

# MAMMOET MAIL 33

House magazine of Mammoet Transport B.V. Summer 1999



## Turret to Singapore

The French "colis lourds"

Troll, the supernatural giant

The TARP project



Although the m.v. "Happy Buccaneer" will be 15 years old in 1999, she is capacity wise the unrivalled champion of the world heavy lift fleet. The vessel is technically and economically performing extremely well and Mammoet Shipping plans to operate her for many more years. As a preparation for the "special survey" later in 1999, extensive plate-thickness measurements were taken while the ship was preparing for loading at Rotterdam. On basis of these measurements Lloyd's decided that a "Condition Assessment Certificate Level 155" (which declares that the vessel is in a structural condition as if 5 years old) will be issued without any steel renewal. A tribute to the seagoing and shore staff taking care of the newbuilding and maintenance of the vessel.

Photo: FotoFile



**12** Mammoet Shipping is preparing for the next millennium. A second fleet modernisation programme is underway which will serve the lighter segment of the heavy lift market. Spliethoff lends a hand when empty legs need filling up. M.D. Arie Peterse recounts the ins and outs.



**22** An eye on London so to speak. The biggest ferris wheel in the world is being manufactured by Hollandia in Krimpen aan de IJssel. The wheel will be erected this Summer by Mammoet E&I and must be ready for the turn of the century. In the next millennium it will provide a splendid view from dazzling heights over central London.



**24** Energy is the key word in the offshore industry. As Mammoet is often involved only in the primary stages of offshore projects, the ultimate result of such projects lies usually beyond the company's perspective. The Troll C platform is just such a project for which Mammoet carried out several load-outs and weighing operations. The colossus is now nearly ready to start work - collecting the rich yields of Norwegian oil and gas from the Troll field North West of Bergen on the Norwegian coast.

► Colophon

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**4** Heavy lift shipping and heavy transport by land: an unbeatable combination of the world-wide Mammoet organisation, proved once more in a complete shipment to Singapore of various components for a Turret Mooring System (TMS). Project managers of Bluewater and Mercon relate the details of this highly sophisticated turret mooring system.



**9** In Antwerp the specialists are found for special transport by road. Targets are not the extreme weights and sizes of cargoes usually transported by SPMT, but all kinds of particular cargoes are taken on which do not fit in a van or a container. Since January Mammoet Transport België is the spider in the European web of special transportation.



*Tonsberg - One of many load-out operations performed by Mammoet. In Norway a 3,700 tonne offshore deck, destined for the Jotun B gas field in the North Sea was moved on an SPMT configuration consisting of 148 axle lines with 592 wheels. The offshore industry is an important line of business for Mammoet Transport.*

► Turret to Singapore



# Turret to



# Singapore

By Aad van Leeuwen

Mammoet's integrated heavy transport concept continues to be a major Unique Selling Point in the heavy lift business. "Unique" in the abbreviation USP can be taken literally. No other heavy lift company can offer so complete a range of heavy lift services as Mammoet. Towards the end of last year this axiom was proven again when one of the biggest Turret Mooring Systems ever built was collected at the Mercon fabrication yard in Gorinchem, the Netherlands and shipped via Rotterdam to Singapore. Here the TMS will be installed in a converted 270,000 dwt tanker that will operate after commissioning in a water depth of 905 metres off the coast of Brazil.

## Bluewater



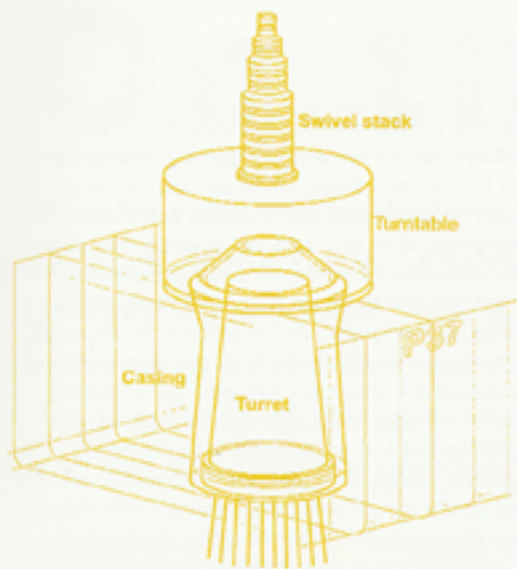
**Hoofddorp - The Turret Mooring System contract was awarded to Bluewater by Maritima on behalf of Petrobras. Design and engineering for the TMS for the Petrobras 37 FPSO was carried out by Bluewater Engineering B.V. Mammoet Mail visits their quarters in Hoofddorp and talks with Ton van Schie, Project Manager of Bluewater. The "Turret Mooring System" (TMS) consists of different parts, such as the anchors and chains, the casing, then there is the turret as a component with the torsion box, which sits as a hat on top, the turntable, the swivel and ultimately the tower support structure, which is a framework to allow access from the ship to the turntable.**

