence suggests that the percentage has increased dramatically over the last 10 years. This increase is undoubtedly due to the major emphasis on the SARA Title III program which began late in the 1980s. Since HaZMat is an area in which the Fire Service community has been active, the increase in the number of local emergency managers with Fire Service affiliations or backgrounds has increased. Previously, the emergency service most often associated with emergency management had been law enforcement.

The tendency within this model is to emphasize people, equipment and procedures based on their use in emergency response situations. This is certainly important work, but the emphasis is often at the expense of a broader understanding of the governmental policy issues which are part of the essential functions of Emergency Management. As an example of this problem, exercises tend to resemble "drills" which involve the movement of response personnel and equipment. The higher level decision making and interdepartmental coordination functions of a jurisdiction are seldom, if ever,

exercised. Plans tend to focus on the roles and responsibilities of emergency services agencies and to resemble standard operating guides rather than broad jurisdictional policies during times of crisis.

Under the ES model, organizational interactions tend to occur primarily between emergency services agencies. Managers may be reluctant to interact with non-emergency services agencies and especially with senior, elected officials. Often, emergency management functions are embedded within an emergency service agency. This has the effect of isolating them even further from the policy making functions of the jurisdiction. Access to local executives and elected officials is often indirect and limited by the organizational structure. Interaction with policy level officials is also often characterized by the attitude that the "politicians" are a nuisance during response operations and should be "kept somewhere so they don't get in the way". Influences of the ES model can also be seen in aspects of the organizational culture of the EM agency such as the adoption of emergency services characteristics including equipping vehicles with red lights and sirens and the wearing of uniforms.

Public Administration (PA): The PA model is based on a philosophy which views emergency management as an element of the overall administration of government. It sees emergency management as that aspect of public administration which deals with the operation of government during crisis. Because of this, there is an interest in the political, social, and psychological factors that are involved in crisis management. The concern is focused not just on the emergency services response, but also on the impact of a disaster on larger jurisdictional issues. The PA model may reflect to some degree the need to continue the Civil Defense emphasis on the preservation of viable government and community functions regardless of the crisis situation. Indeed, PA model emergency managers give significantly more attention to Continuity of Government issues than their ES model counterparts. To say that the PA model is simply a remnant of the national, Civil Defense perspective would be seriously misleading, however.

Practitioners operating under the PA model tend to approach emergency management as a discipline, subject to academic research and debate with the results being used as tools in implementing a local program. The current emphasis of the NCCEM and EMI on the development of emergency management as a profession with a supporting academic foundation in institutions of higher education is a prime example of the PA model at work nationally. The University of Delaware's

Disaster Research Center, the University of Colorado's Natural Hazards Research and Applications Information Center, and the ever-growing number of emergency management degree programs are further examples.

Practitioners of the PA model recognize the necessary role of both politicians and the media in dealing with crises and work to find the appropriate context and methodologies for those roles to be carried out. The PA model emphasizes the coordination and integration of all governmental (and often private) efforts under a single, pre-established framework and considers the work of emergency management to be the development of that pre-established framework and the achievement of consensus around it.

ORGANIZATIONAL IMPLICATIONS OF THE MODELS

Having described the models and discussed the characteristics of each, the question arises, "What difference does it make?" The selection of the basic model by which we operate can have significant impacts on the way emergency management programs are perceived. An approach based on the ES model for instance tends to limit the scope of the local emergency management program and invites questions about its necessity. Why, for example, do we need an emergency management program when our fire service, police and EMS departments are doing an excellent job already? When viewed from a purely ES perspective, there is an apparent duplication of effort which makes it more difficult to justify emergency management programs in times of severe budgetary constraints.

The ES model also tends to produce "turf" concerns within the existing emergency services agencies. If emergency management is perceived to be an additional emergency service agency, it follows that it will impact on the degree of control and autonomy exercised by the other emergency service agencies. In such situations, suspicion and resentment from the rest of the emergency services community may be increased. Many of the external indicators of the ES approach - wearing uniforms, using emergency equipped vehicles, responding on site to emergency situations, etc. - only serve to exacerbate any perceived conflict of roles and responsibilities. In order to overcome this problem and still operate under the ES model, some emergency managers present their role as simply "resource support for emergency services." Such an approach sometimes solves the conflict problem, but limits the role of emergency management even further and invites the argument that the function is redundant and unnecessary.

