

INSIDE ANGLE

Issues affecting all elements of superyacht design plus designers' opinions

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On the Rise

Elevators of all kinds are finding their way onto more and more yachts. The latest and smallest we heard of at The Yacht Report was on a 36-metre design. Here Mike Brandt, the owner of Dutch elevator manufacturer Lift Emotion BV, explains the ins and outs (or perhaps that should be the ups and downs) of the efforts and tread-free way to the sundeck or any deck in between.

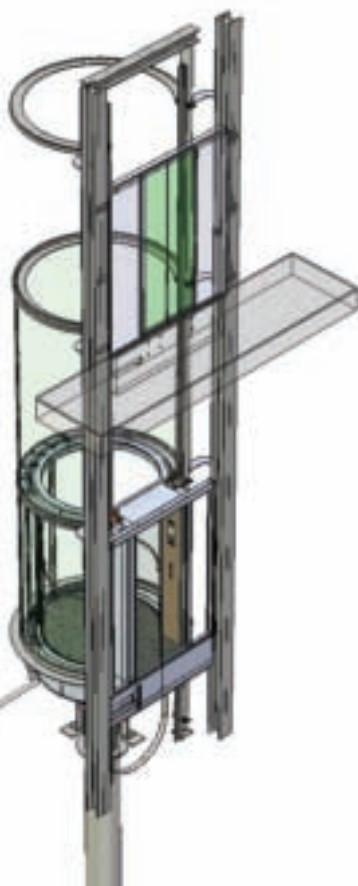
An elevator on board a moving vessel requires a lot more engineering than one in a building. The complete construction needs to be stronger and this has a big effect on the interface with the ship's structure. The electrical cables that normally hang loose in the trunk on a land-based elevator need to be guided. Also there are several regulators that you need to comply with such as American Bureau of Shipping, Lloyd's, Det Norske Veritas, Bureau Veritas etc. We divide our elevators into three different product groups, namely: Design, C-line and goods-only lifts such as dumb waiters or trolley lifts.

Design elevators are – as the name suggests – engineered and constructed with the design aspect up front in various shapes and sizes, for example round, square, ellipse etc. They feature glass and other special material choices and offer clean yacht-like solutions. C-line elevators are elevators inside a closed trunk. The cabin can be made from stainless steel or the yard can opt for the interior cladding by the interior designer – this way it matches the surrounding of the vessel.

The process of designing an elevator on board of a yacht requires some basic information namely:

- Available space (round, square, ellipse, size or other);
- Number of stops;
- Number of entrances to the cabin per deck;
- Requested look and materials;
- Deck heights;
- Travel height;
- Pit depth;
- Trunk top.

The pit depth is the available space measured from the finished floor level of the lowest stop to the elevator trunk floor. According to regulations this needs to be a rather big space. Because on a yacht every mm is precious this is one of the biggest limitations for every design. Basic pit depth must be 1,000mm. The reason for this minimum depth (also in the trunk top) is to ensure a person working in the space has enough room to avoid being crushed were the cabin to descend. However, the use of a simple safety device – a mechanical block – can reduce it to as little as 450mm in some cases.



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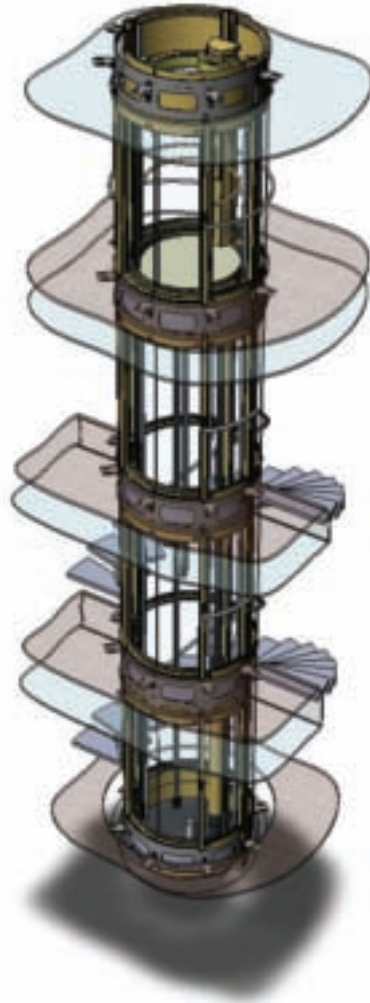
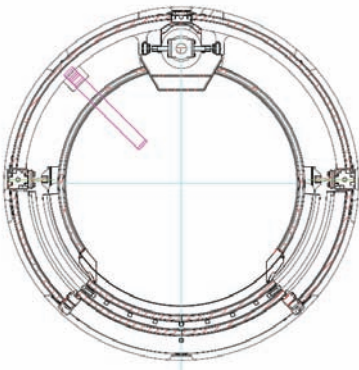
The trunk top is the distance from the lift floor at its uppermost stop to the top of the machinery space above the elevator. This is often a big limitation because of decks above. Trunk top size is normally 3,400mm, but using the special safety devices detailed above it can come down to 2,600mm.

