Integration of Packaging Design and Planning into Transportation

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INTRODUCTION

In the past, numerous programs, projects, and design concepts for packaging and materials production have taken place without all the principal participants being involved in the up-front planning process.

Many major facilities and packagings have been designed without the involvement of Transportation professionals.

Unfortunately, Transportation has been overlooked and in most cases is a critical element that should have been included in the Planning process.

In my presentation today, I will attempt to share some of my thoughts related to the "Integration of Packaging Design and Planning into Transportation" .

Transportation plays a major role in the Big Picture.

INTEGRATION CRITERIA

The two most critical areas in the Packaging and facility design would be to recognize all of the needs of Transportation Logistics in the Design and Planning stage of the projects. Today, I will address some subjects in both of these areas. I will start with Planning.

PLANNING

The planning process is critical and should not be begun without a clear understanding of what is needed, the purpose, and who should participate on the planning team.

First, I will present the definition of Transportation Logistics and some current views of the Transportation Logistics discipline.

Second, we will take a look at Packaging Applications and how they relate to Transportation.

Third, a brief look at the Transportation regulations that control the movement of Radioactive and other hazardous materials.

Fourth, some of the Institutional issues that should be taken into consideration in the planning of radioactive material shipping campaigns.

Fifth, and lastly, Regulatory Compliance Training Requirements

THE DEFINITION OF TRANSPORTATION LOGISTICS

I could have prepared a lengthy dissertation today on this definition. However, I did prepare a summarized version for you which is projected on the screen and will also be in your handout.

TRANSPORTATION LOGISTICS

Transportation Logistics should be, and is in fact, a science that is a recognized discipline. On an international basis, many major colleges and universities offer Transportation Logistics programs that provide Associate, Bachelor's, Master's and Doctorate level degrees.

I would hope that some of the information presented to you today will be of interest to you and your management staff when you return to your office.

PACKAGING APPLICATIONS

There are at least six primary interests for integration with the transportation industry:

The first consideration is to determine what mode of conveyance will be needed to transport the package, Highway, Rail, Water or Air.

The next question should be what type of package should be designed to support the project or program. Essential information or data should be reviewed to determine type of containment (Isotope, Quantity, Physical Form and Chemical Form).

The package that you design or select from a group of previous designed packages must be supported by a current Certificate of Compliance, and/or a current Certificate of Competent Authority.

A Safety Analysis Report with operating procedures for opening, closing, loading, unloading and tiedown procedures.

REGULATIONS AFFECTING TRANSPORTATION

Depending upon the mode of transportation selected and the type of packaging being used, there are international rules and regulations and jurisdictional authority governing transportation.

Additional requirements that may be imposed by each Nation and/or Country regarding transportation equipment, vehicle operators, specific highway routing for some products, the communication necessary to fulfill shipment pre-notification, shipping documents, marking, labeling, placarding, and emergency response.

Within each nation there are State governments that have jurisdictional control within its borders. The States control the issuance of special permits for over-weight, over-size permits, in addition to other restrictions as they apply to certain State roads, bridges, underpasses, construction areas, etc.

There are other jurisdictional bodies of government such as local governments that may restrict movement in the city or county with regard to weight limitations on secondary roads due to frost, spring thaw, bridge or culvert restrictions, overhead or width clearance restrictions, and various types of construction projects.

INSTITUTIONAL ISSUES

Throughout the planning process for the design of packages that will contain radioactive materials, consideration must be given to the Institutional issues unique to the transportation of radioactive materials. The Transportation industry at all levels must continuously interface with international, national, State, and local governments. Each country has laws that apply to the entry into, or passage through borders by highway, or the calling of a vessel carrying radioactive materials at their ports, with regard to notification, requests for approval, or a requirement for inspection.

The passage of radioactive material shipments through major population centers requires pre-shipment interface with local officials, a concerned public, or organized concerned citizen groups.

PACKAGING DESIGN

In reviewing the transportation requirements for the design of radioactive material packagings, there are four important areas of interest .

Vehicle/package interface, vehicle/facility interface, package handling equipment and transportation regulatory compliance.

