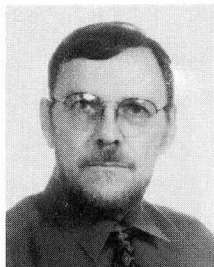


# RESPONSE TO A TRAGEDY



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Everyone feels and understands that the fire at the Sealand Summer Camp is a tragedy. The tragedy is the greatest for the families that lost an important part of the family. The tragedy for society is the loss of citizens that would be future contributors to the society.

There are no actions by the government or by society that will change the outcome of this tragedy. Nothing can replace the lives lost in this fire. The best result of any reaction is to minimize the possibility of similar occurrences in the future.

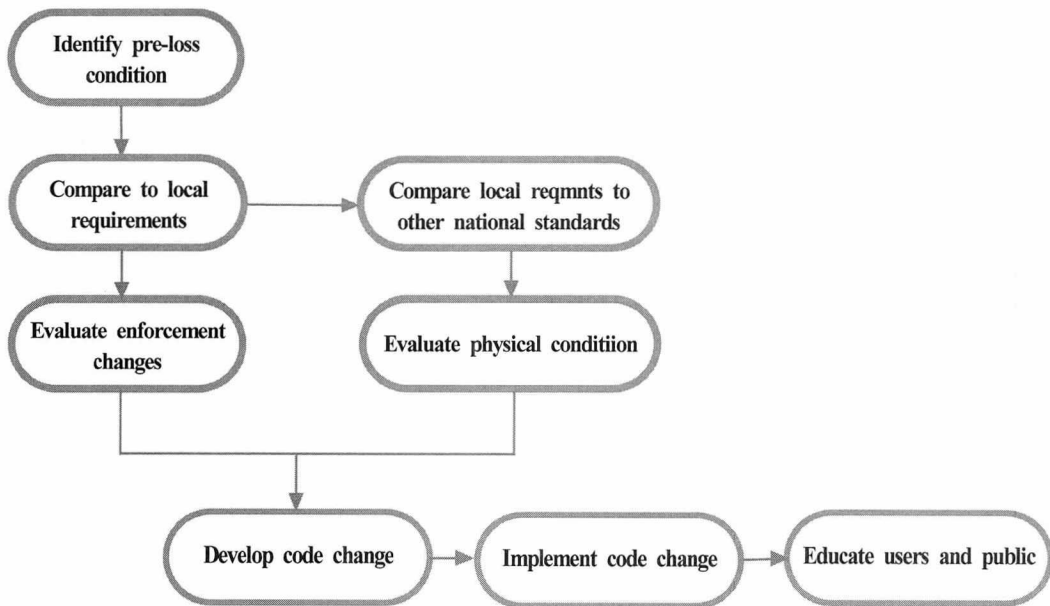
The Sealand Summer Camp fire involved the second and third floors of a 3 story

building of which only the first floor structure had any inherent fire resistant characteristics. In addition the interior and exterior finishes were very combustible. These materials were relatively easy to ignite, produced a significant quantity of heat upon burning, and produced large volumes of smoke and other products of combustion that presented a serious threat to life safety.

In addition it has been reported that there were very few fire fighting facilities provided. Such facilities could include fire extinguishers, fire detectors, manual fire alarm stations, fire alarm notification devices (bells, horns), automatic fire sprinkler system, fire fighting water supply, and emergency lighting system.

An initial reaction to this type of fire loss is to make changes, many times any changes that address some part of the circumstances leading to the enormity of the tragedy. However, any change may not minimize the possibility of future losses. Only with a complete and factual evaluation of this fire can a rational set of changes be developed, evaluated and implemented.

A complete evaluation will include the systematic identification of all factors



contributing to the loss with a relative degree of importance applied to each of the factors. This loss is particularly difficult in evaluation because it involves evaluation of not only the physical features of the facility but also procedural issues in the design, approval and construction process. It can be very easy to not touch "sacred cows" (institutionalized ideas that are thought to be unchangeable).

A response to this type of tragedy is further complicated by the fact that we know how to reduce the possibility of this type of tragedy to almost nothing. However, the practicality of such a response does not exist due to a lack of available resources and the motivation for change.

