U.S. HAZARDOUS MATERIAL IDENTIFICATION

SYSTEM DEVELOPMENT AND HISTORY

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The objective of this presentation, today, is to outline--briefly but substantively--the development of the hazard information system currently in effect in the United States as it applies to the transportation of hazardous materials.

As one who has been involved in the promotion of this system for several years, I hope to give you some insight into how the objectives and procedures of this system have changed and evolved during this period of time.

Additionally, I will attempt to describe how the two prime parties--government and industry--have worked together to reach a common objective...namely, a hazard information system which provides basic, protective information to the public; some degree of technical guidance to the emergency responder; and a system which can be uniformly implemented at the hundreds of thousands of shipping points in the United States.
As you might expect, the growth and sophistication of the U.S. Hazard Information System has paralleled the growth of industry. Even in the immediate Post World War II era, the largest portion (geographically) of the United States was basically an agrarian economy, with heavy industry situated almost exclusively in the Northeast, North Central and Far Western States. Transportation emergency warning systems differed from state-to-state, were exclusively oriented to rail transportation, seldom enforced and designed to assist fire and police personnel.

In the early 1950's, three factors combined to emphasize the need for an improvements in the existing system. First of all, the railroads began to exit the business of carrying packaged freight. This put more trucks carrying hazardous materials on the nation's road system. Consequently vehicles carrying hazardous materials came in closer proximity to the general public—particularly in urban areas.

Second, the United States' industry began to decentralize. Factories were no longer built or rebuilt in the same places. New factories went to new sites in the West, South and other "new" industrial areas. Thus, instead of involving a small number of transportation "corridors", the transportation of hazardous materials gradually became an issue of nationwide concern.
Third, the United States' chemical industry began a rapid technological growth which put a greater number of substances into the transportation network in ever-increasing volumes.

The first organization to recognize this was a private association--representing the interests of fire fighters--called the National Fire Protection Association (NFPA). Historically, NFPA Committees of experts in fire protection wrote "codes" which were adopted as laws by State governments. Eventually, the NFPA fire "codes" were adopted by the U. S. government as a national standard. Variations by State and local government were prohibited.

By today's standards, the NFPA's early standards on hazardous materials were rudimentary, at best. Generally speaking, the placard or warning sign on a truck or rail car consisted of one or two words (such as "Flammable" or "Compressed Gas"). Again, this was to warn fire personnel. There was no national training scheme. There was no supplemental information provided other than the words printed on the placard. Finally, the system did not embody consideration of environmental hazards from the products.
Even as late as the early 1960's product classification—in terms of listing a commodity by its primary hazard characteristic—was done by an agency of privately-owned railroads. There was little official governmental involvement in the process.

In this area, attitudes of both government and the public changed. The social activism of the 1960's and '70's (particularly the environmental movement) elevated public concerns to include not only the acute effects of a transportation incident, but also the chronic effects on human health from exposure to a hazardous chemical products.

The social activism of that period also resulted in greatly increased involvement by our Federal government toward the promulgation of health and safety regulations. Between the years 1965 and 1975, the number of agencies and departments in the United States government doubled—almost solely reflecting the involvement of the bureaucracy in matters related to health and safety, safer workplaces, more comprehensive medical care, and significantly, environmental concerns.

At the same time, U. S. industry—particularly the energy and chemical industries, were producing thousands of new compounds in large volumes. As a result we were transporting those new compounds, by all modes, both domestically and internationally.
Of course, the United States was not alone (within the community of nations) in experiencing the factors of increased use of and demand for products with hazardous characteristics. Neither was it the only nation with legitimate public concerns for the health and safety effects of their transport and use.

Through the auspices of the United Nations, representatives of many countries recognized that social, environmental and economic concerns must be blended in some type of internationally-recognized system of controls—lest free trade in these valuable commodities be jeopardized.

After considerable discussion, it was decided that any such a proposed system would have to meet at least the following criteria: 1) effectively warn the public who would be inadvertently exposed to a product by reason of an accident or incident; 2) provide suitable knowledge to those who might be exposed by virtue of their occupation; 3) be free of the constraints of language or custom; 4) be simple enough to convey a message to those untrained in its use; and 5) be easy to use in the transportation industry.

As one might expect, it was this last criterion—the actual implementation of a system—which proved most difficult to overcome in the United States.
First of all, there was what I will call "the comfort factor". Both shippers and carriers had used the old system for years, had trained their personnel (and fire and emergency response personnel) in its meaning and use, were cognizant of the fact that over 99 percent of the shipments of hazardous materials were domestic, and frankly just did not want to change.

Economics also dictated against any change. Briefly stated, recognition of the fact that it would cost millions of dollars to implement a new hazard warning system on the millions of trucks, rail cars, barges and containers in our economy, plus the enormous related costs such as training, and the ability of this investment to measurably improve safety performance created large obstructions.