VEHICLE/FACILITY PACKAGE INTERFACE

Incompatible package/facility interface is a major contributor to Transportation problems. New facilities have been designed without professional transportation logistics input. Some instances where input was offered but was not accepted. Those items listed on the screen are some of the more important issues to consider, however there are dozens more that could be added to the list.

We all have shared some unpleasant experiences with facilities that were not designed with transportation logistics operations in mind. The planning/design processes are difficult to change, however, working together with the proper professional disciplines, we can build facilities that will be user friendly, safe, and efficient.

PACKAGING HANDLING EQUIPMENT SAFETY

The Materials Handling Equipment (MHE) industry has experienced a technology revolution like many other industries in recent years. There is little justification for physically handling radioactive material packages with 110 lbs weight or more. The use of hand trucks still has a place in materials handling, however, to rely on this ancient method for most packages is not acceptable in 1992. In the designing of radioactive material packages, and facilities that will interface with transportation logistics operations, a serious input of transportation logistics needs is essential. I have listed some examples of the more modern materials handling equipment used in industry. An equipment maintenance and inspection schedule is essential for proper use. Examples of equipment that require maintenance schedules are Cranes, Wire Rope and Forklifts.

The design of both packages and facilities must include the ability to integrate the most modern materials handling equipment into the process to ensure plant safety, public safety and efficiency of operations.

VEHICLE/PACKAGE INTERFACE

The design and weight of a package determine the method of transportation and type of conveyance, whether rail, highway or OSI container. The package design must be compatible with the maximum capacity of the handling equipment and transport vehicle.

Designers must consider these weights and sizes that can be safely accommodated by the mode of transportation selected.

Pointing out that this is all very basic and logical to some, I must also point out that there have been some classic, multi-million dollar errors over the years because these issues were not taken into account.

The method of restraining the package to the vehicle, rail car or vessel is a key safety feature in the transportation system. Depending on the size and configuration of the packaging, engineered tiedown devices may be the most practical method. However, the requirement for the package to separate from the conveyance during an accident may mean that the engineered device to restrain the package during normal transportation to destination may not be available after an incident/accident. Little if any consideration has been directed to restraint device issues in the past. The regulatory compliance and tiedown requirements are just as valid after an incident/accident as they were before the accident.

Off-the-shelf tiedown devices (chains and binders or wire rope) have been the primary method of restraining cargo throughout the history of transportation because of their universal use. For some radioactive packages the off-the-shelf method may be appropriate and practical. These types of tiedown devices must be evaluated and a determination made during the planning stages prior to the actual manufacturing of the package.

Ridged lifting yokes that work as designed in the sanitary conditions found in the high-bays, or load-out facilities are of little value at an accident scene where a 100 ton cask must be recovered from remote locations .

INTEGRATE MATERIALS HANDLING EQUIPMENT NEEDS INTO FACILITY DESIGN

REGULATORY COMPLIANCE TRAINING REQUIREMENTS

The subject of transportation regulatory compliance training requirements is an essential element in our present environment.

Regulatory compliance and safety is the responsibility of the entire work force. Everyone working in this environment is ultimately responsible to ensure that Transportation Regulatory Compliance is adhered to by all who are involved with the shipment of hazardous materials.

These individual professionals must determine that all aspects of the shipment have been addressed and compliance met completely and correctly, and ensure that all agencies and jurisdiction requirements have been complied with.

It is essential for individuals assigned to accomplish these responsibilities to be trained formally, and in this industry to include both International and Domestic Transportation training requirements maintain a current training certificate in the transportation of radioactive materials, substances and wastes.

In conclusion, I would suggest to those who design packages, engineered tiedown devices, facilities, and in-house materials handling equipment, that they would consider including those responsible disciplines in the planning process.

The bottom line of all this is:

In a world where error free performance is demanded as a means of protecting the environment and the public, we in the radioactive material arena, be it production, packaging, transportation, waste management, or disposal, must fully utilize every resource, and all experience and knowledge available to us to ensure that we have performed with excellence.