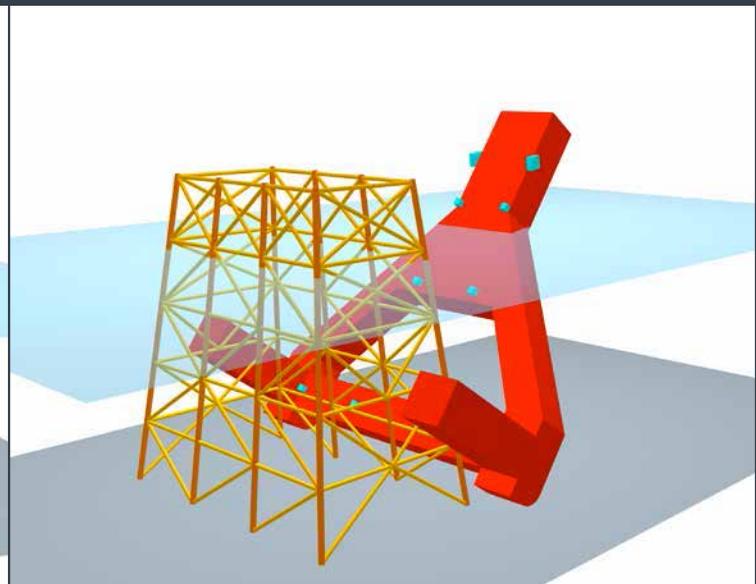
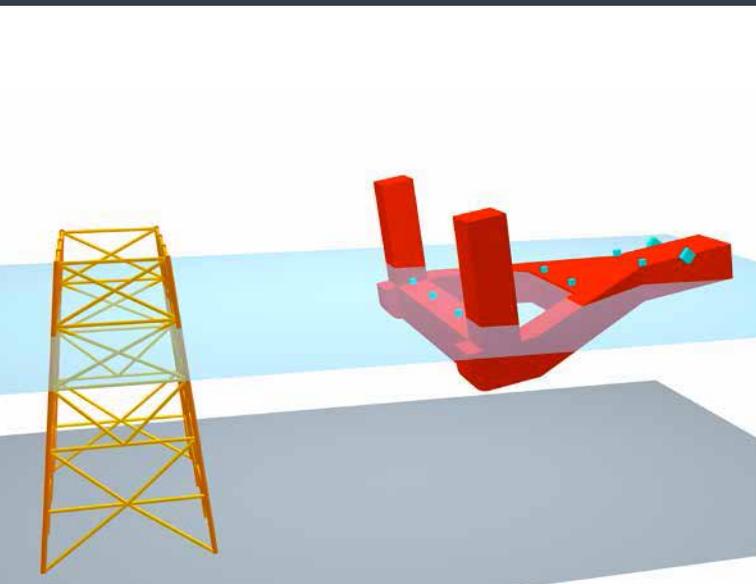




**Safe and cost-effective
single-lift removal
technology for
decommissioned fixed
offshore steel platform
substructures (“jackets”)**



The DeltaLifter being manoeuvred into position (by 4 tugs), no anchors are used. The DeltaLifter is unmanned and power and signals are transmitted through umbilical cables from a containerised power and control unit on the deck of an adjacent supply boat. All systems are fail safe and have full redundancy

The DeltaLifter is ballasted down and carefully positioned alongside one side of the jacket. In a shallow-water mode the DeltaLifter may rest and rotate on the seabed if appropriate; in a deep water mode it will connect afloat higher up. Pre-positioned cradles on the DeltaLifter deck will serve as guide structures for mating with the jacket



THE PATENTED DELTALIFTER PRINCIPLE

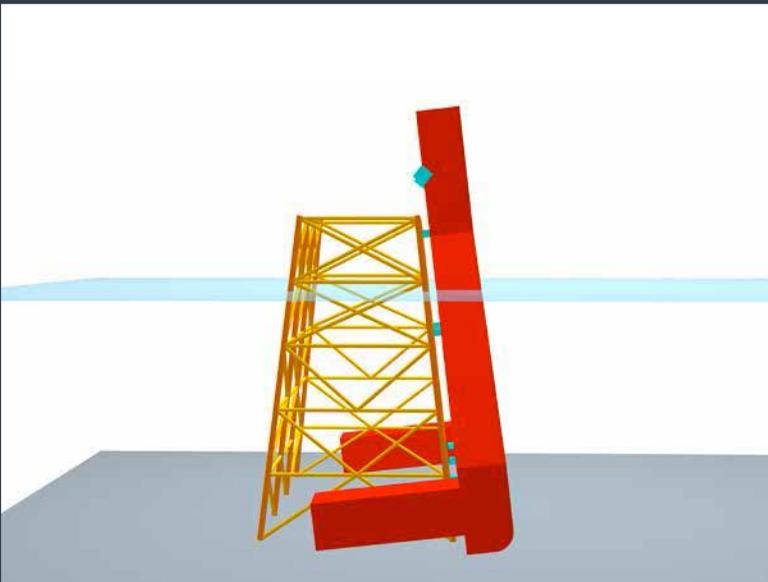
The DeltaLifter is a single-lift tool specifically developed for safe & low-cost removal and transportation to shore of large decommissioned offshore platform jackets, without use of heavy-lift crane vessels or flat-top barges. The DeltaLifter enters the decommissioning process after the platform deck has been lifted off and piles and other subsea connections have been cut. The sole purpose of the DeltaLifter is the safe removal of the jacket, which normally is the largest and heaviest part of an offshore fixed steel platform.

