



## **Terms of Reference**

### **Background**

Inland navigation has a long history of providing safe transport, including the movement of hazardous goods, therefore many regulations and procedures have been developed to lessen the chance and severity of accidents. Statistics show that inland navigation is one of the safest modes of transport. However, accidents do occur including loss of life, injury, or damage with environmental, economic and property damages for the shipping owners and for the navigation structures. These accidents involve collisions from vessels striking navigation structures, such as fixed or moveable bridges or locks, other vessels or grounding. Navigation related accidents are especially prevalent in the areas of high traffic areas; however, accidents occur throughout all inland navigation systems. Several initiatives and regulations have been formed to reduce these accidents.

As with any transportation system one of the key factors that drive investment/use of the system is real or perceived reliability and availability. Unscheduled or excessive scheduled delays or outages are one of the key measurements for determining reliability of the system. Of particular importance is length/duration of scheduled and particularly unscheduled closures. It is conceivable that a single catastrophic closure, if long enough could permanently damage the perceived and real reliability of a transportation system. To that end, the speed of recovery and re-opening of a system is of paramount importance.

### **Objective**

The objective of this working group is to identify useful safety measures and /or regulations and establish recommendations to develop technical and organizational measures to reduce accidents.

The working group will identify the vulnerabilities of typical impounded Inland Navigation Systems as related to perceived and real reliability. Both scheduled closures and unscheduled closures will be addressed as relating to overall system availability and reliability. The ability of the system to quickly return to service

following a major catastrophe (man made or natural) will be a major area of focus for this report.

A study of several existing Inland Navigation Systems will be made and vulnerabilities addressed based on the system's normal day to day reliability but more importantly its ability to recover to full service after a catastrophic event. Methods to restore loss of channel or water depth, clearing of sunken vessels, redundancy of critical components such as lock gates or lock filling /emptying components would be typical areas for primary focus.

This working group would also inventory recent safety initiatives in various countries and give recommendations for the application of techniques to improve safety. The working group report is for the owners and operators of navigation systems, it is not to set vessel requirements.

### **Earlier Reports and Concurrent Working Group Activities**

The present project has been already studied by a working group of PIANC, designated WG 22, which was launched in 1997. For various reasons, this group could not achieve its work. Its results, however, were recorded in a document dated December 2003, which will constitute a basis for the present working group. Some parts of this report, if possible, are to be incorporated to the final report of the present working.

The group will also reference, if necessary, to the report of WG 21 "Economic Aspects of Inland Waterways," 2004

The Working Group, whilst collecting and collating accident data, should expect to find only limited information available. The Working Group is not expected to report on the number or scale of incidents as a result, but instead should undertake and report on case studies on recorded incidents.

### **Matters to be Investigated**

Identify existing databases about inland navigation accidents, including causes, consequences and lessons learned of registered accidents. Establish criteria to rate reliability. Investigate history of these systems with regard to major system closures, causes, durations, final solutions etc. Identify inherent system designs, capabilities which improve reliability. Identify existing useful regulations that lesson accidents, such as, buoys, beacons, etc... Identify safety initiatives to reduce the number of collisions and/or their overall severity.

Identify methods for cost-effectively reducing the number of impacts, impact severity, and physical repair methods to be able to quickly recover in the event

of an accident. These methods can be: installation of equipment to provide up to date project and flow information to mariners, installing energy absorbing devices that protect structures and prevent tow lashings from breaking apart with subsequent loss of control or physical barriers to catch runaway barges. When an accident occurs, methods allow for the project to quickly recover by removing pinned and submerged vessels to prevent the loss of channel. Other recommendations of initiatives to improve safety for inland navigation, such as:

- Tracking and tracing of hazardous goods
- RIS/VTS system development
- Pilot/Crew Training (Behavioural Management)
- Quality certification
- Navigation during floods
- Conflicts with recreation craft
- Degassing for fuel transport tanks
- Real Time Current Velocity
- Electronic Navigation Charts
- Lock Distance Measurement System
- Bull Nose Energy Absorption Product
- Navigation Aids
- Structural changes
- Channel changes, etc.

should be reviewed

## **Method of Approach**

The working group will focus on:

1. Inventory of existing rules and regulations
  - 1.1 International regulations
  - 1.2 Inventory of national safety rules and regulations
  - 1.3 Establish general measurements for system reliability
  - 1.4 Organization and means of action
2. Accidents
  - 2.1 Accidents on IWT : definitions used in the different countries, proposal for a common standard
  - 2.2 Existing Databases where available
  - 2.3 Analyze capability to respond to "worst case scenarios".
  - 2.4 Comparison with other modes
  - 2.5 Suggest the format of a common reporting system for accidents, incidents and near misses.

3. Initiatives to improvement safety
  - 3.1 Overview of methods to reduce hazards
  - 3.2 Prevention : Reducing the causes of accidents
  - 3.3 Protection : reducing the consequences of accidents
  - 3.4 Identify behaviour management techniques to improve pilot safety performance.
  - 3.5 Identify innovations which improve system reliability.
  - 3.6 Identify important system deficiencies which create both perceived and real reliability problems.
  - 3.7 Case Studies

The WG is advised not to expend too much time or effort in collecting exiting accident/incident records.

### **Suggested final product(s)**

All results will be described in a published PIANC report to be utilized by navigation authorities, safety /risk managers and other safety agencies to draw upon world wide experience and develop good practice to assist in reducing the risk to all water based users of waterways.

A technical brief will be provided to aid the promotion of the document and for it to be placed on the PIANC website.

### **Recommended Members**

Members of the Working Group should include practitioners involved in safety management, the design and operation of the navigation system.

- Public/Private administrations
- Organizations representing the Inland Waterway system interests such as CCNR (Rhine Commission), Danube Commission, Inland Navigation Europe, US Army Corps of Engineers and Coast Guards
- Fleet operators
- Experts and agreed certification companies or agencies

### **Relevance to Countries in Transition**

This working group can be useful either for countries where navigations are already established or being developed and where it is expedient to develop structures and systems that remove or reduce the risk of damage to structures and vessels, thereby ensuring greater availability of the inland waterway network.