Under the ES model, local decision makers usually turn to one of the emergency services to handle emergency management as an additional duty. This significantly complicates the emergency management role as a jurisdictional coordinator, since other elements of local government may then perceive emergency management as a "fire thing" or a "police thing" rather than seeing it as the independent and transcendent function it has to be in order to be effective. This is a symptom of the most significant problem with the ES approach - the perceptions of senior elected and administrative officials about emergency management. Municipal managers and administrators for example, are educated and trained to view things from the perspective of the academic discipline of public administration. From that perspective, emergency services has a well-defined, but limited, role in local government. An emergency management function which is perceived by public administrators as falling under the emergency service rubric risks being seen as severely limited in scope and risks having its broader integrating function misunderstood or ignored. Every day, I hear laments from local emergency managers that they cannot get the support or understanding of their elected or administrative officials. I am firmly convinced that, in many of those instances, the implications of choosing an ES model may be the primary cause of their problem.

These problems with the ES model should not be interpreted as an argument against establishing a strong empathy for and involvement with the local emergency services community. Certainly, the first line of response is emergency services and a primary objective of emergency management must be the support for and integration of that response into an overall jurisdictional plan for disasters. In truth, emergency management and the various emergency services are separate, different, but equally important functions within an integrated emergency management system. The important distinction i is between being both closely involved with emergency services and being a strong supporter of emergency services and being a part of the local emergency service function.

An example of the blurring of this distinction on a national level was the creation of NFPA 1600 regarding disaster management. While the fact that NFPA was interested in standards for emergency management was laudatory, the implication that emergency management was a function which fell under the purview of a fire service organization had the potential for serious misunderstandings about the roles of the respective disciplines. Emergency managers operating under the P-A

model would argue that if any entity outside the emergency management community should establish such standards, it would be the National Academy of Public Administration (NAPA) which has done extensive research and studies of the emergency management field. Who at the local level would be most interested in a NFPA standard? - the Fire Chief. Who at the local level would be most interested in a NAPA standard? - the City/County Administrator. The implications are obvious.

The implications of the acceptance of a PA model should be equally clear. Under the PA model, the objective of the local program should be expressed in broad terms, for example: "The function of emergency management is to provide a proactive framework and pre-planned mechanisms which allow government to operate in an effective and integrated manner during a crisis." If the transcendent nature of emergency management is emphasized at the upper echelons of local government, the perception of the role and significance of the program is enhanced, and the credibility issue which so many local emergency managers face can be more effectively dealt with. One of the clearest expositions of the PA approach to the role and function of emergency management comes from Sylves and Waugh in their introduction to *Disaster Management in the U.S. and Canada.* "We sought to refute these common myths: that emergency management is all-training and no education; that the field of emergency management has few occupants willing to promote knowledge, creation, and professionalism; that studies of disaster are only uni-disciplinary and anecdotal; and, that emergency management is peripheral, narrowly occupational, episodic work." Perhaps the single most significant characteristic of the PA model is its implicit objective of creating a viable, credible emergency management profession.

The major problem which practitioners may face with the adoption of the PA model is that it may be perceived as being overly abstract, impractical and, therefore, irrelevant. The challenge is to demonstrate that the research, theory and academic discussions which characterize an advanced discipline do, in fact, translate into concrete, pragmatic lessons which can be applied at the local government level. This is an accepted concept in the discipline of public administration. It is certainly possible in the practice of emergency management as well.

TOWARDS INTEGRATION AND TRANSITION

Since I have posited that the two models exist and that there are distinct implications in the acceptance (or perceived acceptance) of either model, the next logical step should be to examine some potential strategies for integrating the strengths of each model and transitioning to a more comprehensive, professional local emergency management program. As emergency managers, we need to understand that our job is primarily concerned with integration of governmental and non-governmental functions before, during and after a crisis event. This job requires the building of a cross-functional team which is capable of integrating and coordinating activities of a wide variety of jurisdictional, private and volunteer agencies. Just as important, however, is our other role as the coordinator of activities of our jurisdictions to ensure the uninterrupted functioning of government during any crisis situation. These roles are valid regardless of the model we have adopted. We also need to realize that there is probably no "pure" adherence to one model or the other. If the models described could be thought of as ends of a continuum with most local programs falling somewhere in between, then the effort to carry out a transition becomes one of adjustment rather than a radical change of direction. The changes required in style and substance need not be overwhelming and sudden. In fact, there is a great deal to be said for making subtle, less unsettling, transitions.

