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AGENDA FOR URBAN CONCERN

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Professionalism a must to save lives

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SEVERAL recent launch accidents, tragic that they were, have besides taking heavy toll, shocked the nation, perhaps even the world at large. The river disasters speak volumes about the ignorance, indifference and insincerity of all concerned.

The most recent being the heart-rending demise of an entrepreneur along with several members of his family when his private yacht went down under the most bizarre of circumstances in a weather quirk near Chandpur.

Unfortunately, persons responsible for the deaths have never been taken to task. Faulty factors encompassing concept to performance and beyond have seemingly never been remedied. The causes of capsize have been guilty of repeating. Each accident has surfaced as a rerun of the previous one design and construction fault, inappropriate loading, carelessness, unqualified operators, lack of safety measures... It's always the same story. Only the dead are different.

The culpable have continued their apparently thriving business of loading innocent people, mostly poor villagers of this riverine country, and exposed them to known and hidden risks. If this is not criminal, then neither is murder.

The order of the day should be to ensure by law that professionals handle design, construction, operation and maintenance of inland shipping vessels. Professionalism is required from all quarters including administration, owners, designers, constructors, and operators, as is awareness among passengers. Every player has to play his part with utmost dedication because they are dealing with human lives.

Naval Architects Abdur Rahim and Dr. M.R.H. Khondoker of BUET deal in depth with the issues pertinent to make passenger launches safer. They have taken MV Salauddin-2 and MV Subha, two launches that sank in 2002, as case studies. They recommend a course of actions in each of the areas that directly affect stability, safety and other related matters. The strength of their case is in their competence to be candid about the limitations in each.

The proposals merit consideration by lawmakers sitting in the parliament, by people manning the ministries, and by professionals and skilled personnel who may not be in a position to do justice to their discipline.

Till suitable measures have been adopted to ensure professionalism in every phase and sector we have to live with the uncomfortable knowledge that we are knowingly exposing our people to the hazards of water transport.

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Note from the Consultant: There has been some queries regarding the display of logos of Bangladesh Scouts and BUET on this page along with that of The Daily Star. The Agenda for Urban Concern page is an outcome of a series of continuing workshops and seminars organised jointly by the three organisations over the past three years. Some of the features are direct products of the deliberations taking place therein. Others are contributions from persons with an interest in improving the lot of the people in urban areas. As will be evident from the issues taken up it is often not possible to draw a line between the city and the rural areas.

BUET

Achieving safety in inland shipping

ABDUR RAHIM* *and* DR. M.R.H. KHONDOKER**

THE two major passenger launch accidents in 2002 have renewed the concern for safety in the water transport sector of the country. Although, water transport is still the safest of all the modes, but to maintain survivability of this mode against uneven competition from others, it has to improve the safety record. Because a single launch accident causes many deaths, sometime hundreds, it attracts the attention of everyone.

In the backdrop of these two accidents, it is important to identify the causes of the accidents and devise a list of comprehensive remedial measures. The firsthand causes of the accident are generally known. There is however a need to understand the complex interrelated factors affecting safety and to devise attainable remedies, which are sometimes contradictory or possessing serious limitations. This process requires assimilation of knowledge of the various aspects of the launch operation from theoretical studies and feedback from real life operations.

Two useful sources of information and findings can be assimilated to recommend some solutions. These are (i) a theoretical study on a number of such inland passenger vessels and (ii) investigation reports of the two launch accidents in 2002. Both these knowledge base will be considered rigorously to devise recommendations for a set of comprehensive safety measures.

FINDINGS OF THE THEORETICAL STUDY:

The study was carried out on 18 similar passenger vessels with varying size. The smallest was 23.5 meters in length and the largest 48 meters. Two modern methods for integrated stability assessment (Strathclyde and Lyapunov) were applied. The results were consistent. Some are mentioned below:

!*The smaller vessels appeared to be at risk considering their intact stability, stability in waves, wind heel stability and passenger crowding stability.*

!*Presence of waves can drastically reduce the stability in case of smaller vessels.*

!*The smaller vessels are at serious risks in case of beam wind and passenger crowding.*

!*Passenger crowding is more dangerous than any other effect.*

Analysis of the two accidents:

MV Salauddin2

The most serious of the recent accidents have been the one involving the passenger vessel MV Salauddin-2 on 4 May 2002 at about 9-30 a.m. at Shatnol near Munshiganj. The vessel capsized in heavy weather with more than 450 passengers on board. The events leading up to the capsize are as follows:

The vessel left Dhaka river port at around 7-30 p.m., arrived at Kathpatti, Munshiganj about one hour later, berthed there for about 15-20 minutes and then entered River Meghna at about 9-00. The vessel faced strong winds from the Northwestern direction. Soon it started to rain. The Master tried to beach the launch at the eastern bank of the river but failed. Then there was a sudden gust and the vessel got heavily listed, water entered the main hull (engine room through the unprotected opening) and lost buoyancy. The capsize was quick, in fact within 2-3 minutes. As the vessel lost control, she got entangled with fishing nets and passengers who could escape otherwise failed to find an escape route.

Primary investigations revealed that the actual vessel deviated from the construction in the following two aspects:

1) The superstructure of the vessel was longer than approved

2) The vessel was constructed for weather deck rather than approved sunken deck

Detailed investigation to find out the causes of the accident revealed the following:

1) The vessel was loaded with excessive passengers with very little cargo

2) The watertight-ness of the hull was poor

3) Steerage was inadequate to steer her to safety

4) Initial stability good but not the large angle stability

5) The vessel was poor against impact of beam wind

What is important is to quantify the effects of the deviations from the design and make a relative evaluation of the reasons identified for the accident. The quantitative results will not be deliberated here.

It was revealed that the intact stability was just adequate in the approved design but the extension of the superstructure brought it down below allowable limit. However, effect of deviation from weather deck to sunken deck is a mixed one. In respect of stability at small angles (up to immersion of the deck edge) the sunken deck (as designed) appears to be the better option. However, as soon as the deck immerses and water spills over the side to deck, the stability is totally lost and vessel cannot but capsize. In such a situation, weather deck with watertight deck is the better option. However, with deck opening as found in engine rooms, both the options are almost equally bad, the weather deck having a small advantage over the sunken one. In the meanwhile, the efforts by the Master to steer the vessel to shallow water failed due to steering inadequacy. The scenario can be described as follows:

As regards the identified causes described above, excessive loading of passengers with no cargo and concentration of the passengers on the upper deck reduced greatly the metacentric height. To shield wind and prevent rain water ingress into the accommodation space, canvass clothes were fixed on the side resulted in excessive wind impact which happened to come from the starboard side of the vessel causing the vessel to list heavily and reduce stability. All these have combined to create a dangerous situation. As the vessel listed and the deck immersed, water entered the non-watertight engine room and the chances of the vessel returning to upright position was completely lost.

The vessel lost stability due to low metacentric height, stability further reduced by beam wind, the vessel listed heavily and the capsize was accelerated by flooding of the engine room and better steering gear could reduce or minimize casualty. Presence of fishing net prevented escape of the passengers from the capsized vessel

MV Subha

The situation and the sequence of the capsize of MV Subha was much simpler. It sailed from the Char Doani under Barguna with a few passengers and almost no cargo. Soon after it was hit by a strong gust and the vessel capsized almost instantly. Some of the passengers could manage to survive.

Subsequent investigations showed that the vessel appeared to have been built as per approved design. It was also found that the vessel had excessive superstructure and thus the impact of moderate wind force would be too severe for the hull to withstand. Discussions with the Bangladesh Inland Water Transport (BIWTA) authority revealed that till then the plan approval process did not include any wind heel criteria such as IMO A. 562.

One strong similarity of this capsize with that of Salauddin-2 is that in both the cases, lack of watertightness of the engine room caused the capsize to accelerate. Otherwise, with the buoyancy of the main hull available, quite a large number of passengers could perhaps manage to escape before the vessel sank deep into water.

Evaluation of hazards to safety:

From the above discussion, other available information and expert opinion, the reasons behind the accidents may be summarised as below.

1) Faulty loading (mainly overloading)

It appears to arise from a number of interrelated reasons that may be termed as a vicious cycle. There is a serious undercutting (sometime by up to 70%) by the launch-owners because of unhealthy competition. The owners make up their losses by overloading (more than 100% in case of MV Salauddin-2). Owners say that passengers are poor and cannot pay more. This is perhaps not the exact description, if not incorrect. Bus passengers are paying much more. Even poor labourers making journey by truck pay much more. Certainly the people of the southern region is not poorer compared to other regions of the country. It is simply that they avail the undercut price that the owners offer and this cut is sufficient to allure them at the risk of their life.

