

WORLDWIDE HEAVY TRANSPORTATION AND LIFTING

OIL, GAS AND PETROCHEMICAL

ALE   
SMARTER, SAFER, STRONGER



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## Oil, gas and petrochemical

ALE is one of the leading global service providers for the oil, gas and petrochemical industries. We have a presence in all the major oil and gas centres in the world and strong relationships with blue-chip oil and EPC contractors, who rely on us for fully engineered transportation and installation solutions.

As the size of refineries increases, so too does the need for heavy lifting and transportation solutions. Using a combination of cranes, trailers and gantry lift systems, we're able to move critical items of plant and equipment such as reactors, process columns, furnaces, boilers and fractionating towers into position. Detailed project management and the highly developed skills of our engineers mean we're able to execute these moves with incredible precision and in complete safety.

Our experience means we're familiar with the unique challenges associated with working on-site. We've developed a number of effective strategies to meet the demands of long-term or complex operations carried out during revamps and shutdowns, when time frames and space are often very restricted. For example, our comprehensive fleet of heavy cranes – which includes the world's largest land-based crane – allows us to engineer schemes such as lifting 'off-plot' that improve the efficiency of operations. Indeed, we've devised innovative solutions to overcome challenges posed by particular site conditions or local requirements on many of the projects we've completed.



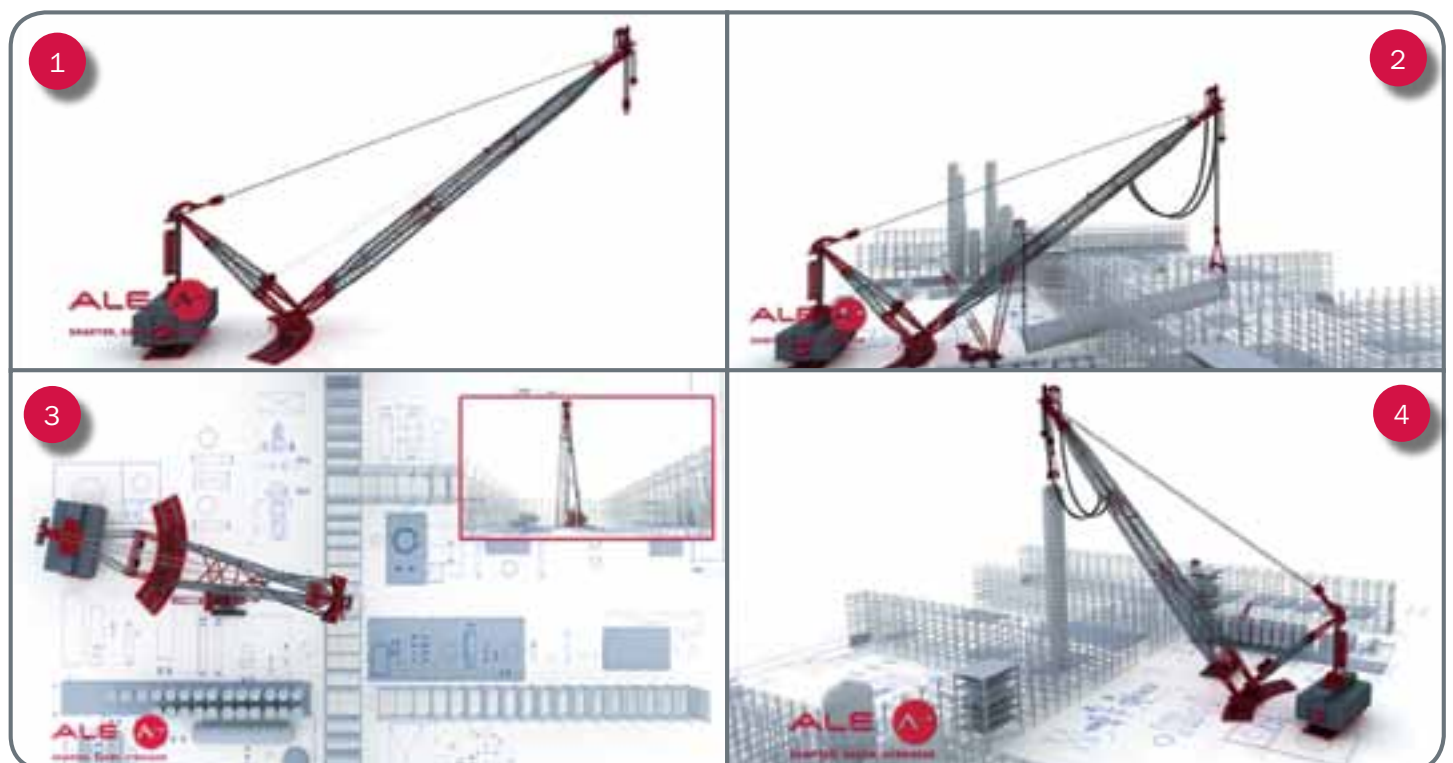
With a pedigree in innovative engineering and an active R&D facility, ALE has always been known for developing new solutions to meet future needs. Over the years we've added to our world-class engineering skills-base through the acquisition of several successful specialist companies, and now we have more than 200 highly qualified engineers working at locations across the globe. This experience means we're well equipped to support the full FEED process, working through complex technical and logistical issues at an early stage to eliminate expensive changes later on.