The first phase of any organizational or cultural change requires personal knowledge and understanding. Just as in the integrated emergency management concept itself, any change of this sort should start with a "hazard and capability analysis". One essential characteristic which any manager should have is the ability to realistically assess an organizational situation and honestly evaluate their own capabilities to effect change in that situation. In assessing the situation, it is important to first look at where we are on the model continuum suggested earlier. What external, visible factors are there which indicate to others what our "self concept" may be. What are the possible perceptions which others may form about the nature of our role and function in local government as a result of these factors? Are these perceptions the ones we want others, particularly local decision makers, to have about our role and function (i.e., where do we <u>want</u> to be on the continuum?)? Are we consciously or unconsciously sending messages to our colleagues in emergency services that we are competing for their "turf"? Do we perceive that there is a lack of understanding of the role of emergency management in our jurisdiction? If so, why and at what level does it exist?

After looking inward, we need to consider external factors which may impose on our program certain ex-

pectations about roles and functions. Are there others within the jurisdiction who have a stake in portraying the emergency management role and function in a certain way? Is the organizational climate such that the integrating, coordinating aspects of the PA model are acceptable? What is the value placed on "professionalism" within the jurisdiction? Are there budget constraints which dictate the roles and functions of the emergency management programs? Here, it is important to note that the size and culture of the jurisdiction may have a real impact on the adherence to a particular model. In many smaller jurisdictions, fiscal constraints may dictate that the emergency manager play a more active role in emergency response or even be involved in the day-to-day operation of emergency services. Also, in some jurisdictions, there is no concept of an integrative public administration function. Such situations do not mean that use of the PA model is precluded. It only means that the emergency manager must take extra care in making a distinction between the emergency services and emergency management roles. As indicated earlier, it makes the job of role definition more challenging. What is the disaster history of the jurisdiction and how does that history work for or against changes in the roles and functions of the local emergency management program? All of these external factors should be researched and their importance weighed before embarking upon any actions designed to change the organizational perceptions about emergency management.

Finally, after the introspection and research suggested above, a series of actions should be planned to begin the cultural change. One very necessary first step would be the creation of job defining documents: a mission or vision statement which puts the emergency management function in a broad organizational context, and a set of goals and objectives which outline the desired results of the EM program. Not only is this valuable in terms of defining the emergency management program, it is also consistent with the current trends and prac-

tices in public and business administration. The simple act of creating these documents establishes a perception of professionalism and provides an opportunity to express the purpose of emergency management in terms of our own choosing. A second step could be the gradual elimination of signs and practices which tend to send the wrong signals about the intent and purpose of the emergency management function. If, for instance, there is a concern over "turf" issues, the elimination of those elements of the program which could be misinterpreted as impinging on an emergency service mission would be advisable. An example might be remaining away from the scene of an incident unless the presence of emergency management is required or requested by emergency service responders. A third initiative might be to increase emphasis on those broader elements of emergency management such as continuity of government, public awareness, and establishment of jurisdictional policies regarding crisis operations while working as a supporter and advocate for the emergency services rather than a "competitor". Obviously, specific actions and strategies will be dictated by the local situation; however, the objective should be to transform the image of the emergency management function where this transformation can improve and strengthen our ability to be viewed as creditable and knowledgeable professionals. We must recognize that our conscious or unconscious choices to emulate one or the other of the models will have consequences in terms of our working with others in our jurisdictions and with how we are perceived. First, we must determine which model we wish to work toward, and then ensure that the approaches and actions we take are consistent with the model and have the desired effect. Finally, in order to be successful as good managers, we must constantly review and analyze what we are doing and why. Such activities are not simple or easy; indeed, they are often challenges – but they are necessary to accomplish the vital but difficult job of emergency management.

