





Helicopter Landing Grids

VDL-KTI supplies in partnership with Iv-Industrie Helicopter Landing Grids (HLGs) and has built up a worldwide reputation. We develop, design and supply high-end HLGs for superyachts, ship building industry, rescue and law, the defence industry and also training and simulation. Since 2004 the design has been optimised and dozens have been successfully supplied to our clients. We are the party to go for advisory, design, calculation and delivery services for HLGs for any type of ship, building, offshore platform and also UAVs (Unmanned Aerial Vehicle) platforms or flight decks. Our HLGs is a special rapid securing system aimed to securing a helicopter to the flight deck immediately after touchdown by the hydraulic engagement and lock of the helicopter harpoon into the flight deck.

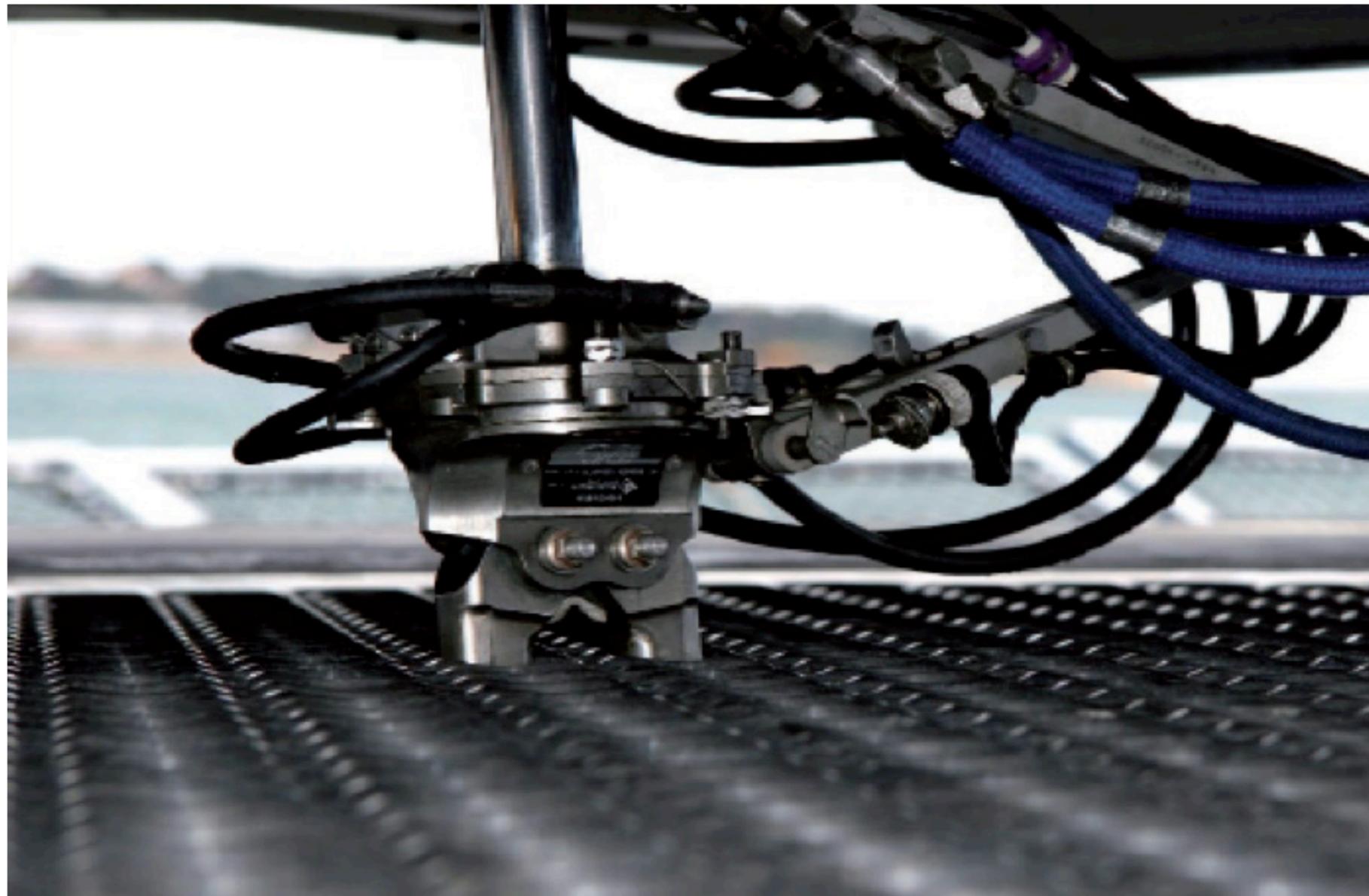


| Optimised design

Our custom designed applications enable helicopters to land safely on the deck of a vessel. The HLGs enables an incoming helicopter to be tethered to the deck of the ship with a harpoon. When approaching, the helicopter is tethered to the grid by shooting a harpoon into it. This greatly facilitates landing in rough seas.

During take-off, the grid once again provides a high measure of safety. Dimensions of grids for use on naval vessels are in accordance with the NATO standard specifications (STANAG 1276). We have adapted the design of these grids to take the ever-increasing weight of modern helicopters into account. We use the Finite Element Method (FEM) and 3D modeling to calculate the required strength and safe working loads. The maximum pulling force before plastic deformation occurs is established by the harpoon tensile load (the maximum breaking force of the harpoon) or the resistance of the deck lock systems. For the downward force before plastic deformation, we use the maximum take-off weight (MTOW) of the helicopter increased with a factor of safety (FOS).

The heaviest grids can withstand pulling forces of 110 kN and downward loads of 220 kN. New designs have now been produced for lighter applications, ensuring that the most appropriate option is available whatever the specific requirement may be. HLGs have been designed for various helicopters, buildings and offshore platforms. The HLGs are available for helicopters such as NH90, Bell 206/407 and Eurocopter EC-120/145. HLGs for specific helicopters and other applications are available on request.