Our FEED capabilities form a crucial part of the service we offer. ALE has contributed to many high profile projects that have been right at the forefront of global trends in the sector. We are able to adapt to ever-changing industry requirements, evolving safety standards and scope changes as the project gathers definition during the design process, while at the same time providing solutions which are as cost-effective and safe as possible. As a result, we're able to work closely with our clients from an early stage to establish what's required and provide practical engineering advice.

FEED services include:

- Physical route surveys to determine maximum practical equipment weight and dimension information
- Investigation of environmental conditions affecting the heavy lifting and transport discipline
- Road layout and route improvement studies

- Advice on local regulatory issues relating to the movement of large and indivisible loads to the job site
- Equipment lifting and installation studies to determine the most cost and schedule effective methods of sizing and placing equipment
- Design of rigging and lifting equipment
- Outline design of new build site construction jetties
- Selection of optimum shipping methods and identification of suitable vessels or barges
- Logistical studies to ensure that transportation and installation scope support the project schedule
- Design and input to design of transportation support steel and lifting and lashing/securing points
- Assistance in modularisation studies to determine the maximum practical extent man hours can be removed from the job site



Continuous HSQE improvements are a fundamental part of our ‘Smarter, Safer, Stronger’ ethos. Although extremely high, our standards in these four areas are continuously reviewed and refined so we remain at the forefront of the industry. This is overseen by a team of professionally qualified HSQE advisors who are dedicated to developing, implementing and evaluating our global policies.

ALE works to ISO 9001:2008 standards in quality management and ISO 14001:2004 standards in environmental management. Our global HSQE objectives include improving customer satisfaction and competence, and to this end we develop and implement internal training schemes based on our unique equipment, as well as delivering externally built training

courses that ensure adherence to the latest industry standards. We’ve also established Centres of Excellence in each of our service areas to enable experienced staff members to pass on their invaluable knowledge.

Our commitment to quality management, sustainability, professionalism and safety goes a step beyond the usual focus on people and profit. Despite the scale and ambition of the projects we undertake, we’ve succeeded in maintaining safe and healthy working environments in remote and challenging locations around the world. The many local and global HSQE initiatives we’re involved in are intended to help us maintain our excellent quality and safety record.



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## ► Case study: Lifting and pulling of modules in Tampico, Mexico

**OVERVIEW:** ALE has successfully performed a number of transportation, lifting and pulling operations at the Dragados Offshore yard in Tampico, Mexico in three separate projects.

**SERVICES REQUIRED:** The first project involved the transportation of two lifting gantries. The gantries, which weighed 870te each, were moved 280m using five self-propelled transport platforms. Both gantries were moved with the stability leg and the lifting equipment already installed, and passed over the living quarter module and the 19m deck. The passing tolerance between the platform and the gantry was just 200mm at the most critical point.

ALE also performed the lifting and pulling of DOMSA modules across three distinct operations. Firstly, the 2,000te top module of the living quarter platform was lifted using eight 500te HLS5000 units in an operation that lasted eight hours. The lower platform of the structure was then pulled into position using skid shoes. The skidding manoeuvre, in which the modules travelled a distance of 68m, was completed in less than five hours.

In the third project, two offshore platform modules were lifted and pulled in three phases. Again, this involved the lifting of the upper module by means of eight HLS5000 lifting units, the pulling of the lower platform from its temporary position to its final position under the upper modules, and the lowering of the upper module to assembling position. The lifting and pulling operations were monitored and controlled from SLS control computers.