CIVIL AFFAIRS SUPPORT TO DOMESTIC DISASTER RELIEF OPERATIONS

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A new concept is being introduced into military doctrine which has been termed Operations Other Than War (OOTW) by the 1993 version of (FM 100-5, OPERATIONS.) This concept, within the "Range of Military Operations," provides for the use of military forces in some nontraditional roles such as peacekeeping, nation assistance, and support to domestic authorities. Some of the types of OOTW missions that have been emphasized are Humanitarian Assistance (HA) and Disaster Relief Operations (DRO). The important aspect of training and preparing for these missions is that the tasks of providing the assistance to people in need is the same in an overseas theater as it is in a domestic scenario.

Disasters are suddenly occurring events which produce mass casualties and cause extensive damage to personal property and the public infrastructure. These include events such as Hurricane Andrew, the Mt Pinatubo eruption, the Northridge earthquake, and the mid-west floods. Disasters may be natural or man-made, and do not have to be connected to any military operation.(1) Domestic disaster relief operations use Department of Defense (DOD) personnel, equipment, and supplies to promote human welfare, reduce pain and suffering, and prevent loss of life or destruction of property from the aftermath of natural or man-made disasters. In domestic disaster situations, the coordination of the response is through the direction of the Federal Emergency Management Agency (FEMA) under the FRP for Public Law 92-228. As a supporting agency to the plan, the US Army is the DOD executive agent. The Army's ability to deploy rapidly, and its capability to operate in the most austere environments make it ideal for this mission.(2)

The statutory authority for federal domestic disaster relief operations is the ROBERT T. STAFFORD DISASTER RELIEF ACT, 42 USC 5121. It provides for the declaration of an emergency or disaster by the President as well as describing the amount and type of federal assistance available. The STAFFORD ACT authorizes the President to use DOD assets for the disaster relief operation once a formal declaration is made. The DOD

Policy for implementing the domestic disaster assistance, as outlined in the STAFFORD ACT, is DOD Directive 3025.1, MILITARY SUPPORT TO CIVIL AUTHORITY and Department of the Army Regulation 500-60, DISASTER RELIEF.(3)

The fundamental principle for employing military resources is recognizing that the civil government has the primary authority and responsibility for disaster assistance within its respective jurisdictions. The National Guard has the primary responsibility for providing military domestic disaster assistance within its respective State and is employed under the auspices of a State Disaster Declaration issued by the Governor. A *federal* disaster is any event whose severity or magnitude overwhelms the capability of the local and state authorities to respond to the situation or where the disaster area covers multiple state boundaries. (4)

In a disaster situation, the military role is well defined and by law is limited in scope and duration. Military resources temporarily support and augment, but do not replace, the local, state, and federal civilian agencies that have primary authority and responsibility for domestic disaster assistance. Domestic disaster relief operations are normally conducted in stages; response, recovery, and restoration. The role of the military is most intense in the response stage and steadily decreases as the operation moves into recovery and restoration. The military withdraws when the civilian authorities have regained the ability to provide basic services and security to the affected community.(5)

When a disaster has occurred, assessing the potential or real damage, and the anticipated military support requirements must precede the commitment of military resources. This assessment is usually shared by federal, state, local, and military agencies. This insures the commitment of resources and forces will be appropriate for the mission and that they will be used efficiently.(6) The US Army Civil Affairs units are mission tasked to prepare for and conduct disaster relief operations and assistance to civil authorities in both domestic and foreign situations. As a US Army Reserve (USAR)

element of the United States Special Operations Command, Civil

Affairs units can offer unique skills and abilities to the overall aspect of disaster relief operations. As a Reserve Component element, it relies on its citizen-soldier status to better understand and empathize with the political, economic, and social aspects of an affected community which may not be as well appreciated by an Active Component element. A Civil Affairs unit is designed to be the interface between the military and civilian agencies in the disaster area. The military assists the civilian community to help itself recover from the disaster and reestablish basic services to its citizens. Civil Affairs units advise the military commander on the impact of military activities on the civilian sector by translating civilian needs and requests into the necessary military terminology and planning processes. They assess damage to the civilian infrastructure, assist in the operation of temporary shelters, manage a Civil-Military Operations Center (CMOC), and provide a liaison between the military and the various civilian governmental, non-governmental, and private relief organizations. Also, as a USAR unit, it is not bound by individual state statutes or regulations which would limit the scope of a non-federalized National Guard unit in a multistate disaster situation. (7)