Ton van Schie points out the various parts on a drawing that hangs in his office. The components were built in various yards, the casing, for instance, at Noell Imac in Abu Dhabi in the Middle East, the swivel at Verolme IJsselmonde in Rotterdam, and the turret and turntable at Mercon in Gorinchem (the Netherlands). Striking detail: some swivel parts came from the Skoda factories in the Czech Republic. The choice of fabricator is partly depending on commercial reasons. "In the Middle East and in the Netherlands certain parts can be produced cheaper than in other countries. Furthermore, fabricating in the Netherlands has the advantage of short communication lines, which is an agreeable situation with a complicated piece of equipment such as this TMS. It was more or less a prototype and the largest of its kind. Other criteria for the contracting are the logistics, which are to be looked at when a tight schedule must be run, so various scenarios need to be considered to be able to meet deadlines. We made a similar system for Petrobras before, but never yet one with 43 risers for a water depth of 900 metres. With the sixteen metre diameter we have now, the stress pattern is completely different. The whole design is dictated by the mooring forces in the anchor chains: from the combination water depth and a certain wave pattern stresses are generated which must be absorbed in the system. This happens in the so-called main bearing, whereafter they will be smoothed away via the construction into the ship. This solution is Bluewater's technical know-how."

According to Mr Van Schie the weight of the system is also relevant to the price. "By using a different construction we can make the system lighter and therefore less expensive. The total weight of the system is now about 2,500 tonnes and we suppose that competitive design will weigh more." Project Manager Van Schie is primarily responsible for communication with the client. He sees to it that the so-called deliverables, the drawings, reports, specifications and so on, are sent from the engineer to the client. "That must flow as smoothly as possible. Every change, or remark from the client that could have an effect on the original design must be incorporated in the specifications. It is a matter of summarising what the

client wants and if he wants more than before, it can have financial consequences. That is a full-time job. From the start of the project one is always busy tying knots and the further the project develops, the less one is involved in the actual construction. It is our philosophy to have some of our people present on location, who keep a close watch on the building activities with the approved drawings in hand. Quite a unique aspect of this project was that the payment schedule was coupled to the progress of the construction. In other words, if the client gave his consent when we reached a certain stage, payment was to follow. The implication is that sometimes certain phases within a period must be speeded up and of course that is not always feasible at the last moment. Therefore we had to plan carefully."

For the transportation of the equipment from Abu Dhabi as well as from the Netherlands, Mammoet was involved. Mr Van Schie explains, "In this case the choice for a transporter was the builder's. Both Mercon and Noell Imac had their own responsibility. Of course we had to give our consent for when it comes to ship strengths and seafastening we are nevertheless involved. A transport like that holds a certain risk factor and one wishes to reduce that as much as possible. Furthermore, a surveyor is needed for insurance reasons. It is a team effort of various parties and we also add our expertise. The whole thing is a lot more manageable when speaking to knowledgeable people than when working with people one has to remind of certain details. Overall, the whole transport went very smoothly." Companies like Bluewater are subject to the oil price. Mr Van Schie explains that some projects are shelved awaiting better times. Especially the development of marginal fields has suffered. "The Marlin field, however, with a water depth of 905 metres is a huge field, which will yield oil for twenty years. So this is not a marginal field. There is also a tendency to turn to floating systems for deeper waters as these entail smaller risks. And the system is easier to remove and relocate. Compared to a fixed platform it might be a better investment. Yet, the oil companies must first make this reckoning where after other solutions can be found. The deeper the water, the more creativity one needs."



Since its foundation in 1987, Bluewater has built up a technological lead in innovative Single Point Mooring systems and tanker-based Production and Storage Systems. Bluewater provides a broad scope of services, supplying one or all services required from the flow lines at sub-sea wells to transportation of crude by shuttle tankers from the FPSO (Floating Production and Storage Platform) to a refinery. Bluewater operates worldwide with offices in Belgium, The Netherlands, United Kingdom and United States.

## Turret Mooring Systems



Bluewater Turret Mooring Systems allow the vessel to freely weathervane 360°. No hawsers, floating hoses, active turret rotation systems nor propulsion systems are required. Bluewater's compact turret casing minimizes hull reinforcement, allowing the turret to be positioned close to the vessel's bow, thereby maximizing overall vessel storage capacity. The turret concept can receive more than 43 production risers and associated umbilicals. The small diameter and slender turret design reduce deflections, improving bearing reliability. Bluewater Turret Moorings are installed worldwide in water depths ranging from 70 metres to more than 1000 metres.



