

# THE BIG TOW: WICK TO WESTER

THERE IS A 38-YEAR TRADITION OF ABNORMAL ROAD TRANSPORTATIONS IN THE EXTREME NORTH OF SCOTLAND BETWEEN TWO RATHER UNLIKELY LOCATIONS. SINCE THE LATE 1970S, OVER 160 LARGE SUBSEA TOWHEADS HAVE NEGOTIATED A PARTICULARLY CHALLENGING ROUTE, ATTRACTING WIDESPREAD MEDIA ATTENTION. **JOHN MALCOLM** TRACKED THE LATEST TRANSIT

PHOTOGRAPHY: **DEREK IRONSIDE**

Wick is a quiet coastal town with a historic harbour which has witnessed some spectacular sights down through the years. Developed in the 1800s to berth the huge local fishing fleet of over 1,100 vessels, harbour traffic peaked with a record landing of over 50 million fish in two busy days in 1900. The fishing fleet has long gone, and today the harbour is mainly used by leisure and light cargo vessels.



Six miles north of Wick along the A99 lies Wester, located on Sinclair Bay, whose beach has been voted one of the world's 10 best. It's a picturesque setting more suited to tourist marketing than heavy industry operations, but, several times a year, this short stretch of road accommodates one of the UK's most challenging abnormally large transportations.

The locals are now well accustomed to seeing massive steel structures being slowly hauled up the road from Wick harbour to Wester.

The structures in question are subsea towheads – steel manifolds weighing up to 300 tonnes. These are manufactured in offshore fabrication yards along Scotland's east coast and destined for a unique construction site at Wester operated by international subsea engineering contractor Subsea 7.

“Since 1978, we have transported around 160 towheads up the hill from Wick harbour, through the narrow streets of the town and along the road to Wester,” says Willie Watt, general manager at the site. “Particularly with larger towheads, the route is extremely challenging for our heavy transport contractors. It starts with a 14% gradient up from the quay and into the town where they have to negotiate a number of narrow streets with extremely tight corners offering only centimetres of clearance.”

The towhead transits are now a familiar sight to the residents of Wick, but they continue to attract the attention of the media and heavy transport “spotters”. In 2014, BBC Television's The One Show filmed a typical towhead transit through the town, with veteran political reporter John Sergeant clearly impressed by the skill and expertise of the Subsea 7 operations team and the heavy transport specialists, Allelys Group.

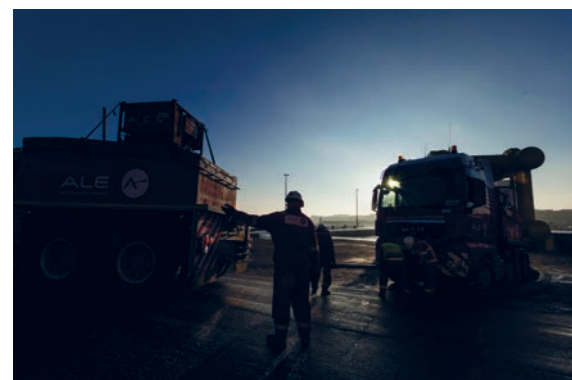


## VOYAGER 81

Subsea 7's latest towhead to be transported was a subsea manifold 25 metres long, six metres wide, six metres high and weighing 211 tonnes. "At Wester, we fabricate unique subsea systems called Pipeline Bundles," explains Watt. "These are constructed on site and are among the longest transported engineering structures produced in any industry anywhere in the world. A typical Pipeline Bundle could be 56 inches (1.42m) in diameter, 7.7km long and weigh up to 10,000 tonnes. To date, we have produced 81 Voyager Pipeline Bundles at Wester since 1978, constructing everything on site apart from the towheads."

Voyager 81 is destined for the Callater subsea field tie-back development operated by Apache North Sea and located 330km offshore to the north-east of Wick. The towhead is tied-in to the 3.5km Bundle on site and tested before the whole construction is towed by tugs along the site rail track, down the beach launch ramp and out to sea.