The current doctrine is to use US Army Civil Affairs units to assist in the preparation and conduct of disaster relief operations. In most cases, however, Civil Affairs units are not effectively utilized to conduct their assigned mission because they are located in the Reserve Components. Civil Affairs units have been underutilized or even non-utilized in the past for missions which are directly related to Civil Affairs operations. Many after-action reports have stated the need for Civil Affairs units to be in the initial employment of forces. Historically, however, Civil Affairs units have been brought into the operation in the later part of the cycle. Many of the missions within the realm of Civil Affairs seem to be tasked to Active Component infantry units out of convenience. Today, with the downsizing of the US military forces, there is a greater need for more effective utilization of Reserve Component units for viable missions instead of just tasking the Active Component. There is a need to better utilize Civil Affairs, specifically, to perform roles that clearly fall within their assigned mission and scope. Humanitarian assistance, disaster relief, and support to domestic authorities are ways to accomplish these goals. The long term survivability of Civil Affairs as a functional segment of the overall Reserve Component force is directly related to

the better utilization of these unique citizen-soldier assets to meet both the foreign and domestic disaster relief needs of the United States.

The biggest hurdle to USAR Civil Affairs units being employed in response to domestic or foreign disasters is the National Command Authority's reluctance to mobilize Reserve Component units except in a major crisis situation such as Operation Desert Shield/Storm. Under current law, Federal Reserve Component personnel can be mobilized for domestic disaster relief operations under two statutes; 10 USC 672(b) which cover 15 days of Annual Training (AT) and 10 USC 672(d) which covers volunteers. (8) In a disaster relief operation, these statutes have proved to be both inadequate and unresponsive. The United States can not continue to rely on "volunteer" support for these emergencies. Volunteers, in the past, have provided the greatest level of support when called upon, but the continued reliance on the volunteer system violates our doctrine of employing trained units to meet mission requirements. Relying strictly on volunteers does not insure that the best and most trained or prepared soldiers are utilized—only those who may be available at any given time. Gathering numbers of volunteers together into a provisional unit requires an amount of stand-up time for the personnel to learn their jobs and to work together as a functioning team. This is not the most efficient or effective manner in employing these assets, especially in time-sensitive emergency or disaster relief operations.

If Title 10 USC is amended to allow for the mobilization of up to 25,000 Reserve Component soldiers ("a 25K Call-Up," for humanitarian assistance missions and/or domestic disaster relief operations), Civil Affairs Detachments, Battalions, or Brigades could deploy from their home station to the disaster area via military airlift or self-deploy using organic transportation. As units, they already have an existing chain-of-command, a communications-coordination network, equipment with trained and assigned operators, standing operating procedures (SOPs), and experience, based on their training program, to function as an effective unit in the disaster relief or humanitarian assistance situation. Since their mobilization and employment would be for the stated purpose of providing humanitarian assistance and disaster relief, in most cases, the immediate response periods will usually not exceed 30 days, and therefore, individual Reservists probably would not be in jeopardy with their civilian employer as previously feared. During the response to the Hurricanes Hugo, Andrew, and Iniki, as well as the major winter storms, and floods in the past few years, the outpouring of support from

within the local communities to support those in need has been overwhelming. This popular support should translate to political support which would allow the President or Secretary of Defense to mobilize USAR soldiers for large scale disasters while their use in some low intensity conflict situation such as Somalia and Bosnia may not be as palatable. By using the mobilization authority instead of relying on volunteers, the "25K Call-Up" would protect the Reservist or Guardsman just as any other mobilization statute. How better to demonstrate the importance of the Reserve Components than to employ them to support people in need, especially for domestic emergencies!

Several need to be addressed to better utilize Civil Affairs in meeting humanitarian assistance and disaster relief training and mission oriented operations within the United States as well as overseas. Civil Affairs soldiers must be able to effectively coordinate their efforts with those of the American Red Cross and the Federal Emergency Management Agency (FEMA), which are the primary civilian agencies tasked to provide humanitarian assistance and domestic relief in the United States. Three recommendations to better prepare for actual emergency or crisis operations are: standardized disaster or emergency management training programs through resident and nonresident instruction; a training, coordination, and operations association between the military and civilian agencies; and a way to quickly deploy and employ Reserve Component Civil Affairs elements to provide foreign and domestic humanitarian assistance or disaster relief support.

