DATE: September 24, 2020

TO: Dr. Ken Machoian

FROM: James Hernandez

SUBJECT: Recommendations for Transportation of Hazardous Materials; Stowage Plan

**RECOMMENDATION OF A STOWAGE PLAN**

**What is a Stowage Plan?**

In the chemical shipping industry, a stowage plan is a kind of blueprint for a vessel. For example, it lists all stowage tanks and provides in- formation about tank volume for each unit on the vessel.

*Also Listed in Stowage Plan*

* Tank Coating
* Stowed Product
* Weight of Product
* Loading Port
* Discharging Port

**Importance?** A stowage plan is made out for each vessel on each voyage and records all chemicals loaded. The following information concerns cargo considerations (chemical properties and tank features) and some specific uses of the stowage plan in industry.

**THREE MAIN CARGO CONSIDERATIONS**

The three main cargo considerations in planning stowage are *temperature, compatibility, and safety.*

**Importance? -**  Chemicals have physical properties that distinguish them from one another. To maintain the natural state of chemicals and to prevent alteration of their physical properties, a controlled environment is necessary.

**Reasoning -** Some chemicals, for example, require firm temperature controls to maintain their physical characteristics and degree of viscosity *(thickness)* and to prevent contamination of the chemicals by any moisture in the tanks.

* In addition, some chemicals, like acids, react violently with each other and ***should not*** be stowed in adjoining, or even neighboring, tanks. In shipping, this relationship is known as ***chemical compatibility.***

**CONTROLLED ENVIRONMENT AND COMPATIBILITY**

The controlled environment and compatibility of chemicals have resulted in safety regulations for the handling and trans- porting of these chemicals.

**Regulations**

These regulations originated with the federal government, which based them on research done by the private manufacturers.

* **Location and Size**
  + Location and size of tanks also determine the placement of cargo.
* **Tank Arrangement**
  + A ship’s tanks are arranged with all smaller tanks around the periphery of the tank grouping and all larger tanks in the center.
* **Tank Composition** 
  + These tanks, made of heavy steel and coated with zinc or epoxy, are highly resistant to most chemicals and thus reduce the chance of cargo contamination.
  + Each tank has a maximum cargo capacity, and the amounts of each chemical are matched with the tanks.

Often chemicals to be discharged at the same port are staggered in the stowage plan layout so that after they are discharged the ship maintains its equilibrium.

**A QUICK WRAP-UP**

The stowage plan is finalized after consideration of the cargo and tank characteristics. In its final form, the plan is used as a reference document with all information relevant to the loading/discharging voyage recorded. If an accident occurs involving a ship, or when questions arise about discharging operations, this document serves as a visual reference and brings about quick decision