Subsea 7 contracted freight management specialist deugro (United Kingdom) Ltd, which is part of the global deugro Group operating in 40 countries, to ship the Voyager 81 towhead by barge from its fabricators at Isleburn, near the port of Invergordon 129km to the south, into Wick harbour and onwards to the Wester construction site.



The heavy haulage element from quay to site was sub-contracted to ALE, which deployed three tractors - two Trojan 8870s heavy haulage ballast units and one MAN TGX - and a 16-axle trailer from its base in Staffordshire. One Trojan was an unused back-up tractor, and the trailer was split into two sections for the 805km transit to the north of Scotland. The Trojans were designed in-house by ALE, have a design weight of 48 tonnes and can pull a gross combination weight of 300 tonnes at 14% gradient.

"This was the first time Subsea 7 had used deugro for a towhead transit, although some of the ALE team had worked on previous local transportations for us," says Watt. "We have obviously accumulated a wealth of knowledge of the route over decades of operations and shared deugro/ALE's commitment to minimising disruption to the local community."





## MONTHS OF PLANNING

Planning the project began five months in advance with site surveys by deugro's Operations Manager Di Kenny, a highly experienced industry veteran with 40 years' global experience. "Although I have shipped many larger over-dimensional and heavyweight loads, this was probably a unique operation because it had previously been executed along a challenging route so many times before by different contractors," she says. "As with all our risk assessments and method statements, we start from first principles based on thorough pre-planning together with the client, other contractors and local sub-contractors and all stakeholders."

"Safety is paramount through all stages of the contract, and we worked very closely and successfully with Subsea 7's knowledgeable local operations team to ensure that this difficult, and very valuable, cargo was transported without incident or delay. Most clients don't want to know about the journey, just the result, but on this occasion collaboration delivered results."

The methodology was based on deugro's early visits to all the sites, carrying out detailed reconnoitres of all routes and identifying possible obstacles and impediments along the way.

"This is a very close community, and we are a major employer in the town," says Watt. "We are aware of our responsibility to be a good neighbour and minimise the disruption to local residents who live and work along the route." Subsea 7 supports many local community initiatives, and, as on previous occasions, tasked the local Cub Scout pack with leafleting all properties along the route warning them in advance of the slow-moving convoy.





## A DRESS REHEARSAL

The deugro/ALE team was also able to undertake a valuable rehearsal the previous day with a slightly smaller towhead, the 120-tonne Skene manifold for the trailing end of the Callater pipeline. “Although we had already carried out detailed swept path analysis to map the trailer turning radii on the tight corners in the town, the earlier transit was an excellent foundation for the larger Callater towhead,” says Nathan Clarke, ALE’s project manager. “The Skene towhead was slightly longer and wider but only 3.5 metres in height, so our five banksmen got an ideal chance to confirm their optimum viewing stations for the two tightest corners in particular.”

ALE brought a team of 10 up to Wick for the operation – six transport crew and an additional four for the on-site installation of the towheads. The Skene towhead was successfully negotiated through the town within an hour, including the de-coupling of the Trojan tractor following the haul up the 14% gradient from the quay. The road convoy to Wester took an additional hour, followed by a safe off-load on the construction site as the scarce hours of daylight faded.

“At this time of year, dusk falls around mid-afternoon when you are as far north as Wick,” says Watt. “So, although we returned the trailer to Wick harbour within six hours of starting the Skene towhead transit, we had always planned to defer loading the second towhead until daybreak the next day.”



## NEGOTIATING THE OBSTACLES

The following morning was crisp and clear – ideal conditions for the larger and significantly higher transportation.

The operation began with a routine ‘self-loading’ of the towhead onto the trailer using the trailer hydraulics and coupling the MAN TGX to haul the load off the quay at Wick’s River Harbour. One of the Trojans was then added to negotiate the twisting gradient up from the harbour and into the town.