STANDARDIZED TRAINING PROGRAM

The military element with the explicit mission of preparing and conducting humanitarian assistance and disaster relief operations is Civil Affairs. One of the stated missions of Civil Affairs Commands, Brigades, and General Purpose Battalions is to plan and conduct humanitarian assistance, disaster relief, noncombatant evacuation, and displaced civilian operations in a theater of operations and to train other governments to be able to support their citizens' needs through the development of disaster response plans (9). Civil Affairs soldiers could have an additional skill identifier (ASI) awarded to designate those who trained with or gained specific experience in disaster or emergency services with FEMA, the Red Cross, or other similar relief agencies. Since Civil Affairs soldiers provide the link between the military and the civilian government or agency, the ASI would be used to validate the joint training and experiences necessary in disaster relief operations. FM

25-100, TRAINING THE FORCE, and the various training support literature stresses the importance of training on a task in the same manner as the task is to be executed–train as you will fight. In the humanitarian assistance/disaster relief arena, the best way to train to perform the task during an emergency situation is to train on the respective task or tasks during scheduled training periods. There is no standardized training on these subject areas in the military training system. Where does the military go to get training support packages–to the American Red Cross and FEMA! Other relief agencies are also available, but the training support system of the Red Cross and FEMA can best meet the needs of the military which needs a standardized, distributable training package.

The Red Cross and FEMA provide several standardized, nationally approved training programs in emergency management and disaster services to the civilian population. These programs are targeted at those persons responsible for domestic emergency actions at the local, state, and national level and parallel the Army Training and Evaluation Program (ARTEP) mission training plans for Civil Affairs units from the Command to the Detachment level. There is no need to "reinvent the wheel" in developing training programs for the military to perform humanitarian missions when the civilian "experts" already have a viable system in place. A two-phased training program can be established using the existing standardized programs. The FEMA Independent Study Program provides a no-cost method of gaining an overview of general emergency management processes and procedures. These correspondence courses provide a vehicle to provide training in a group or individual study manner and provides an excellent foundation for more "hands-on" instruction. The American Red Cross disaster services training program provides this support. These courses are taught in a resident or classroom setting by certified Red Cross instructors. This training is at no cost to the unit and it covers basic, intermediate, and advanced level instruction and may include staff exercises based on the needs of the audience. Many of the instructional programs are either 4, 8, or 16 hours in length. Since 97% of the Civil Affairs units are assigned to the Reserve Components, this fits well into their weekend or Inactive Duty Training (IDT) or could be combined into a standardized two week Annual Training (AT) period. This training provides Mission Essential Task List (METL) training to the Civil Affairs units and it also provides a trained manpower pool from the "citizen-soldiers" in the various local communities for the local Red Cross Chapters to

use as volunteers in case of emergencies in which Reserve Component units are not mobilized.

Many of the civilian oriented disaster services training activities fit into the types of military oriented activities Civil Affairs units do on a routine basis. Planning for all military operations always begins with an estimate of the situation. Training in damage assessment procedures teaches the soldiers how to conduct a standardized assessment of the disaster situation and to put this assessment into a series of reports that will help develop a plan or course of action to direct the relief effort. Mass care operations train the soldiers how to organize or set up emergency shelters and mass feedings for large numbers of displaced persons or evacuees. The military has always been proficient in sheltering and feeding large numbers of military personnel in both garrison or field conditions and providing for their basic comfort, health, and welfare needs. In emergency mass care situations, the only difference now is that military unit is sheltering, feeding, and providing for the needs of displaced civilians, instead of soldiers.

Training in assistance to families, teaches personnel how to interview people affected by a disaster and to assist them to meet their immediate and long term needs. This is very similar to the interview processes that take place during a soldier's inprocessing into a unit, birthmonth personnel audit, and processing for overseas movement (POM). Since the majority of the Civil Affairs soldiers are Reservists or citizen-soldiers, they are more familiar with the various civilian support agencies and their respective operations. Civil Affairs soldiers can better direct those in need to places where they can get relief. Active Component soldiers can provide similar assistance in a disaster, but since most active duty family support in similar situations comes from installation or military oriented providers, they may not be aware of the similar agencies in the civilian environment.