► **Case study:** Installation of jack-up drilling rig, Mexico

**OVERVIEW:** ALE has performed the installation of the 402te leg sections and 575te living quarters of a jack-up drilling rig in Tuxpan, Mexico.

**SERVICES REQUIRED:** Both the installation of the leg sections and the lifting of the living quarters were carried out using the CC8800-1 crane. The crane configuration for the leg sections was: 108m main boom, 12m fixed jib angled at 15° and 50m backmast. For the living quarters, this configuration was changed to 78m main boom and 50m backmast, working at 22m radius and with a 440te counterweight on the tray.

► **Case study:** Replacement of coke drums at Valero Refinery, Houston

**OVERVIEW:** ALE was awarded the replacement of six coke drums at Valero Refinery in Port Arthur, Houston. This involved the disassembly and assembly of a 1,400te superstructure in a single piece.

**SERVICES REQUIRED:** The AL.SK190 was used to exchange coker drums, removing six old drums and replacing with six new drums weighing up to 471t each. The crane first lifted a 1,400t derrick structure, which was positioned on top of the existing coker drums at a height of 100m, and set it on the ground. The coker drums were then exchanged, and the derrick structure replaced.

The derrick lift performed by the AL.SK190 was the first time a complete derrick assembly consisting of triple drill towers and cutting deck, had been removed and replaced in a single piece. The lift required a complex tackle arrangement with a 12-point pick up only possible with the AL.SK190 crane. To successfully complete the project without the need to shut down the coker the AL.SK190 was rigged outside the boundaries of the coker pit. This also enabled the completion of the project with no permanent equipment in the refinery having to be dismantled, and the coke pit wall did not have to be removed.





## ► Case study: Lifting and installation operations in Sines, Portugal

**OVERVIEW:** As part of a long running project in Sines, Portugal, ALE has successfully completed the lifting and installation of a number of heavy items at the Galp Petroleum Refinery and Artenius Petrochemical Plant.



**SERVICES REQUIRED:** ALE was engaged in a series of projects including the transportation, unloading and installation of two reactors, the transportation and installation of a splitter and a deisobutanizer, and the installation of other heavy items such as a reactor condenser, a dehydration column and a CTA dryer.

At 1,576te, one of the reactors is the largest cargo to have been unloaded and transported in Europe. ALE carried out the unloading from a marine transport vessel at Sines harbour dock, and transported it along 9km past 2km of 10% slopes using two parallel Self Propelled Modular Transporter (SPMT) platforms with 34 axles each. This reactor was then lifted from a horizontal position on the transport trailers to a vertical position, ready to be installed onto permanent foundations. ALE used the CC8800-1 crane for the first time to complete this manoeuvre in under six hours.



For the lifting and installation of the deisobutanizer, ALE engineering was involved at an early stage as both space for manoeuvring and timescales were severely restricted. Using the CC2800 crane, the lifting operation was completed in an hour. The installation was executed in a high-risk area and the refinery remained in operation while it was performed, so the highest security arrangements and levels were implemented during the assembly of the main crane and the lifting of the deisobutanizer.



The CC2800 crane was also used to perform the lifting of a kerosene stripper. With a 600te capacity, this lattice crawler crane is recognised as the most suitable for projects of this nature thanks to its versatility on-site and the fact that it does not need to be dismantled to move to a new position.



### ► Case study: Transportation of three vessels in Kleve, Germany

**OVERVIEW:** ALE transported three vessels from Kleve in Germany to the Rhine near Emmerich, covering a distance of 10km. Before the vessels were loaded, they were first jacked up to the required height using 12 climbing jacks.



**SERVICES REQUIRED:** The vessels were transported in two nights. Weighing 450te, the heaviest vessel was transported using 4-file/6-axle and 4-file/8-axle SPMT trailers with turntables on the first night. The transport route involved three junctions and many traffic lights and signs which had to be removed for the duration of the manoeuvre. When the transport arrived at its destination, the vessel was placed on temporary supports and the SPMT trailers were driven back to Kleve.

The next night the same SPMT trailers transported the longest vessel, which measured 68.5m. The third vessel was transported using a 16-axle conventional trailer. The morning after, these two vessels were ro/ro loaded onto a barge. While this was happening, the SPMT trailers loaded the heaviest vessel again and when the conventional trailer was ready, it was also ro/ro loaded onto the barge.