The irony is that while most of the launches are overloaded, the owners complain against BIWTA for issuing route permits to additional launches and says this is creating unhealthy competition. However, it will again be unwise to assume that the owners are not concerned with the safety of their property (launch) if not the lives of the passengers and the crew. It is in fact a vicious cycle that has developed and a good organisation of the owners can resolve the issue with facilitation from the administration. Awareness generation and development of response must be a major element in the same.

The following specific measures may be helpful in alleviating this problem:

!*Enforcement of rule*

!*Find out means to improve the design to achieve overloading tolerance*

!*Understand passenger behaviour through research and find out means of motivation.*

!*Total passenger load to be estimated through survey*

However, the following limitations must be kept in mind while trying to reduce overloading in passenger launches:

!*Increased passenger intensity during festivals and weekends*

!*Local influence restricts entry of new vessels by intimidation and harassment*

!*Passengers are indifferent to accidents; limited awareness drive seem not to be creating any impact*

2) Design and construction

Design certainly has a very important role to play in ensuring safety. However, the significance and involvement of 'design' is quite vast one. Design includes the hull form, subdivision, structure, propulsion, systems, sea-keeping, intact stability, damaged stability, wind stability, passenger crowding stability, etc. Although each of the items is important for overall quality, it is the ones related to safety that we are presently addressing. Various aspects of stability are obviously the main issue. For inland vessels, sea-keeping is not really very important.

To ensure safety, the usual practice is to adopt some criteria for different indicators of stability. There are IMO criteria for each category. However, it must be remembered that such criteria are limits set after statistical analysis of cases of accidents and ships with satisfactory safety record. Thus, each of the criteria is appropriate for the population with which the statistical analyses were made. The International Maritime Organization (IMO) developed and adopted the criteria for ocean-going vessels. It will be imprudent to apply the same to inland vessels without further consideration and suitable modification. The need to evolve suitable criteria for inland passenger vessels cannot be over emphasised. Furthermore, the computational expertise required for stability analysis and scrutiny of the same is not available in the country. In this background, the following measures can be adopted to obtain vessels designed with the highest possible stability standard for our inland waterways:

!*Development of institutions and allocation of resources*

!*Criteria be developed to ensure stability related safety and to be periodically amended through feedback information*

!*Until such a criteria is developed IMO A.168, IMO A.469, (for intact stability), IMO A.562 (for wind beam), etc. cab be employed with suitable modifications where possible.*

!*Accidents be investigated scientifically, and mechanisms be developed for incorporation of results into future design*

Most of these vessels are allowed to carry cargo in holds. Practically cargo is not stowed inside the deck until the amount is large and loaded at the destination. Analyses indicate that highest stability is achieved when the vessel is carrying the permitted amount of cargo in holds. This is better than the vessel with no cargo by two counts; the centre of gravity goes down and the displacement increases the impact energy absorption capacity of the vessel.

The situation with MV Salauddin-2 was perhaps the worst with no cargo even on the deck and too many passengers on the second deck. MV Subha was in a slightly better condition in respect to intact stability, because of less number of passengers. But this advantage was offset by the larger windage area and smaller displacement. As discussed earlier, the crowding of passengers is extremely dangerous for these vessels since the deck is an open space and the passengers can move a great distance in the athwart direction and this must have been true for both the vessels.

These complexities clearly demonstrate that stability related safety of a vessel involves more than one parameter and a comprehensive index has not yet been developed. But judicious application of the various criteria can be fruitful.

However, it must be remembered that satisfaction of criteria does not ensure complete guarantee against accident but up to a certain extent will minimise the risk of being capsized in an adverse condition.

Apart from stability the design of the steering gear also affects safety. Even the largest of the vessels have manually powered steering and single plate rudder. This rudder is allowed to turn up to 80^0 and there is no lock at 35^0. The helm of the larger vessels needs two to three persons to operate. In case of emergency uncontrolled rotation of the rudder renders the rudder ineffective due to stalling. The single plate rudder becomes largely ineffective in cross flow, a phenomenon common in disaster situations. The testing for the response time of the rudder is not carried out. The following precautions are necessary:

!*The design code should specify the maximum allowable vessel with single plate and manually operated rudder*

!*Registration survey and annual fitness survey should include performance test of the steering*

To obtain a safe ship, a safe design must be translated through a proper construction. A vessel not properly constructed may experience structural failure or leakage of the hull or structural collapse in accident/collision, develop machinery and equipment fault, etc. However, as may be noted that in none of the accidents, faulty construction has been identified to be the main or secondary cause of the accident.