## Mercon

*Gorinchem – The most conspicuous parts of the TMS mooring system are the turret and the turn table. They were built at Mercon Steel Structures Yard in Gorinchem together with the main bearing box and*

*the tower support structure. Other than the name turntable may suggest, it is the complete oil production tanker that turns around the turntable, weathervaning with wind and current so that it is the large carousel-like device that stays geographically in its identical position. This prevents the 43 risers, which are used for oil supply to the tanker and water supply into the oil field, from becoming entangled. Mercon's Project Manager Peter van den Brule explains the whole construction as follows. "It is really a giant hosepipe reel mechanism and the complexity of the system lies mainly in the large number of risers. The turret has 43 riser paths that are used with a 150,000 bpd process plant, this is a genuine world-record."*

The fact that the various modules for these FPSOs are built by different companies and in different locations is, according to Mr Van den Brule, quite normal. "After all, you work with drawings and specifications and these also give the tolerances. With this data you speak to the client and agree on a building method. Calibrated measuring equipment enables you to prove that the tolerances are met. Otherwise, certain parts we can actually fit physically, such as for instance the swivel – built at our sister company Verolme IJsselmonde – which we had with us for a week to connect all the piping. We connected everything, put it under strain, tested and unconnected the whole lot again. The piping design is logged into a computer as a 3D model, so that a certain volume is reserved and if that is not correct the computer indicates with a fault signal. Clients put more and more responsibility in the hands of the fabricator. In the past the client did everything himself, including detailed engineering."

In eleven months production time Mercon used 1800 tonnes steel, 340 tonnes piping, 7 kilometres tubing and 18 kilometres cable. Mr Van den Brule states, "For transportation we actually needed extra supports which we designed ourselves. Decisive factors for our choice to move the whole thing by heavy lift vessel were the quicker transit time and a better roll moment."

Mr Van den Brule points at a world map on the wall of his office. "Every so often Mammoet Shipping sent me a fax with the m.s. "Happy Buccaneer's" position. I kept track on that map. Mammoet Shipping was able to tell us exactly to the day how long the journey would take. Quite a thing if you realise that Singapore is more or less on the other side of the world." ■

**"Mammoet's brief was: here's the stuff and it has to go there."**



Mercon designs, builds, assembles, repairs and exports all kinds of steel structures with the most exacting requirements. The Mercon Steel Structures Yard at Gorinchem embodies the tradition which has made this Dutch town a steel construction centre. The company has experience with many different kinds of steelwork, ranging from light-weight structures to extremely heavy, complex and bulky projects. The yard at the river Merwede covers an area of 45,000 sq.m. and includes a huge assembly bay for indoor construction of modules and other apparatus.



# On the road...

By Aad van Leeuwen

*Modules from Hengelo in the Netherlands to Fawley in the UK, transformers from Antwerp to the South of Spain, heat exchangers to Germany, hydraulic man-lifts to Gothenburg in Sweden, windmills to Ireland; to mention but a few daily road trips undertaken by the Mammoet special road transport unit, based in Antwerp. Since the beginning of this year it is the core business of Mammoet Transport (België) N.V. The changes are divulged by business manager Wil van Merrienboer.*



Photos: Ben Wind

**Antwerp** – "Since 1 January 1999 the Mammoet office in Antwerp is dedicated to special road transportation. Local crane activities were taken over by the Aertssen company in Stabroek. They also became agent for the Mammoet cranes in Belgium, whereby we agreed that cranes up to 250 tonnes will be rented out by Aertssen, while for cranes over 250 tonnes Mammoet Stoof in Breda will be involved. The Mammoet Transport (België) N.V. office is now exclusively occupied with special road transport and we work in the Benelux and throughout Europe."

According to Mr Van Merrienboer it is no coincidence that this special branch of heavy lift transportation is concentrated in Antwerp. Partly, this turns out to be on historical grounds. "Certain major clients, such as for instance the C.M.I company (Cockerill) in Seraing, have been established in Belgium, and of course it is important that here in the Antwerp port we are right in the middle of our customers. They are mainly forwarders and they know where to find us. We are interested in transporting everything that is excessively long, wide, high or heavy."



To practise this kind of sport we need special equipment and we do invest quite heavily in that. Just recently, we bought a set of three-axle trucks. These trucks run local errands one week and are off to the South of Spain the next. Furthermore, we ordered three new Nooteboom semi-lowbed loaders. The specialty of these semis is that they can be lowered to 77 cm deck height – which makes loading and unloading a lot easier – and with their lowbed length of 9.60 metres, which can be extended to 16 metres, they are longer than our old semis. This is ideal for the transportation of man-lifts and other fairly small

machines throughout Europe. We notice an ostensibly upward trend in cargoes – crates, boilers and smaller vessels – with heights between 3.4 and 3.8 metres. With these low 4-axle semis we can move both long and high cargoes. Next to which we also have the so-called Euro lowbed loaders, which are used for heavier cargoes.”