The training received through the Red Cross and FEMA opens the lines of communication between the military and the civilian agencies. FM 100-19, DOMESTIC SUPPORT OPERATIONS, emphasizes the importance of mutual understanding, communication, coordination, and liaison between the military and civilian agencies as a key to success in providing effective and efficient domestic emergency response or support. This understanding will allow for an easier transition into working together during actual emergency situations because all agencies in the disaster response have a level of appreciation for the other's goals, objectives, and

methods. The better each responding agency works with its counterparts, therefore the quicker and more efficiently any disaster assistance will be provided to those in need.

TRAINING AND OPERATIONAL ASSOCIATION

One of the successes in preparing Reserve Component units to be combat ready is the Directed Training Association (DTA) program. The DTA program, outlined in FORSCOM Regulation 350-4, TRAINING UNDER CAPSTONE, links similar type Reserve and Active Component units in a training support association. The Active Component unit provides the trainers and their respective knowledge and experience to train their Reserve Component counterparts. This program is designed to raise the level of training readiness of the Reserve Component unit and its soldiers in meeting their wartime mission. The DTA aligned units may not have been in the same wartime chain-of -command or "CAPSTONE trace" but the spirit of the program was to insure trained and ready forces, while at the same time showing the Active Component soldier the capabilities of their Reserve Component "brothers-in-arms."

A similar program can be established for Civil Affairs Brigades, Red Cross, and FEMA Regions. Currently, there are nine Civil Affairs Brigade Headquarters, eight Red Cross Regions, and ten FEMA Regions which can be grouped into training and operational associations to provide disaster relief assistance within specified geographical areas. This association would be established so that the training assistance from either or both civilian agencies would be provided to the Civil Affairs partner. This training would include classroom instruction, drills, and training exercises at various levels. This includes the respective subordinate units or elements of these agencies. This program would support a Civil Affairs Battalion or Detachment by training with their local Red Cross Chapter or Emergency Management Agency. Since operational and contingency plans development and review are a mission requirement of all agencies, the Civil Affairs units and its soldiers could assist the local chapters and field offices in reviewing and developing emergency response plans to meet the needs of their respective communities or areas of responsibility. This fits well into the Civil Affairs mission task of assisting local, state, and national level governments in their respective operational theater. In this manner, Civil Affairs soldiers get the necessary training and experience, through supporting their local agencies, that they will need to provide humanitarian assistance overseas, while at the same time, the Red Cross

and FEMA get additional support in meeting their respective mandates. This allows the Civil Affairs unit to effectively train to meet its "wartime" or METL task under nation assistance overseas by providing domestic assistance at home.

When an actual emergency occurs, the Civil Affairs Brigade Headquarters would be alerted when their respective Red Cross and/or FEMA region is alerted. The Civil Affairs Brigade would coordinate the employment of its subordinate battalions to assist in the emergency response. The emphasis would be on employing at the lowest level of response needed, but with the capability of expanding as the need arises. If the situation elevates to the point of employing large military units to provide disaster response, such as after Hurricane Andrew, the Civil Affairs Brigade could provide the necessary liaison between the military commander and the various private volunteer organizations and non-governmental organizations. In this manner, all of the available assets for disaster response can be quickly brought together to alleviate the suffering of people in need.

CIVIL AFFAIRS QUICK-REACTION TEAM

A Civil Affairs Quick-Reaction Team should be established in Civil Affairs Battalions or Brigade Headquarters. This team would be trained, with the necessary equipment on hand and prepared for deployment within 12-18 hours. The key to this concept is to identify, train, and prepare this Quick-Reaction Team just like an Active Component type unit. Many Civil Affairs Battalions and Brigade Headquarters have a majority of their unit members within one hour's commute of the Reserve Training Center or home station location. The individual soldier's equipment is usually stored at the Reserve Center as well as the bulk of the unit's assigned or TO&E equipment. Once the personnel are identified as team members, they would receive an official letter of notification to give to their respective civilian employers in advance of an actual mobilization order. This advance alert-notification insures that the employer understands the urgency of the Reservist leaving work with little or no notice in the event of an emergency.