The DeltaLifter is towed to location and positioned next to the jacket by tugs. By controlled ballasting and de-ballasting, the robust DeltaLifter is mated to the side of the jacket and thereafter in a single operation uses buoyancy to lift the complete jacket from its vertical position on the seabed to a horizontal position, afloat on the deck of

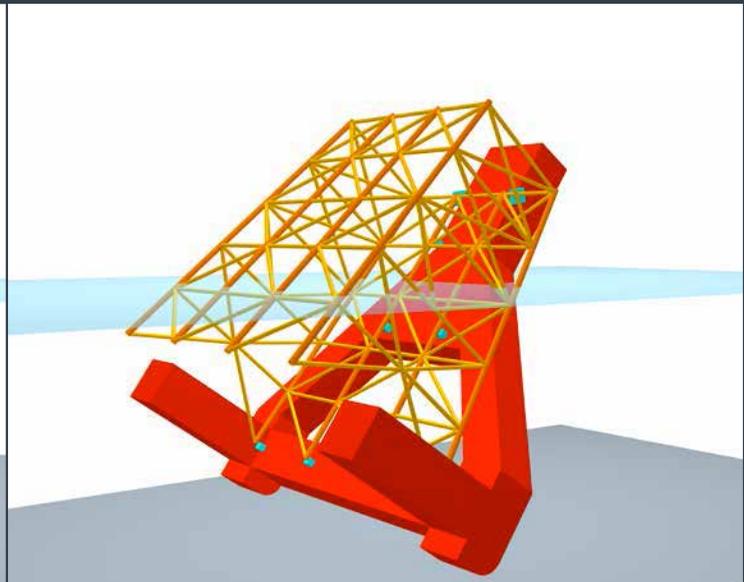
the DeltaLifter. With the DeltaLifter acting as a barge, the jacket is thereafter towed to an onshore recycling yard and skidded ashore – in effect reversing the load-out process that took place years earlier when the newbuilt jacket was skidded horizontally on its side from the assembly yard onto a launch barge.

Alternatively, the jacket can be cut into smaller pieces at the recycling yard while still sitting on the deck of the DeltaLifter.

The DeltaLifter is a unique and simple solution using sound design, fabrication and operating principles that can in many cases eliminate the need for expensive heavy-lift crane vessels or barges for jacket decommissioning. Its low draft allows access to multiple recycling yards.



The DeltaLifter being connected to the top of the jacket. No underwater work is required. All necessary structures for connecting the jacket to the DeltaLifter will have been installed prior to arrival of the DeltaLifter. Most (or all) seabed connections will have been cut off prior to the arrival of the DeltaLifter using proven methods