### Synergy

One important client for the road transportation department is Mammoet. The Antwerp office takes care of the production details for the movement of the large Mammoet cranes such as for instance the Demag CC2600. Mr Van Merrienboer continues, “Last week we moved this crane from DSM in Geleen, the Netherlands to a site in Burghausen in Southern Germany. This means we moved 24 lorries with mast parts, a main engine of 65 tonnes and the crawlers of 40 tonnes, with some tilt-trailers thrown in. We take care of the whole lot.

In the early 1990s 80% of our business was for our own Mammoet companies. That percentage has reduced to some 30% and for the other 70% we are working with our external customers. Whatever we do to promote our company to our road transport clients, however, it always contains the Mammoet “Factory to Foundation” philosophy. A nice example of how we try to accomplish that, is the contract we carried out for Stork Thermeq in Hengelo, the Netherlands. The project contained some 24 moves, within which 16 modules were between 30 and 55 tonnes from Hengelo to Fawley in the U.K. Our colleagues in England carried out the lifting. Now we are offering for the transportation of 50 modules from Hengelo to Dormage in Germany which also includes lifting. This is



not only good for Mammoet but also for the client. No hassle with a transport company that must wait for the crane company. When we go to England and Ireland with all kinds of cargoes, we keep in close contact with Mammoet Ferry Transport (Deeside). They arrange the English road permits, the escorts and they also book the ferry. There is an open exchange of work. If Mammoet Ferry Transport has a cargo they cannot fit into their tilt trailers, they call us. Another example is the contract from the Zuid Nederlandse Staalbouw from Fijnaart for some 25 movements to England. Only three of these are special transportation with Mammoet Ferry Transport taking care of the other 22 loads in tilt trailers."



*It is obvious that exceptional road transportation is bound to complex rules and regulations. For Mammoet it is a kind of organically grown speciality, which can be beneficial to the client.*

### Escorts

Good preparation is essential also in special transportation. Despite the European Union, the paperwork is very different from one country to the next. "In Belgium the permits are issued by the Ministry of Transportation in Brussels. Many transporters stumble upon difficulties in Belgium since with the application for a permit we have to enclose an original order form from the client. Therefore, the application can not be entered by fax and if the order form is not there, there will be no permit. Last year we had an engineering programme developed with a calculation system and that was sanctioned by Brussels. Two or three times a week we drive down to Brussels, meet the responsible people and usually within a week we have a permit. In the Netherlands you ask for an exemption with the TET (Permits Exceptional Transport) in Zoetermeer. They issue permits for the national roads as well as for the provincial and local routes. In France every department have their own individual permit. It may take some 3 to 4 weeks before such permits are issued. In order to get through all that paperwork, we use a local agent. In short, every European country has its own procedures and one runs somewhat smoother than the other." ■

**Rotterdam - Atlantic Container Line (ACL) makes regular use of the services of Mammoet special road transportation. ACL works some five container ro-ro vessels in a transatlantic service between North America and Europe. The G3 vessels are the largest combined container / ro-ro vessels in the world with a capacity of 3000 teu, 1900 cars and 420 ro-ro teus. Wil Goemaat, inland transport coordinator at ACL is in contact with Mammoet Wegtransport in Antwerp every day for connecting road transportation to various destinations in Europe. Mammoet Mail spoke to him by phone one night.**

"Since the start, only Atlantic Container Line has been sailing for East Coast America and Canada. In ro-ro transportation we are the largest, the strongest and virtually the only one on this route. We keep five vessels afloat, which maintain a weekly service. In Europe the first port of call is Liverpool, then the vessels sail to Antwerp, thereafter Bremerhafen and Gothenburg. Then the vessel returns to Antwerp to avoid loading and unloading problems in the other two ports and the last port of call is Liverpool again. At the other side we have a similar set-up: Halifax, New York, Portsmouth, Baltimore and back to New York and Halifax. Of course all kinds of combinations are possible. For instance, we booked an agricultural machine from Liverpool, which will be unloaded in Bremerhafen and then put on a feeder service to Gdynia in Poland.