### ► Case study: Heavy transports, Spain

**OVERVIEW:** ALE has successfully executed the transportation of three heavy items from a fabrication yard to the port in Avilés. The scope of this project also included intermediate handling of the components on the pier before they were loaded onto a waiting vessel.



**SERVICES REQUIRED:** The transportation of the three items – a flexicoker heater, flexicoker gasifier and a reactor – was executed with SPMTs in several transport configurations: 18x4 for the gasifier and heater and 8x4 + 6x4 + turntable for the reactor. It was necessary to remove lampposts and traffic signs as well as make some temporary modifications to existing roundabouts in order to clear the route of obstacles for the journey.



► **Case study:** Transportation and tailing of a reactor in Gdansk, Poland

**OVERVIEW:** ALE transported a 695te reactor from a barge onto site and then tailed it in preparation for erection and installation.

**SERVICES REQUIRED:** SPMTs with turntables were used for the transportation of the reactor onto site in order for the corners along the route to be negotiated successfully. Once on site, the tailing operation was completed using SPMT trailers with a tailing frame on top. The upper section of the tailing frame was installed on the skirt of the reactor and lower frame on the SPMT trailers.



► **Case study:** Transportation of 22 vessels at the Kirishi Hydrocracker Complex, Russia

**OVERVIEW:** ALE transported 22 vessels to the Kirishi Hydrocracker Complex in Kirishi, Russia. The items varied in weight from 38te to 1,066te, and all transports were carried out using SPMT trailers.

**SERVICES REQUIRED:** Facing extreme weather conditions, ALE worked with the client to plan an achievable transport route and schedule. The vessels arrived by pontoon to a ro/ro ramp near the site. The trailers were driven under the load to pick it up and driven off the pontoon to the temporary storage area. An SPMT trailer with 40 axles was used for the heaviest load.



► **Case study:** Transportation and installation of 19 vessels in Lysekil, Sweden

**OVERVIEW:** ALE executed the transportation and installation of 19 vessels at the Preemraff Refinery in Lysekil, Sweden.

**SERVICES REQUIRED:** The transportations were executed using SPMTs and an 8-axle Goldhofer trailer with truck. For the two heaviest items – reactors weighing 569te and 575te – 38-axle lines of SPMT were used. After the components had been transported, they were installed using a LR1750 crawler crane. For the tailing of the two heavy reactors, an ALE tailing frame connected to a 12-axle, 4-file SPMT was used.



► **Case study:** Handling and transport of a 95te Stinger, South Africa

**OVERVIEW:** ALE was contracted to handle and transport a 95te Stinger in Cape Town harbour.

**SERVICES REQUIRED:** ALE received the Stinger under hook directly onto the trailer and then transported the 95te load from Elliott Basin to A-berth. ALE used a 14-axle, 4-file SPMT for the movement of the Stinger. The manoeuvrability of the SPMT allowed for sharp turns to be made and safe access into A-berth at the multipurpose terminals.



► **Case study:** EGP3 Project, Escravos, Nigeria

**OVERVIEW:** ALE has completed the offloading, site transportation and installation of modules and equipment for the EGP3 Project at Escravos in the Niger Delta.

**SERVICES REQUIRED:** The plant consisted of 11 process modules weighing up to 365te and various columns, vessels, storage spheres, compressors and generators weighing up to 225te. Modules were unloaded from ro/ro vessels berthed at the temporary construction jetty and then skidded into position. The remaining equipment was received from geared vessels and installed using a 500te crawler crane.



► **Case study:** EGTL Project, Escravos, Nigeria

**OVERVIEW:** ALE has completed the offloading, site transportation and installation of two reactors for the EGTL project at Escravos, Nigeria, as part of an ongoing commitment to receive and install all major equipment during the project.



**SERVICES REQUIRED:** The two reactors were the first columns to be installed on the EGTL site. The installation was performed using a gantry and a tailing frame attached to SPMTs. When the vessel was lifted to the vertical, the tailing frame was removed from the skirt. The reactor was then skidded transversely on the gantry until over the foundation, from where it was lowered into position. The gantry, which weighed 1,250te on its own, was skidded fully assembled across the foundation to lift the second reactor.