Figure 1 provides a simplified flow diagram for identifying, developing and implementing changes to respond to this type of tragedy.

I have been asked many times since this fire if a building of similar use and construction could be built in America. My answer has been yes, if the individuals involved choose to ignore building codes and other regulations that are in effect in most parts of the country. If existing codes and regulations are not observed, then adding more requirements in the codes and regulations will not improve a specific design or prevent future tragedies.

The events leading to this fire must be evaluated as closely as the physical features at the building site. Codes and regulations alone will not assure a safe society. An article in the Korea Herald on Thursday, Aug. 5, 1999 reported on a survey conducted at 43 construction firms after the Sealand fire by the Construction and Economy Research Institute of Korea. One of the findings from this survey was that more than 3/4 of the

respondents indicated that bribes were most effective in getting approval of completion of projects, in asking permission for building plans, and for getting approval of construction designs.

Another article appeared in the Korea Herald a few days later reporting on a survey of 1000 civilian monitors by the National Information Agency. This survey resulted in no less than 250 ideas and policy recommendations regarding "eradication of the deep-rooted corruption within Korea's bureaucracy". The criminal indictments against the individuals actively contributing to this tragedy is one step in the process. A continuing education of individuals and organizations in society is another step.

Education may take many different forms. Public awareness of the cost of tragedies like the Sealand fire can be accomplished through national campaigns by professional organizations and government agencies. Identifying and publicizing individual responsibilities in all phases of the process (design, approval, use) is another means of education. Providing ongoing technology transfer from professional organizations to public officials at all levels of the government is another education step.

Another procedural step is providing a system of 'checks and balances' in the approval process for high risk (large loss of life potential) facilities through independent inspection or review programs. This could include third party (insurance companies, private consultants, public organizations) inspections upon completion of construction

as well as over the life of the facility. An independent, third party professional review of design and construction drawings could be required.

Such steps do not guarantee the elimination of future tragedies but will help reduce the possibilities of such occurrences due to oversight or criminal negligence in the process.

Addressing the issue of the physical characteristics of the Sealand facility is the easier of the two tasks. Using the results of a detailed fire investigation, the first step should be an analysis of the physical features at Sealand compared to the existing building code and fire regulations. This comparison may identify existing regulations that are not practical or cost effective to implement as well as those that were simply ignored in this design.

The next step in the evaluation of the physical features is to compare the existing regulations to other national or international standards. This comparison can identify additional requirements that are included in other countries or other parts of the world. The comparison should also identify alternative approaches with which it is easier to comply or that are more cost effective to achieve similar or better fire safety results.

In the Life Safety Code<sup>®</sup>, NFPA 101, the Sealand facility would be classified as a Residential occupancy. Under this classification the specific occupancy would be a dormitory which is defined as group sleeping accommodations for more than 16 people in one room or a series of closely associated

rooms without cooking facilities.

Life safety code considerations for this type of occupancy include:

means of egress components consisting of

- doors
- stairs
- number of egress routes
- capacity of egress components
- minimum component widths
- travel distance to exits
- normal and emergency lighting
- exit access corridors

protection features

- fire sealing of vertical openings
- combustibility of interior finishes (walls, ceilings, floors)
- detection, alarms, communication (initiation, notification, annunciation)
- extinguishment - automatic sprinklers
- fire extinguishers

operating features

- fire exit drills
- exit diagrams posted sleeping room doors

Some examples of requirements in NFPA 101 for the above features include:

egress component width	- $\geq 81$ cm
minimum corridor width	- 112 cm
maximum travel distance to exit	- 30 m

corridor smoke detection - required  
single station smoke detection

in rooms - required

exit access corridor walls

- 1 hour fire resistance rating

doors opening onto corridor

- 20 minute fire rating, self closing, self latching

## Conclusions

Simple, very visible responses to a tragedy may not result in reducing the severity or frequency of future tragedies. A systematic approach is required to address all of the issues in the most cost effective means possible. Regulations for adding more fire fighting systems or for staff training that cannot be enforced will have little effect on the prevention of future disasters.

All participants (government officials, regulators, users, professional designers) in the system for making changes to ensure the minimization of similar tragedies must look at all reasonable options which meet the realistic objectives of the society.