As uniform as container cargoes are, the ro-ro cargo with ACL is much more varied. Mr Goemaat states, "Something special comes up at least once a week. For instance we recently moved an original American hamburger stand, which was transported through to Paris by Mammoet. We have shipped railway carriages and locomotives, and in the past even a complete circus with escort. In principle we can ship everything and anything, as for instance the Chinook helicopters. They come in at ACL Antwerp. When they are unloaded, the military assemble them on the quayside and fly them to Soesterberg airfield themselves." According to Goemaat the cooperation with Mammoet is satisfactory. "Through years of experience we know what the market is about which saves a lot of time and effort. In case of doubt I ask Wil van Merriënboer. At the moment we have a number of transports planned for Hungary, and next weekend we have four or five complete moves coming in for an exhibition in Paris."

Mr Goemaat regards the cooperation with Mammoet as something quite usual. Nothing to pay special attention to. Slightly embarrassed he closes the conversation with "Our transports are in the right hands with Mammoet, but I'm sorry, I have an exam on Saturday for my navigation licence and I want to revise tonight so that I'm not taken by surprise. It would be a pity to have to do it all again in six weeks time." ■

# Second phase modernisation



*"The second phase of Mammoet Heavy Lift Partner's fleet modernisation programme kicks off with the first of four new heavy lifters of the "Tra-" type arriving this year," says Arie Peterse, Managing Director of Mammoet Shipping. "These ships will enable us to serve the lighter segment of the heavy lift market in the best possible way. And after the introduction of these vessels we will be looking at the heaviest part of the market."*

The modernisation programme of the heavy lift fleet is brought about in phases. The first phase consisted of the introduction of the four "Happy-R" vessels, which all have a loading capacity of 15,600 tonnes. "With these vessels", Mr Peterse explains, "we were aiming to serve the heavier midsection of the heavy lift market. But heavy lifts and project cargoes apart, these ships also had to be capable of carrying other types of cargoes such as steel, wood, paper and containers. In other words, they had to be widely functional heavy lifters." The first vessels to strengthen the fleet were "Happy River" and "Happy Rover" in 1997. A year later the "Sailer Jupiter" and the "Happy Ranger" followed suit. By the way, pool partner Mitsui OSK Lines renamed "Sailer Jupiter" to the "Enchanter" and brought her under Panama flag. Meanwhile we have gained very good experience with this new class of vessels. They can be utilised to the very best of their potential and due to our good relationship with Spliethoff other kinds of cargoes can be secured to prevent so-called empty legs.

If a ship is empty after a voyage with heavy lift or project cargoes, the Spliethoff organisation may utilise it. One of the "Happy R-vessels", for instance, became open after discharging an offshore module from Bordeaux to West-Africa, so it brought back to the Netherlands a full bulk cargo of cocoa beans."

## Second phase

The next phase of the modernisation programme has meanwhile started. For this Mammoet Shipping deliberately choose to strengthen the lighter section of the heavy lift market. Arie Peterse explains: "At the time we had to choose; either invest in more of the same or look towards another part of the market. The "Happy R-" vessels were doing well, but one could ask whether it would be useful to stake everything on one market segment. In the end we decided to look at the lighter part of the market as well, so, slightly smaller vessels which can also enter smaller ports. These vessels do not need such high lifting

# fleet kicks off

By Paul Schaap



Photos: Ben Reerink

capacities as the first series, which have two times 400 tonnes. The Confidence type vessel came along our path more or less by coincidence. The Welsh - Danish combination Graig-Clipper initially ordered six Confidence-type ships at the Chinese Zonghua Shipyard in Shanghai. These vessels were announced in the press as 300 tonne heavy lift vessels. However, they turned out to be not really true to type heavy lifters but a kind of container feeder with a 300 tonne lifting capacity with limited outreach. Nevertheless, this ship type did offer possibilities, although certain things would have to be modified."

## T-series

"Pool partners also showed an interest in this Confidence-type ship and it became clear that Graig-Clipper had quite a few options still available to build even more of such vessels at the yard in Shanghai. We then agreed that the yard would build four ships without cranes, which would subsequently be sold to our partners immediately after commissioning. The first vessel, m.s. "Tramper" will be commissioned sometime in August 1999. The other three, "Tracer", "Transporter" and "Traveller" will follow in three monthly intervals. The first two of these so-called T-series will definitely come to the Netherlands immediately after their commissioning to provide them with two Huisman/ltrec cranes. As far as the other two are concerned, we are still contemplating whether we will furnish them with cranes here or in China. Judging from our good experiences with the "Happy R-" type vessels we will also be able to use the T-series for more than one purpose. The vessels will be able to carry some 8500 tons and every one of them will be equipped with two cranes of 275 tonnes capacity each. In tandem they will be able to lift some 500 tonnes. This is quite sufficient to load heavy pieces such as transformers and other components for power stations. In short, they will be ideal ships to service the bottom segment of the market in the best way."