### ► Case study: Pearl GTL Project, Qatar

**OVERVIEW:** ALE successfully undertook the complete transportation of heavy lifts for the largest gas-to-liquids (GTL) project in the world, known as the Pearl GTL project, in Qatar.

**SERVICES REQUIRED:** Starting in February 2008 and running until January 2010, ALE transported more than 1,000 heavy lifts, the largest weighing over 1,200te. Project barge ALE 250 was used for some of the heaviest items. Thanks to ALE's support on this project, the principle contractor, TTJV, was awarded 'Road Transport Safety Contractor of the Year'. ALE was also contracted along with Gama Qatar, Linde and CCIC for various additional site movements and installations.



### ► Case study: Olefins Plant, Saudi Arabia

**OVERVIEW:** ALE was asked to complete major lifts at a petrochemical plant in Jubail in the Kingdom of Saudi Arabia using the AL.SK190 crane.

**SERVICES REQUIRED:** ALE performed more than 100 lifts on this project during a five-month period. The AL.SK190 crane was used to lift a depropaniser column and a C3 splitter column into place, working at 84m and 75.4m outreach respectively. The ability to lift these loads at such distances allowed on-site engineers to complete foundation and pipe racks in advance of installation.

### ► Case study: Green Diesel Project, Abu Dhabi

**OVERVIEW:** ALE successfully completed the receiving and delivery of various heavy-lift cargo for the Green Diesel Project in Ruwais, Abu Dhabi.



**SERVICES REQUIRED:** All the cargo was received at Port Mina Zayed in Abu Dhabi, and then the majority was transported by barge to the jetty at Ruwais because of height and weight restrictions on the Abu Dhabi roadways. This involved rolling the cargo onto the barge and sea-fastening it, rolling it off the barge in Ruwais, and then transporting it to site. During these operations, ALE was responsible for all barge management including the mooring and ballasting.

The vacuum tower, weighing 307te and measuring 47m in length, was the last of the heavy-lift cargo. A 4-file, 22-axle SPMT was used to avoid the use of bolsters.

### ► Case study: Qafco 5 Extension Project, Qatar

**OVERVIEW:** ALE provided transport for all heavy equipment from the Commercial Port to the Qafco 5 Extension Project in Mesaieed Industrial City, Qatar.



**SERVICES REQUIRED:** ALE received all heavy-lift cargo from vessels in the Mesaieed Commercial Port providing temporary jack down and stoolage for customs inspection and clearance to take place. Thereafter, heavy and oversized cargo was transported to site where it was either immediately lifted from ALE trailers or stooled off to be transported in alignment with site installation schedules.

ALE provided transport for 120 items ranging from 40-50te. The main 450te urea reactor was transported on heavy duty bolsters that have a capacity of up to 1,350te. Among the transports were 500te ammonia converters, which needed to be moved into crane lifting position for installation; 300te CO<sub>2</sub> absorbers, which were received from the vessel using 4-file, 22-axle conventional trailers; 300te boilers, which were moved to site using SPTs; and 200te flash drums.

### ► Case study: Maiden voyage for ALE 300 barge, Abu Dhabi



**OVERVIEW:** ALE was contracted to complete the transportation of two demethaniser vessels as part of the Integrated Gas Development project in Abu Dhabi.

**SERVICES REQUIRED:** ALE successfully completed the transportation with the first use of its new ALE 300 barge. The 98m vessels were transported by sea from Mina Zayed Port to Ruwais and onwards by land to the Habshan 5 Process Plant.

ALE received the two 830te vessels at Mina Zayed Port using two SPMT split trailer configurations. Measuring 98m long x 8.5m wide x 8m high, the vessels are the largest ever handled in this port. Each vessel was then loaded out to the ALE 300 barge.

After load-in the demethaniser vessels underwent a 'jack and pack' operation. Using the SPMTs' integral jacking stroke, each vessel was jacked up from 1.6m under the saddles to 3.1m in order to change to a bolster – or turntable – configuration.

Transporting the vessels from Ruwais to the first parking area 12 kilometres from the city required a purpose-built road. ALE then had to change the SPMTs to a split trailer configuration to meet Department of Transport guidelines for the remainder of the journey along the highway. The pieces were then transported through the site to the delivery position and foundation.





► **Case study:** Thai Growth Project, Thailand

**OVERVIEW:** ALE completed the transportation and lifting of 25 heavy lifts as part of the Thai Growth Project in Map Ta Phut, Thailand. With weights ranging from 73te to 813te, all items were transported, lifted and installed in just 22 days.