Very frequently, faulty construction results in leakage of the hull in a short span of time. It is not unlikely that such leakage have caused water to get accumulated in the hold creating a free surface effect reducing the stability greatly. A weak structure will get damaged in collision and may thus cause capsize. With little or no control on the quality of the construction, it is almost impossible to obtain a really watertight hull.

Sixteen years ago the government constituted a Panel of Supervisors consisting of Naval Architects to supervise construction of inland vessels. The system has failed miserably. The failure was due to the fact that the major elements of the assignment, i.e. *authority, responsibility, accountability and liability* were not fully defined and the little that had been defined was not implemented. In this background, it is identified that to achieve good shipbuilding practice in the country, the following steps may be taken:

!*establish accountability of construction supervisors*

!*develop construction friendly design*

!*standardise construction facilities*

!*introduce certification of shipbuilding manpower*

The following limitations are to be taken into account:

!*Attitude of owners against paying for better design*

!*Lack of institutional finance for shipbuilders*

3) Maintenance of vessels

Poorly maintained vessels are endemic in the country. This is more serious in smaller vessels. Generally, the engine is more or less maintained in operational condition. The hull is subject to neglect. Smaller damages are fixed with temporary measures such as putting cement on a leakage in the hull. Owners reportedly ignore complains by the crew. Vessels are not docked until it is extremely essential. Preventive maintenance is almost absent. This results in hull leakage, weakened structure, loss of watertight integrity, etc.

The following remedies are suggested to ensure proper maintenance of the vessels:

!*rigorous annual survey*

!*provisions of random inspection by surveyors*

!*enforcement of stringent docking requirements*

!*watertight integrity, hull leakage, steering and propulsion systems be examined more rigorously during annual survey*

The following limitations are likely to create bottlenecks:

!*Owners of small vessels complaint of very little income to cover proper maintenance*

!*Earning of the smaller vessels reportedly reduced severely due to operation of mechanised boats*

4) Maritime administration

Maritime administration is a vital element in ensuring safety and discipline in the water transport sector. Presently, the inland shipping is regulated by two administrations in two different phases: plan approval is the function of BIWTA while survey and registration that of the Department of Shipping (DoS).

BIWTA is poorly equipped to scrutinise drawings. Its scarce infrastructure allows many defects to pass unidentified. At the DoS, manpower and logistics are inadequate. The small number of surveyors is grossly inadequate for the more than 5000 registered vessels. Even there is no thickness gauge to measure the hull plate thickness.

There is no arrangement for collection of feedback information on a continuous basis for analysis, and suitable amendment of rules and regulations. There is also no set methodology for the formulation of laws, nor any mechanism to consult various stakeholders, although some are consulted occasionally.

Occasionally the surveyors are also assigned to supervise construction of new vessels but this is almost never done because of two main reasons:

i) the limited number of surveyors

ii)the jurisdiction of a surveyor on a vessel under construction is not defined; the owner may report to any surveyor after the construction of the vessel, and submit approved drawings and supervisor's certificate.

The administration may be made more effective by the following measures:

!*Administration be reorganised with resource allocations commensurate to the contribution of the IWT sector*

!*Manpower expertise requirement be identified reorganised accordingly*

!*Rules implemented and feedback thereof be monitored scientifically*

!*Rules be amended periodically with scientific approach*

!*Adopt scientific methods for accident investigation*

!*Develop a permanent arrangement for incorporating feedback information in rules amendment*

!*Employ experts from all relevant disciplines for accident investigation*

!*Put emphasis on construction supervision*

The following limitations may hinder any improvement in this respect:

!*The government, as a matter of principle, is against any increase in size*

!*IWT is labelled a low-budget sector*

!*Administration frequently works under undue pressure*

5) Manpower

It is necessary to improve the aspect of operational personnel to ensure stability and achieve safety. Obviously this involves a review of the training and certification process with a view to upgrading and making it more effective. Formal training facilities for training of the inland vessels crews are too inadequate. Most of the crews are illiterate or with very little formal education. A considerable number among the crews are too old, have lost the physical fitness required for the job and also may have forgotten what they had learnt many years back when sitting for the examination to obtain the certificate. There are also reports of fraudulent practice with certificates of competency.