| Cost efficient Manufacturing and delivery

We not only design HLGs but undertake full construction and assembly, including any required support structures and surfacing materials. We act as the main contractor, and handle the overall project management. We maintain direct contact with our client throughout the design, fabrication and installation phases. We also assume the responsibility for the quality, the design and fabrication documentation, and factory acceptance testing. We offer:

- ▶ HLGs deck plate of high tensile stainless steel
- ▶ Substructure for the support of the grid plate including all attachments
- ▶ Several cover plates (optional)
- ▶ Interface information for mounting the substructure on the ship deck (head assembly drawings and manuals included)

We strive to continuously improve the design by using the latest technology. In designing the HLGs the production process plays an important role. By optimising we can lower production costs, improve quality and reduce time-to-market. This leads to long-lasting relationships with our clients, strategic corporations and partnerships.

| HLGs characteristics

- ▶ Made of high tensile stainless steel (Virgo 39)
- ▶ Available in several versions suitable for the heaviest helicopters
- ▶ Fit on all types of flight decks
- ▶ Long lifetime, high reliability and virtually no maintenance
- ▶ Compatible with any helicopter handling system
- ▶ Static harpoon anchoring in heavy wind (Force 10) and a ship roll of 30 degrees
- ▶ Harpoon anchoring and lashing for heavy wind (Force 12) and a ship roll of 30 degrees
- ▶ The useable diameter is 2.5 metres with an overall diameter of 2.7 metres

| References

- ▶ Two helicopter landing grids for heavy weight helicopter for LPD2 of the Royal Dutch Navy
- ▶ Two helicopter landing grids type NH90 for M-Frigates of Royal Dutch Navy
- ▶ Six helicopter landing grids type NH90 for M-Frigates and Patrol vessels of the Royal Dutch Navy
- ▶ Three helicopter landing grids type NH90 for Sigma Frigates of the Royal Moroccan Navy
- ▶ Two helicopter landing grids heavy weight type for JSS of the Royal Dutch Navy
- ▶ Four helicopter landing grids type HLG-6 for the Chinese government



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