Resistance—from all types of carriers—rail, truck, water and air—was high.

It is at this point, our Federal Government's Department of Transportation chose an excellent tactical route to gain broad support for domestic implementation of the new hazard warning system. This new system was based on concepts adopted for international trade via the United Nations transportation committee. The U. S. Department of Transportation participated in the development of the new system so it was anxious to introduce it into its domain.
Recognizing that our chemical industry would be the most significantly affected sector of the US economy by any new hazard warning system, our Department of Transportation gained their support.

They knew that the chemical industry produced most of the hazardous materials of concern. It is also an industry deeply involved in the import/export market of chemicals. Since carriers of all modes are customers of the chemical companies it was recognized that they could put economic pressure on the carriers to accept the new system.

Therefore, by the mid-1970's, our present hazard information system was a matter of Federal law. Again, no individual State or locality may enforce any other standard in this area.

The principles of the system are simple. Both placards (for vehicles) and individual labels (for containers in vehicles) are composed of a symbol, a so-called "alert word", a four-digit number and a single digit number.

The purpose of the pictograph symbol is to identify the nature of the hazard, such as flammability, corrosivity or poison. The four digit hazard information number (most prominent on the placard or label) is for guidance to emergency responders. The single digit number at the bottom of the placard is to indicate the United Nations hazard classification.
While some variations in applications of this system are permitted—the basic elements may not be compromised. For instance, you may use placards containing just the pictograph and numerical designation or, a placard with the pictograph and hazard classification and the number on a separate panel may be used. Or for tank trucks so laden, the words "Gasoline" or "Fuel Oil" may be placed for the red flammable placard.

In other cases, information in addition to the placard must be supplied. For instance, in the case of tank vehicles laden with certain compressed gases—the specific shipping name of the product must be on each end and side of the vehicle. Examples are propane, butane and anhydrous ammonia.

This is part of the U.N./U.S. "system". Of course, a "system" is more than just signs on a vehicle or labels on a container.

Note, for instance, that the four-digit number on the placard or label is coordinated with an Emergency Response Book which has been distributed by U. S. government and industry to fire fighters and emergency service personnel who would respond to a transportation incident. By referencing the book, with the four-digit number on the placard, emergency personnel are given written instructions on how to react to a fire, spill or leak of the product. Additionally some environmental and human factors warnings are outlined.
Almost one million of these booklets have been distributed throughout the Nation.

In addition, the system is coordinated with the documentation which must accompany each shipment. Federal governmental regulations dictate that such documentation must contain: (1) the exact name of the hazardous product as specified in the regulations; (2) the hazard classification of the product (flammable, corrosive, poison, etc.); and the four digit hazard information number. Obviously, the purpose is to provide some redundancy for the emergency responder should the placards or labels (on the vehicle or container) be destroyed or illegible.

In implementing the hazard warning system, the Federal Department of Transportation has recognized that it is the shipper (or manufacturer) of the product to be transported that is the key because it is in the best position to determine the material's hazard characteristics.

Therefore, U. S. regulations mandate that: (1) it is the shipper who is legally responsible for testing the product to determine its hazardous properties; and, (2) it is the shipper who is responsible for providing the placards to the carrier.
As I noted at the beginning of this presentation, the hazard information system in use in the United States has evolved from a very basic system to one of increased sophistication and complexity.

An additional and critical part of the emergency response system in our country is CHEMTREC—the Chemical Emergency Transportation Center—founded by the U. S. Chemical Industry's National Association—the Chemical Manufacturer's Association. This 24 hour-free call in system provides immediate technical assistance for first responders. It uses data sheets containing a great deal of information on individual chemicals which are provided by the makers of the chemicals. CHEMTREC also acts as a telephonic liaison between the accident scene, the chemical companies' technical experts and the carrier. In its 10 years of existence, this industry/government cooperative project has been instrumental in improving first response at accidents.

Of course, this is not a perfect system. Critics note that the system does not offer appropriate warnings as to the potential long-term or chronic effects of exposure to humans in the event of a transportation incident. Others point out that the system's reliance on numerical designations detracts from its impact on untrained members of the public who might be inadvertently exposed.
These criticisms are valid, however, those critics must also remember that the system is a significant improvement over past practices.

All in all the current placard system provides a generally acceptable level of warning to shippers, carriers and the public. Adoption of this system, combined with training in the companion Emergency Response Guide, provides a far higher level of on-scene technical assistance than existed previously.

Each year since 1976 this system has gained wider acceptance in the public domain. Fire services, state and local governments, shippers and carriers have come to know and understand it. While it is impossible to quantitatively measure the value of the hazard information system in the U. S. we can assume that it has contributed in the enhancement of safe operations, improved emergency response, and resulted in fewer avoidable deaths and injuries.