With the additional height of the second towhead, deugro had arranged for street lighting to be hinged down. “Because of the regularity of our towhead transit operations, we arranged some years ago with the local council for some of the street fittings and furniture along the route to be demountable,” explains Watt. “So Wick now has hinged street lighting standards, removable railings and dry-stone walling on the tightest corners, all of which can be removed as and when required.”

The two tight corners were the slowest stage of the transit, with five banksmen scrutinising the over-sails and, with the additional height of the Callater towhead, monitoring the overhead street furniture including signage, lighting and guttering.







"We use the steerable axles of the trailer activated by our steersman to inch our way round these tight corners, where we literally only have a few centimetres of clearance," says Clarke. "By this stage, we had de-coupled the lead Trojan used for the steep initial gradient and used the MAN tractor for negotiating the tighter corners and the open-road convoy along the A99."

Overhead cables had also been removed in advance, and deugro had arranged for street kerbs to be temporarily back-filled and pavements steel-plated to avoid damage. Further remedial work had also been carried out under deugro's remit to re-compact the approach ramp onto the quay and to create temporary parking areas for residents whose street-parking had been curtailed for two days.





## RECORD TIME

The 9.6km convoy to Wester was safely executed in just over one hour, accompanied by seven escort vehicles - three police cars, two ALE crew-buses and two Subsea 7 pick-ups.

Once on site, the towhead was jacked-up and off-loaded onto a chicane on Subsea 7's construction rail tracks, ready for tie-in to the Voyager 81 carrier pipe and flowlines. The site has four independent narrow-gauge rail tracks totalling around 27km, with the pipelines carried on several hundred bogies which transport them through fabrication, testing and the ultimate spectacular beach launch.

"As part of our survey, we drove the full length of the railway to inspect ground stability, and arranged for steel plating to be gravelled in at the chicane area to underpin the towhead off-load," says Kenny. "We then concluded with a final clean-up to ensure we were leaving the route and both sites in good order. The whole operation went very smoothly and in record time, which enabled Subsea 7 to commence welding the towhead tie-in ahead of schedule."





## THE NEXT GENERATION

Willie Watt has the rare distinction of having supervised the construction of all Bundles at the site since Voyager 19 in 1992. "It's amazing that a small community like this can be a world leader in subsea technology," he says. "We still get a thrill watching the tugs towing a Bundle down the 240-metre launchway and out to sea, which, depending on the tide, can be up to a 36-hour operation.

"Transporting the Bundles to their offshore destination is quite a story in itself. Subsea 7 has developed the Controlled Depth Tow Method where the 7km Bundle remains submerged during the tow

to protect it from fatigue-inducing wave motions and surface ship traffic. We are now developing new technologies for the next generation of Pipeline Bundles for installation in both shallow and deep water applications, and our research programme indicates that we will be able to tow considerably longer Bundles in the near future.

"Energy companies are increasingly interested in installing processing systems on the seabed instead of on oil platforms, so we are gearing up for even more challenging towheads for future big tows from Wick to Wester."

"MOST CLIENTS DON'T WANT TO KNOW ABOUT THE JOURNEY, JUST THE RESULT, BUT ON THIS OCCASION COLLABORATION DELIVERED RESULTS."



WILLIE WATT, SUBSEA 7



DI KENNY, DEUGRO



NATHAN CLARKE, ALE



## WHAT ARE PIPELINE BUNDLES?

Pipeline Bundles are an extremely effective technology for extending subsea infrastructure lifespans and reducing field development costs. They are fully pre-assembled, tested and verified onshore at Wester in controlled conditions on advanced welding lines before being towed by

powerful tugs down the beach launch ramp and out to subsea installations in UK, Norwegian and Danish waters. Each finished Bundle has a towhead at either end, which incorporate a diverse range of subsea valve work and controls, and contains multiple flowlines and service lines packaged

inside the carrier pipe. Wester was identified by Subsea 7 in 1978 as an ideal site for the fabrication of Pipeline Bundles, with flat unobstructed moorland terrain for the 7.5km construction lines and a gently sloping beach and sheltered bay for the launch of the finished Bundle.