With the information above we can make a basic layout and decide what is the most appropriate drive system. In most cases this will be a hydraulic driven system with electronic control to ensure smooth rides and stop accuracies of ~1 mm.

Case Study – The Design elevator

With a client request for an elevator with a trunk dimension of 1,600mm in diameter and four stops offering the maximum area of glass and with the use of the in house made under driven doors, we can incorporate the cabin door in the trunk and cabin design.

The first 2D drawing below outlines the regulation pit and trunk top size along with the optional minimum. Once we receive plan approval on the 2D view the elevator trunk will be designed in 3D.



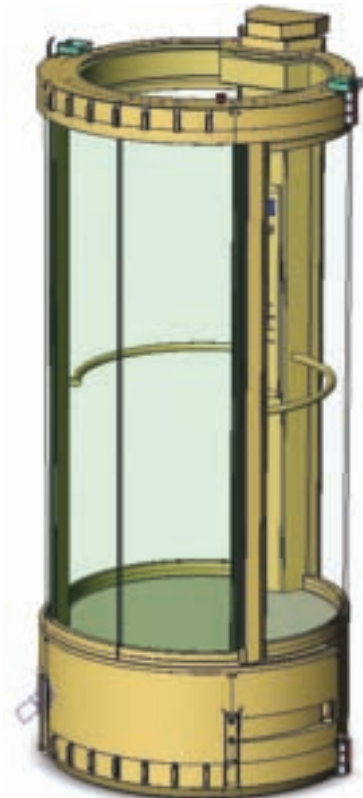
During the discussions between client, designer and yard the different options for the specific trunk details will be discussed. Then those different options will be submitted with CAD drawings or means of hand sketches. Finally, a 3D file will be sent to the client for a further approval showing, in most cases, the whole elevator including the staircase and the connection between elevator and ship. At this point the installation method is determined; it could be a complete hoist-in elevator or perhaps bringing in the elevator in parts then assembling *in situ*.

A 2D auto cad drawing will be submitted showing the general arrangement and interface drawing. In the interface drawing the specific details of connecting the elevator to the yacht – including the forces involved – will be shown with reference to, for example, centreline and frame numbers.

Although part of the whole elevator design, the cabin will be shown in separate drawings; it also must go through a separate approval process. After such approval our engineers will make production drawings from the 3D file. During projects with high end design elevators, we often have to guide yard and designer through possibilities of the requested design and also the limitations imposed by the strict elevator rules and technical feasibility, all without losing style and usability.

When complete, the elevator will be subject to a factory acceptance test (FAT); during this visit the complete elevator and elevator trunk will be shown in the factory and together with the client's representative we work through a detailed checklist verifying important dimensions and materials.

After mutual approval the elevator will be packed and transported to the yard for installation.



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Case Study – C-line elevator

A C-line elevator is an elevator with basic principles and will have no glass trunks etc. The C-line will be built in an enclosed trunk delivered by yard. Because we use standardised units we can supply different basic designs within a brief lead-time. The drive unit is mostly a 2:1 hydraulic system; a piston with a sheave and ropes; this allows us to minimise the pit depth and trunk top. The great flexibility of sizes and layouts allows the yard to have something unique yet within a reasonable budget. The cabin floor and walls can be decorated by the interior sub-contractor offering a special look. Even the landing door (with or without A class fire certification) can have special cladding made by ourselves or the yard. During the FAT we show the goods and a completely preassembled cabin, including a cabin door.

Mike Brandt
Lift Emotion

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