**SERVICES REQUIRED:** The project originally specified a large crawler crane based in three positions over a three-month period. However, ALE’s record-breaking AL.SK190 reduced this to less than one month as its integral ‘quick winch’ system allowed loads of variable weights to be lifted by the same crane from one position, achieving significant cost and schedule savings. Due to its high capacity outreach, the AL.SK190 was able to perform all required lifts from a single location, avoiding the expense and time associated with de-rigging, re-rigging and relocating. Columns could be lifted over the new structure, enabling other structures and pipe racks to be installed ahead of schedule. In what was deemed a ‘flawless execution’ by the client’s construction manager, 25 items totalling 4,230te were lifted.





► **Case study:** ONGC ICP-R Process Platform Project, Indonesia

**OVERVIEW:** ALE was engaged to move and load-out modules as part of the Process Platform Project. ALE was able to provide full engineering support on transport, mooring design checks and barge ballasting and analysis.



**SERVICES REQUIRED:** Part of the redevelopment of the Mumbai High South offshore oilfield, the platform consists of a main structural frame, building module, process module, turbo generator and compressor module. With modules weighing between 1,400te and 2,850te, and one piece standing 45m high, this project showcases ALE's ability to provide innovative solutions in challenging situations. Due to its weight, ONGC initially specified for the heaviest piece, a 2,850te main structural frame, to be loaded-out using a skid system. However, after careful re-studying of the project, ALE was able to provide an engineering solution that would allow the frame to be shifted by SPMTs, achieving significant cost savings for the client and negating the requirement for additional equipment on-site.

► **Case study:** BP-OCC Whiting Refinery Modernisation Project, Philippines

**OVERVIEW:** ALE won the contract for the transport, shifting and load-out of more than 90 modules, pipe racks and vessels of various sizes and weights, including the jacking and weighing of the heaviest piece.

**SERVICES REQUIRED:** ALE mobilised a 52-axle SPMT and commenced work in July 2010, with the last module scheduled for May 2011. A full engineering study was prepared for each movement, including studies for moving the pressurised vessels safely without using any bolster.



► **Case study:** Jacket load-out in Malaysia

**OVERVIEW:** ALE has successfully completed the skidded load-out of a 5,800te jacket in Malaysia during a complex project that called on a range of ALE's capabilities.



**SERVICES REQUIRED:** The first phase of the project saw ALE weigh various modules for the F23R-A and CPDR-A Projects in Teluk Ramunia. These modules included a 1,715te and 1,882te deck that were weighed using an 8 point and 10 point weighing operation respectively. Post weighing, the decks were loaded-out using SPMTs, using more than 120 axle lines to roll the decks onto the transportation barges ready for offshore installation.

The heaviest structure of this project, a 5,800te jacket, was loaded-out using a four 441te capacity strand jack skidding system and a centrally controlled 32 ballast/de-ballast pump arrangement.



The second phase of the project used SPMTs for the load-out of a further deck, flare tower and inlet separators as well as a second jacket requiring the strand jack system for load-out.

In addition, ALE conducted all of the engineering works for this project and supported the client during the construction phase by supplying 24 axles of SPT trailers on long-term hire to assist in the construction of the jacket and module.

### ► Case study: Load-out for Pluto LNG, Thailand

**OVERVIEW:** ALE carried out the weighing, transportation and load-out of a process module from the Qtech fabrication yard at Sattahip port in Thailand.



**SERVICES REQUIRED:** Using 3 x 26-axle SPMTs, ALE transported the 1,370te module to Sattahip Port and loaded it out to the designated barge. This module was one of 96 pieces included in ALE's scope of work that ranged from 120te to 1,600te.



### ► Case study: Load-out of Chim Sao topside, Vietnam

**OVERVIEW:** As part of the Chim Sao project in Vietnam, ALE was engaged to move a 1,150te topside from the PTSC fabrication yard and load it onto a barge moored against a jetty.

**SERVICES REQUIRED:** Using the combination of a 90-axle SPMT and a 26-axle SPT, ALE transported the topside 300m at an angle of 30° from the fabrication yard to the jetty – a considerable distance for a topside site-move. In order to then load it out onto the waiting barge, ALE undertook a full feasibility study and all barge, mooring, ballasting and lashing calculations.



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