## Differences

Apart from a more limited carrying capacity and a lower lifting capacity the new T-type differs from the Happy R-series in various other aspects. Mr Peterse explains: "the most striking feature of the T-series is that the cranes are not positioned on the same side. We chose to install one crane on starboard and the other on the port side of the new vessels. The "Happy R"'s taught us that it is a tricky business to negotiate long items through the cranes. In our computer simulations we struck on the suggestion to position the cranes diagonally. It turns out there is more leeway that way and at the same time it is more comfortable for the ballasting system. Another new feature is that the cranes will no longer have cabins. They will be operated by radio control. Our experience on this front is such that we have complete faith in this system. As a back up we will still be able to plug in the remote control into the cranes. Furthermore, compared to the first ships of the Confidence class, the decks will be made somewhat heavier. They will be pontoon-type weather decks with inflatable seals, which can be

opened independently, there is no fixed sequence. To open the hatches, which is done, by the way, by the ship's own cranes, the seals are first put under pressure with a compressor."

## Fleet size

At the moment the Mammoet Heavy Lift Partners fleet comprise 13 vessels, which includes Mammoet Shipping's "Happy R"-class. On the question whether older tonnage will be taken out of the fleet at the arrival of the new T-series, Arie Peterse replies: "If we do nothing, our total fleet will soon contain 17 ships. But that is not the size we want it to be, as we will then be our own competitor. We have some ships in our fleet which are actually over-aged. One could consider the "Project Orient", the "Project Arabia", the "Titan Scan" and the "Thor Scan" which on the other hand are all four in fairly good condition. The same is true for the "Encourager" and the "Enlivener" of our Japanese partners. All these vessels are older than 15 years. We sold the first four some years ago and chartered them back immediately for a limited period. This is a method to be flexible in fleet size. The first ships to return to their owner will be "Project Orient" and "Project Arabia". Furthermore, we are discussing the possibilities to let go the "Encourager" and the "Enlivener" which have already past the 20 year mark, and we will contemplate what to do with "Titan Scan" and "Thor Scan" later. Apart from that we also have the "Project Europa", one of our own, which was built some fifteen years ago. This vessel is still working well and she is in fairly good condition so she underwent the special survey. This will enable her to earn her keep for another five years. The rejuvenation project of this vessel was carried out at a shipyard in China, close to the yard where our T-series is being built. I think that our ideal fleet size will be between 12 and 15 vessels."

## Heaviest lifts

To the question as to what the next step will be in the frame work of fleet renewal, Arie Peterse responds, "Now that we have good coverage for the heavier and the lighter part of the market, we will have another look at the top field in which the "Happy Buccaneer" is active. This market turns out to be growing towards ever larger and heavier components. We will have to get on this bandwagon, while at the same time we will create a new chunk of market. On the other hand, we expect that in the coming years the market will decline. Because of the crises in the Far East not many new projects will be started there, but the most influential factor for our activities are actually the low oil prices. Most of the cargo we move is related to investments in the oil and gas industry. Apart from the reduction in demand for heavy cargoes the number of heavy lift vessels in the market has increased. Not only by our own investments, but also by our colleagues". Despite that, Arie Peterse is not looking apprehensively towards the future. "Because of the abilities of the Mammoet Group we are able to offer a complete package of transport possibilities. Besides, we are well supported by Spliethoff in the use of our vessels. ■



**Amsterdam** - the original, over a 100 years old Mississippi sternwheeler "Mark Twain" was destroyed in the port of Amsterdam in a blaze. It was one of few remaining original Mississippi steamers from late last century. The sternwheeler turned restaurant had been shipped by Mammoet Shipping in 1985 from New York to Amsterdam with heavy lift dockship "Happy Mariner". Thereafter, Nedlloyd had the vessel, which had most of its original interior still in tact, renovated and for years it served as a reception centre at the building site of the newly built East-Indiaman Batavia in Lelystad, the Netherlands. What remains of "Mark Twain" has been bought by a new owner who wishes to refurbish the hull into a party ship.

**Jamnagar** - An stupendous transport operation was carried out by Mammoet for the construction of an oilrefinery in the state of Gujarat, North of Bombay. A total of 43 vessels, weighing up to 1500 tonnes, were moved by SPMTs from the quayside to the Reliance site, about 20 km inland. The picture shows the largest column, with a length of 100 metres and a diameter of 17 metres. It certainly was a whole new experience for the people of the Jamnagar district, especially where the road from the jetty joined State Highway 25 for a short distance and crossed the local railway line before turning off to the job site. The project was engineered and managed from the UK offices of Mammoet, with labour from the Middlesbrough, Breda and Singapore branches forming a site team to see the job through.



