



Transport by landing craft: a flexible yet risky solution

Préalable

- A landing craft, better known as a *Landing Craft Tank* (LCT), is an amphibious ship intended for military use: offloading tanks and troops on to river banks. Largely used during conflicts in the second half of the 20th century, it can be easily converted for use in the civil sector.
- Currently, particularly in Asia, these LCTs are being used for commercial transport of rolling equipment. This type of flat bottomed boat does not need a berth or port infrastructure to load or unload cargo.
- Operations are performed using an axial ramp located at the front. This explains why the LCT is so widely-appreciated in island groups for inter-island trips (e.g. Indonesia / Philippines). Ideal for short trips, it can serve sites that are hard to access (shallow areas) and are often far upstream.



Average age of fleet	16 years
Total DWT of the fleet	378,531 tonnes
Average DWT	412 tonnes
Total number of units	918

Weaknesses of the LCT

1. Ramp water-tightness
2. Seaworthiness and securing conditions
3. Limited maritime scope
4. Maintenance levels

1 Ramp water-tightness

■ The ramp on LCTs has two purposes: accessibility (handling) and water-tightness (sailing). LCTs do not actually have a **watertight door** to protect the cargo space. When used for frequent commercial operations, its water tightness (in terms of the International Convention LL 1966 / Ch. 1 / Annex I / rule 3 → «weathertightness») can quickly become a problem at sea.

■ In general, this «front door» is manoeuvred by a hoist system and simply locked by chain stoppers. This closing method does not assure the portage quality on the compression bars offered by hydraulic cleat systems.



Recommendations relating to consignment preparations

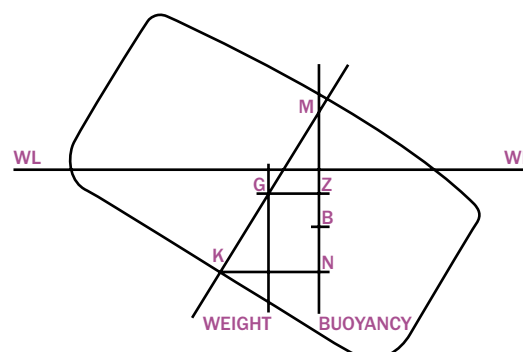
> Verification that the ramp is structurally sound and maintained to the correct level (distortion lengthways or crossways, corrosion levels, play and alignment of the transverse axis, general condition of the hoists, built-in sheaves, compression bars, possible stoppers and seals made of rubber); either by previous on-board inspection or by prior examination of photographs received from the transporter.

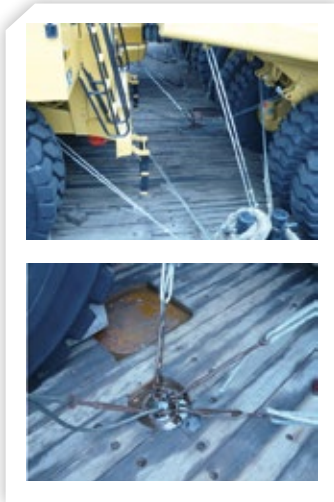
> In the light of the results of this examination, do not rule out postponing departure if weather conditions are not good: from force 3-4 for sea conditions (see table above).

Force	Description	Wave height in meters
3	Slight	0.5 to 1.25
4	Moderate	1.25 to 2.50

2 Seaworthiness and securing conditions

■ LCTs are flat bottomed boats. This shape gives them poor transverse stability in rough conditions: when loaded, the metacentric height (GM) imposes significant righting levers (GZ) and consequently sudden accelerations when rolling increasing risks of the cargo shifting. Loaded units slipping in the hold onboard LCTs fatally reduces its weak buoyancy reserves, which could lead to sudden irretrievable capsizing and losing goods into the water.





■ The seaworthiness risk is often combined with mediocre configuration of the LCT's on-board securing points. Designed as landing craft, LCTs are rarely rigged for commercial sailing. In light of the regulations in force (SOLAS resolution A.714), the distance between the securing points on the bridge should not generally exceed 2.5m lengthways nor be less than 2.8 m cross-ways. The maximum securing load (MSL) should not be less than 100 kN. If the securing point is intended to receive **y** lashings, the MSL should not be less than **y x 100 kN** *.

■ Unless strictly observing the parameters given in the rule, the cargo space for an LCT must be able to offer enough securing points to correctly fasten all the units of load on board. Otherwise accelerations might seriously damage the cargo or even put the whole consignment in danger.

* 100 kilo Newton (kN) = 10.2 tonnes force



Recommendations relating to consignment preparations

> Verification of securing capacity provided by the LCT: Inventory or distribution diagram for the rings and pitons that are accessible and available on the ballast ceiling and side shells; either by previous inspection on board or by prior examination of a plan provided by the transporter.

> Verification of the securing material available (cables, cable fasteners, chains, rigging screws, etc.) for the consignment; either by previous inspection on board or by prior examination of an inventory provided by the transporter.

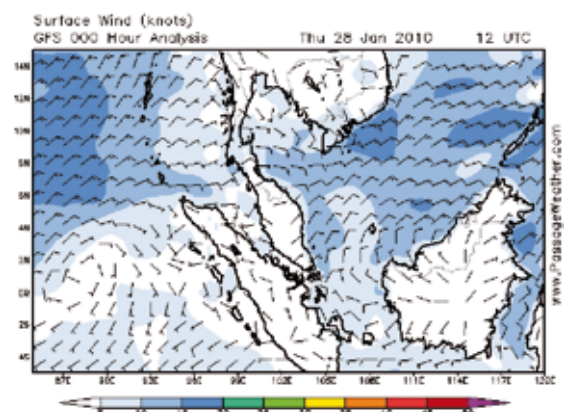
> In the light of the results of this examination, possibly consider nominating an expert technician to monitor and report on loading operations. This person should particularly verify the following points:

- Correct securing of all packages on board.
- For road equipment travelling in poor sea conditions, it is best to provide complementary security.
 - Wedging wheels
 - Parking brakes on and locked
 - Gearbox in neutral
 - Semi-trailers should not be resting on their struts

Limited maritime scope

■ The LCT is above all designed for landing. The aforementioned intrinsic weaknesses make sailing it precarious as soon as sea conditions become rougher. Its commercial use is generally limited to transshipment within the strict framework of sailing within view of the coast. This explains why LCTs are rarely equipped with weather receivers to consult the forecasts.

■ Sea weather forecasts are generally limited to 72 hours. This period generally corresponds to the transit time of LCTs within the range of their use.



Recommendations relating to consignment preparations

- > Consult the weather forecasts valid over a given transit time; do not rule out postponing the trip if a gale warning is currently valid (8 on the Beaufort scale).
- > If the coming journey's transit time must be longer than three days, check the sea passage: LCTs should never move more than 2 hours outside a sheltered roadstead.

4 Maintenance levels

- Many LCTs are more than 20 years old, and are neither registered with a classification society nor assured with a P&I firm.
- The Indonesian LCT fleet is usually registered with BKI (an Indonesian classification society). LCTs in the Philippines are often registered with the local government classification. In both cases, there is no obligation to undergo strict upkeep procedures or ensure that sailing equipment is complete and up to date. Consequently, the seafaring instruments, the condition of the ship structure and the upkeep on the machines are often of a mediocre standard.

Recommendations relating to consignment preparations

- > In conclusion, when using this ship for the first time and particularly if long term use is envisaged, it is best if a qualified expert can appraise the LCT's maintenance level following the critical safety points (propulsion, structure, cargo space, means of navigation) and thereby tick off all the issues covered in this document.