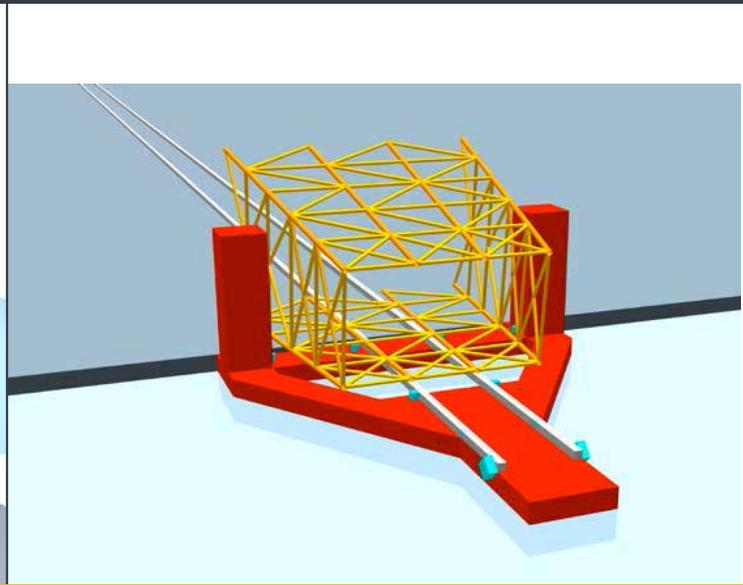
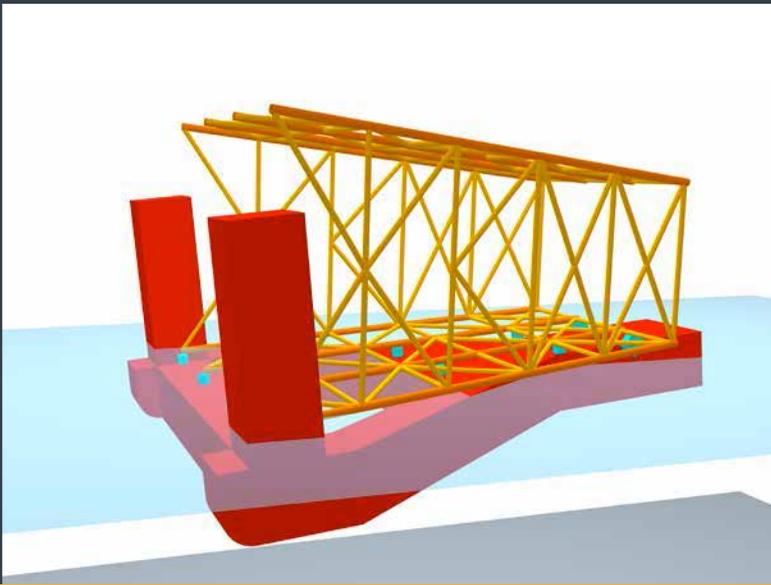


Tilt-up operation is achieved by controlled de-ballasting of the DeltaLifter

THE DELTALIFTER FEATURES

DeltaLifter units can be built in different sizes, each designed to remove a range of jackets within each unit's dimensioning limitations. Each DeltaLifter unit will provide:

- A safe solution, minimizing subsea and offshore work. No divers, and no operators onboard the Jacket or the DeltaLifter during operations.
- A robust box structure that is easy to fabricate, operate and maintain
- A flat deck area to accommodate support cradles – as part of the removal preparation the robust cradles are welded on deck of the DeltaLifter in a pattern to match the geometry of each jacket, serving the dual purpose of guides during mating and sea-fastening during towing.
- Low wave loads and reduced chance of impact damage on the jacket during connection, lifting and towing
- Ample weather tolerance, permitting a wide operating window and reduced risk of down-time
- Benign motion characteristics due to limited water surface area during positioning and tie-up – towing to shore can be done in partially submerged position
- A shallow draft allowing access to a range of recycling sites. The flat deck can accommodate various skidding or wheeled transport system configurations for jacket transfer to shore
- Short operation time offshore, maximizing the number of removal operations per season
- Low capital and operational costs – the unmanned DeltaLifter is moved by means of leased tugs. Power and controls to operate pumps and valves are supplied through an umbilical cable from a containerised power unit on deck of an adjacent OSV.
- The DeltaLifter design and operating principle is covered by several international patents.



The DeltaLifter in its tow-to-shore condition. The tow-to-shore can be carried out in a semi-submerged condition to enhance the superior motion characteristics of the DeltaLifter

The DeltaLifter is ballasted on an even keel at ground level and the jacket is transferred onto a recycling yard using conventional skidding technology. The maximum draft of 8 meters allows access to a number of alternative recycling sites

THE DELTALIFTER ADVANTAGES

Safety

Elimination of almost all underwater work (other than pre-mobilisation cutting of seabed connections). The custom designed temporary connection between the jacket and the DeltaLifter is made above sea level, before the turning and lifting operation starts. There will be no persons onboard the DeltaLifter or on the jacket during the lifting operation or towing. The time offshore is shortened.

Highly Competitive costs

Through its simplicity, the DeltaLifter delivers significant financial savings in both capital outlay and operating costs in comparison to other jacket removal technologies.

Reduced operating costs are achieved through simplicity of operations, low maintenance, reduced need for extensive underwater dive operations, and lower levels of manpower required throughout the removal and transportation phases. The robust DeltaLifter is designed for a long economic life.

Reduced operating time

Due to its shape, the DeltaLifter has benign motion characteristics, allowing operations to continue even during adverse weather conditions. The possibility of impact damage during the mating operation is low. Jacket removal time is significantly shorter than for alternative methods due to simplified field operations and less chance of weather-induced downtime.

A shorter turnaround cycle means more operations in a season.

Environmentally friendly

The DeltaLifter is an environmentally friendly method of jacket removal. It minimises offshore work and allows removal in one piece thus maximising onshore recycling. It uses existing tugs for transportation and only needs power during operations to operate its pumps and valves.