# Mammoet

## Co-operation with Aertssen Cranes in Belgium

**Antwerpen/Stabroek** - From now on Mammoet Transport N.V. (België) will be fully dedicated to special road transportation. Renting out cranes to a capacity of 250 tonnes will continue in Belgium in a cooperation agreement with the Aertssen Kranen N.V. company which has its office in Stabroek. This company will be agent for Mammoet Stoof VOF, Breda for the Belgian market when hiring cranes over 250 tonnes, whereas they are also the contact for heavy transport and integrated projects. Special road transportation will be carried out as usual from the present site in Antwerp. With this made-to-measure service Mammoet can supply their customers in Belgium with an even better service than before.

**Richards Bay** - Mammoet Southern Africa was appointed by the Group 5/Grinaker Joint Venture as sub-contractor for the placing of all precast beams for the construction of a dry bulk jetty and gallery in Richards Bay. Mammoet supplied their Manitowoc 4100 W Ringer series 3 which was placed on a barge supported by a tugboat for proper positioning. Concrete beams of 55 and 62 tonnes were being lifted in place. Assistance cranes were supplied by a 90 tonne LT1090 and a 50 tonne American Hoist 5299 crawler crane. The project is expected to be completed end of 1999.



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**Jubail** - An impressive boiler was transported by Alatas Mammoet in Saudi Arabia. A conventional 48 axle-line platform trailer pulled by a Mercedes truck took the 588 tonne boiler to the site. The boiler had been brought to Jubail from Gdansk by Mammoet Shipping's m.v. "Enchanter".



**Port Dickson** - A 850 tonne regenerator being erected and positioned by WWM Singapore's Manitowoc M1200R with fly-jib at the Shell oil refinery in Malaysia. The regenerator is tailed by a Demag CC2600. The regenerator had been delivered from Japan by Mammoet Shipping's "Happy Buccaneer".

# in Focus




**Rotterdam** - Mammoet was busy till after midnight to move Alexander, Blijdorp Zoo's new bull elephant, to his new residence in the Rotterdam zoo. Earlier that day Alexander had packed his trunk and left his home in Germany for Blijdorp Zoo, where he will follow in the footsteps of Ramon, who passed away some time ago. Lifting six ton Alexander into his new accommodation was quite an event. After the long journey, Alexander was in somewhat of a rebellious mood and it was no easy task to move him and his container. Eventually he was hoisted over the fence and at two in the morning he got to meet his new friends.

**Dubai** - The more than 300 metre high Arab Tower, part of the new 6-star Jumeirah Beach Hotel, nears its completion. Mammoth Gulf took care of the transportation of the odd-shaped structures with their self-propelled Cometto platform trailers. As the hotel is built on an island, a temporary bridge was used to take all building materials to the site. To remove this bridge, the known options were either to use an expensive crane-mounted barge or to build a dam around the bridge for dismantling. After exhaustive engineering work Mammoth Gulf came up with a better and much cheaper idea: a 450 tonne Demag CC2400 crane with reduced track width and a 70 tonne Linkbelt LS318 removed the concrete beams while standing on the piles of the very bridge it took apart.







An aerial photograph of a large-scale industrial construction project. A prominent feature is a massive red lattice boom crane with a long boom extending from the top left towards the center. Several tall, grey, cylindrical columns are being installed or positioned on the site. The ground is a mix of dirt, gravel, and concrete, with various construction materials and equipment scattered around. In the background, there are more industrial structures and a road. The overall scene depicts a complex and large-scale engineering endeavor.