The Quick-Reaction team would have received the necessary training to perform disaster response or other related humanitarian missions. This training would include military related subjects, emergency medical or first aid training; disaster operations procedures from existing civilian or non-governmental agencies such as FEMA, the Red Cross, and the Salvation Army; and strategic communications procedures. They would have

been processed in accordance with FORSCOM Regulation 500-3-3, with only the final personnel actions held in abeyance until actual mobilization. All other requisite preparation for deployment would have been accomplished in advance, such as weapons qualification, physical fitness tests (APFT), HIV screening, and general immunizations. The higher headquarters would periodically inspect or exercise the team to validate their readiness in advance of a mobilization order. The team's equipment could be prepackaged or prepared so as to facilitate quick loading. This would include prepositioning air load items and other blocking, bracing, and tie-down items as needed. Necessary supplies, such as food (Class I), fuel (Class III), medical supplies (Class VIII), and repair parts (Class IX), could be preloaded and secured in the battalion, separate from the remainder of the battalion's operational equipment and supplies. Periodic inspections of the individual and team equipment would be performed in order to rotate supplies and to validate the team's readiness for immediate deployment. Vehicle and personnel manifests for USAF or other carriers would be set up in advance and inspected or "quality checked" to save time. Upon notification through command channels, the team members would be notified through the alert roster to assemble at the requisite time and place. The Full Time Unit Support (FTUS) personnel would begin the assembly and load out process while the Reservists begin to arrive at the Reserve Center. Transportation to the emergency site would be coordinated through the US Transportation Command and the team would be given the load and "wheels-up" times. The team members would finalize their mobilization or active duty call-up procedures and be ready to load the equipment on aircraft or road march to the disaster site if appropriate. The FTUS personnel would then access the mobilized Reservist into the active duty personnel system at the closest entry computer terminal while the team is heading to the disaster location. This allows the soldiers to move quickly to the disaster site without having to go from home station to a mobilization site enroute. The Civil Affairs team can be quickly employed in the disaster situation instead of waiting for the slow mobilization process currently in effect. Once on the ground at the site of the emergency, the Quick-Reaction Team would coordinate its efforts with the civilian relief agencies or governmental officials, then provide an assessment to their chain-of-command which could identify the need for follow-on units, especially by type or function, that would best serve the needs of the specific situation. The Quick-Reaction team could also be the advanced party

for the remainder of the Battalion or Brigade which could mobilize and deploy under the current FORMDEPS system.

CONCLUSION

Civil Affairs units have a great deal to offer to the National Command Authority in meeting both the domestic and foreign needs of the US. Because of their unique Citizen-Soldier's knowledge, skills, and abilities, they can bring more civilian-related capabilities and experience to bear, than Active Component units in certain circumstances. The Total Force Policy would be better served if Active Component units were used for missions for which they are trained, while Reserve Component units were used where they are best suited, such as short-term humanitarian or disaster response missions. The Civil Affairs unit's ability to provide humanitarian assistance is directly related to the training and operational experience gained through a working partnership with the Red Cross and FEMA. This partnership in domestic situations translates into related skills and abilities in working with similar local, regional, national, or even international relief agencies in foreign humanitarian assistance missions.

This paper has sought to offer several ways to better prepare Civil Affairs units in meeting their mission training requirements, to develop ways to better employ these trained units to alleviate human suffering, both for foreign and domestic emergency situations, and to better utilize Reserve Component forces during a period of the downsizing of the overall US military force and the shifting of missions within the Total Force. Civil Affairs can be an important "combat multiplier" as well as an economy-of-force element in many missions of the emerging "Operations Other Than War" situations that the military is now facing. As the requirements and the missions within the spectrum of OOTW become more frequent, Civil Affairs should be integrated into these operations as early as possible and in a way to best utilize their skills and abilities. Through the linking of Civil Affairs and the civilian agencies which are charged with domestic humanitarian actions, the best interests of the United States can be achieved. The use of the unique capabilities of Civil Affairs supports the US national strategy and its supporting military strategy as the United States continues in its role as a world leader through its ability to quickly deploy and employ trained military forces anywhere in the world. Now, these forces are seen as a national capability in providing foreign and domestic humanitarian assistance and disaster relief as they were in purely military situations.

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7. FM 100-19, p 4-15.

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