Scalability

The base version of DeltaLifter targets a range of jackets with a weight up to 8200 t. For larger and heavier jackets, the design can be scaled to the required size.

THE DELTALIFTER DEVELOPMENT

The principal inventor, Dr Birger Natvig, has advised oil companies, naval architects, offshore contractors, terminal operators and ship owners on a range of hydrodynamic, offshore operation and floater design issues. He served as President of the International Society of Offshore and Polar Engineers ("ISOPE"), has authored a number of scientific publications and has served as a speaker and moderator at several professional seminars. He holds a BSc degree in naval architecture from the University of Strathclyde and earned an MSc in ocean engineering and a PhD degree from the University of London on non-linear motion behaviour of floating structures.

His co-inventor, Professor Tor Vinje, earned degrees in applied mathematics and a doctorate in ship structure, and taught at the University of Trondheim and the University of Oslo in Norway as well as the University of Michigan in the US. A recognised authority in hydrodynamics, response statistics, system mechanics and structural engineering, he has held senior technical positions in Det Norske Veritas, Aker Marine Contractors, Norwegian Contractors and Seaconsult AS; in addition, he has authored number of scientific papers and served as expert witness in international arbitrations.

Other team members include naval architects and professionals with extensive experience in the offshore energy industry, in particular in wave response analyses, mooring system analyses and calculations related to a variety of fixed and floating offshore installations.

DeltaLifterTechnologies AS, the DeltaLifter patent owner, has entrusted the further DeltaLifter commercial and technical development to International Contract Engineering ("ICE"). As Europe's largest independent marine design bureau, ICE has a 50-year history and clients world-wide, including in the offshore energy industry.

ICE will also be available to supervise construction and commissioning of DeltaLifter units, and will provide engineering services to builders, owners and operators of DeltaLifter units.



International Contract Engineering (ICE)
www.icedesign.info

Prototype

Dimensions

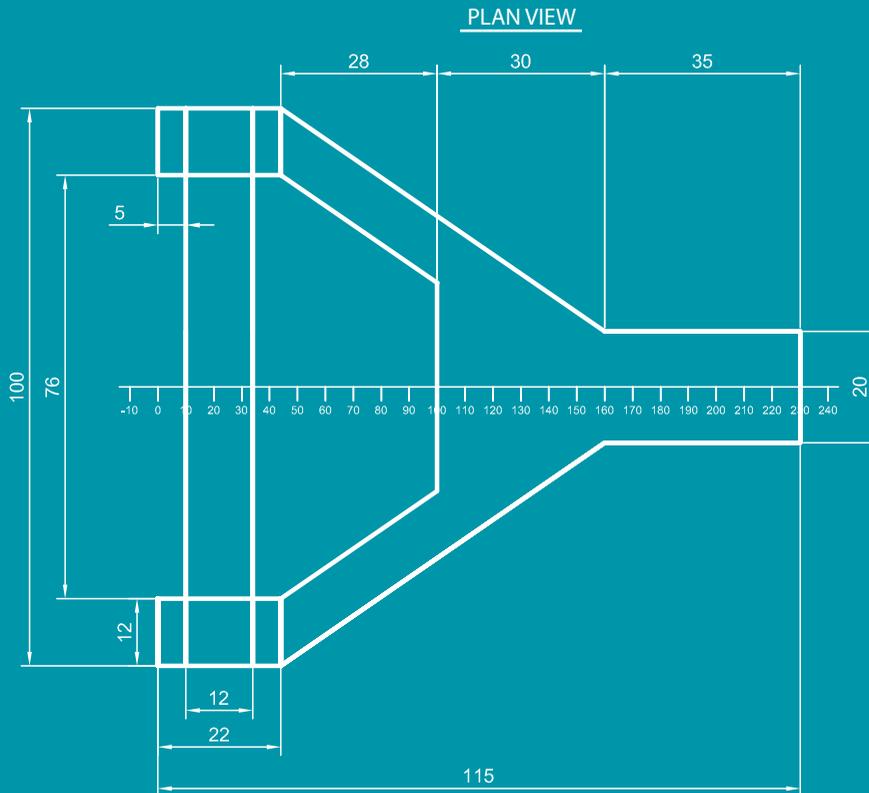
Overall length	115m
Maximum width	100m
Width between columns	76m
Column height from pontoon top	37m
Column and pontoon width	12m

Weights

Steel weight & equipment	9,600 t
Max jacket weight	8,200 t
Fixed ballast	5,000 t

The DL-8000 is designed to remove jackets of a wide range of configurations weighing up to 8,200 tonnes in water depths ranging from 60 to 120m. Other DeltaLifter versions can be designed to handle different size ranges of jackets.

All figures are subject to change.



The DL-8000 - approximate dimensions in metres