The following measures may help to improve the quality of the manpower engaged in operation of the vessels:

!*Formal training programme be widened*

!*Practical test be introduced for examination*

!*Take measures to attract educated youths*

!*Certificates be made renewable periodically*

!*Put a limit on age of crews*

However, improving the manpower standard in the IWT is likely to suffer due to the following limitations:

!*Crews are from illiterate background*

!*This is socially not a very respectable profession*

!*Vessel owners not willing to pay respectable salary*

6) Waterway and infrastructure

Water transport is the most neglected amongst the transport modes in the country although the development of which would be beneficial in many other sectors as well. There are many problems. Silt and fishing nets have narrowed many channels making shipping hazardous. This had been the main reason for the large number of deaths in MV Salauddin 2.

Navigation aids are frequently stolen making navigation hazardous in many places. Landing stages for the launches are minimum. Embarkation/disembarkation from and to open riverbank is often perilous. There is also the problem of piracy in the larger rivers.

The following steps can alleviate the sufferings:

!*Allocation for IWT commensurate to the role of the sector*

!*Arrange dredging of navigation channels and justify investment*

!*Increase the number of landing stages*

The following limitations have hindered development of the IWT infrastructure and the limitations are likely to remain in the near future:

!*Importance of IWT is not realised by policy makers and fund providers*

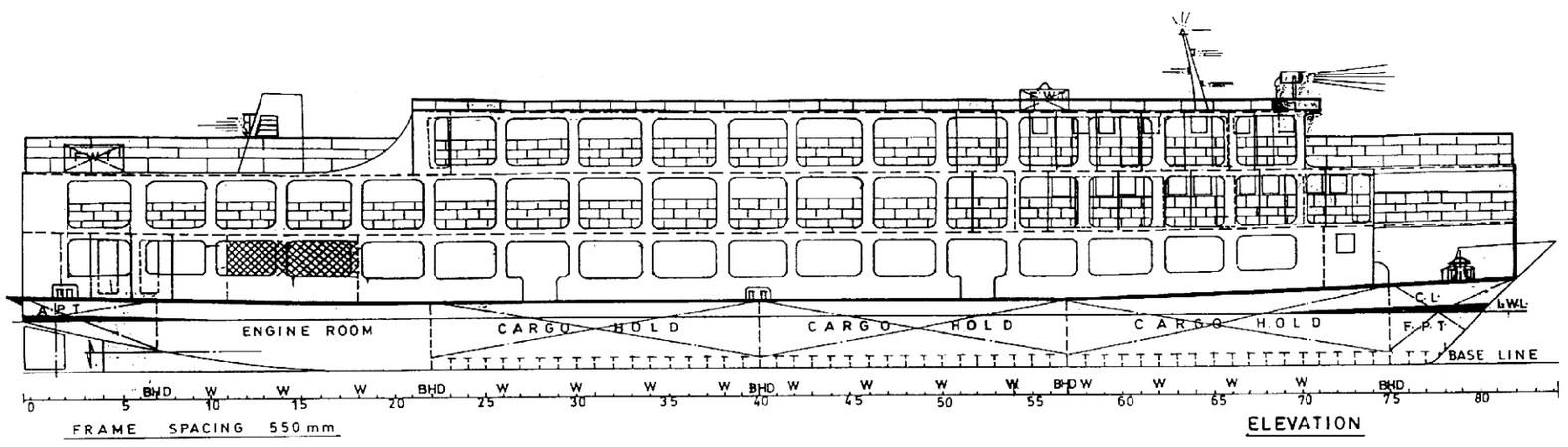
!*Politicians indifferent towards the sector*

Conclusions

The paper has tried to highlight the intricacies of the factors affecting safety of inland passenger vessels and specified recommendations. It is not pretended all the factors have been analysed properly and exhaustively. However, it is expected that the discussion will provoke thought and subsequent deliberations will supplement the discussions here.

The question of safety of inland passenger launches and involves many aspects beginning from technical details to passengers' and owners' attitude. Thus, any meaningful solution should involve all the parties and consider all the factors to face up to the challenges of the complexities.

(The piece has been extracted from a paper and edited by the Consultant)



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