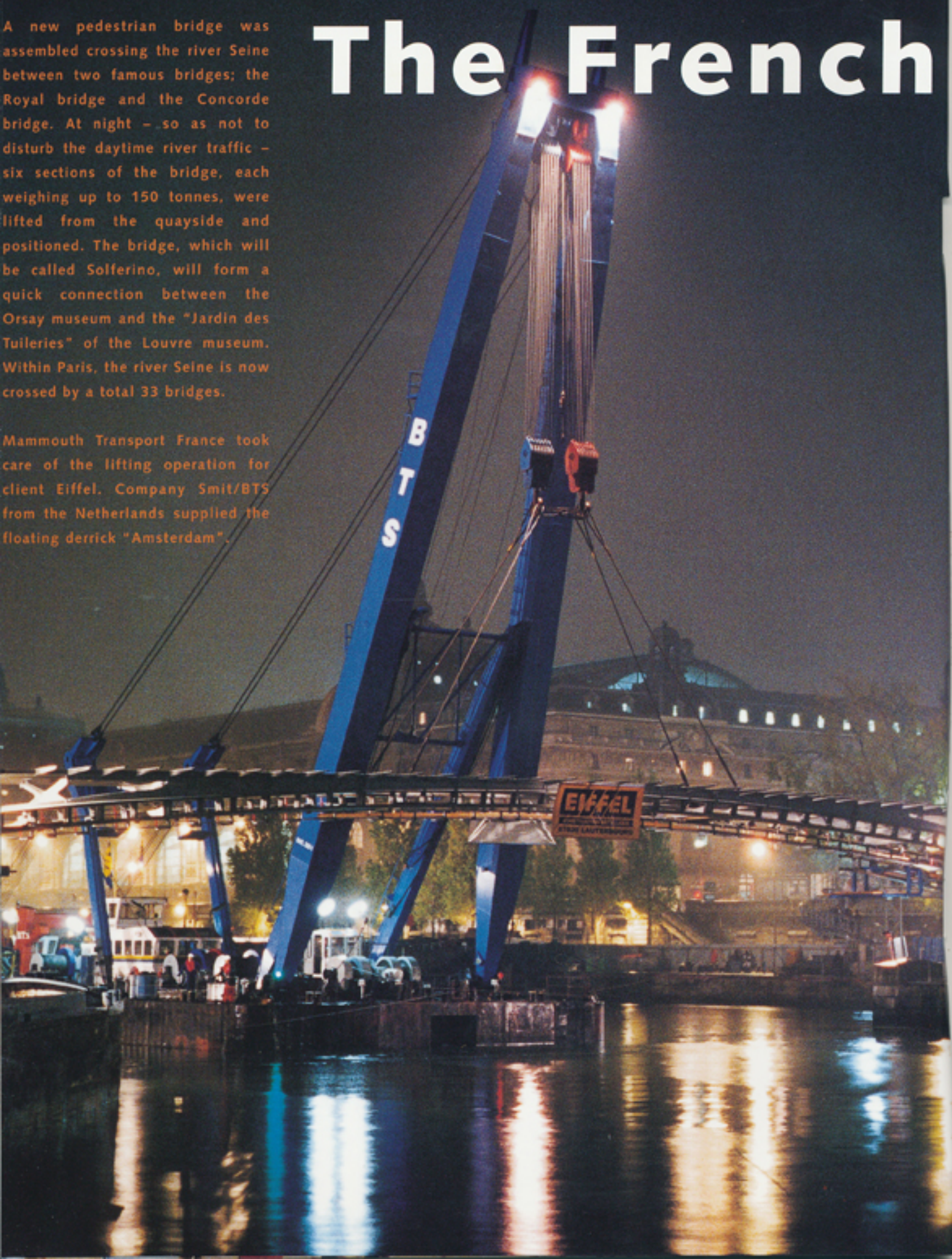
**Point Comfort** – In Texas the MSG 50 of Mammoet positions a number of heavy columns for a chemical factory. The MSG 50 is transportable in 65 standard container size blocks. The crane's maximum lifting capacity is 3600 tonnes (3,600,000 kg). The remarkable thing about this lifting operation was that the crane, with a total boom length of 114 metres, installed all heavy pieces from one and the same spot over an area the size of a soccer pitch, whereby the heaviest piece weighed 726 tonnes and was 90 metres long.

A spectacular lifting operation was carried out by the 300 tonne capacity floating sheerlegs "Amsterdam" in the centre of Paris.

A new pedestrian bridge was assembled crossing the river Seine between two famous bridges; the Royal bridge and the Concorde bridge. At night – so as not to disturb the daytime river traffic – six sections of the bridge, each weighing up to 150 tonnes, were lifted from the quayside and positioned. The bridge, which will be called Solferino, will form a quick connection between the Orsay museum and the "Jardin des Tuileries" of the Louvre museum. Within Paris, the river Seine is now crossed by a total 33 bridges.

Mammoth Transport France took care of the lifting operation for client Eiffel. Company Smit/BTS from the Netherlands supplied the floating derrick "Amsterdam".

# The French



# "colis lourds"

By Aad van Leeuwen



*"All projects are of course important, but I can remember a reactor which we carried from Fos sur Mer to the U.K. for the power plant of Sizewell. Although it was not really a spectacular operation, it was a contract you can never forget. I opened my file in December 1981 and we executed it in December 1990, some nine years after opening the file. And this file was always close to me on my desk. Sometimes on the right side and sometimes on the left side, but it always was there and I had the feeling that this contract was for us. Paradoxically, however, the file was open for nine years, but when we did the job it only took twelve days."*

Paris - Gilles Thomas, General Manager of Mammoet Shipping France is clearly devoted to his work and as he has been in the company since April 1980 he has built up much experience in the heavy lift sector. Some of the more memorable jobs he brings up are the transports for the Eurotunnel. Mammoet Shipping took care of the first leg and delivered several tunnelling machines from Japan and the U.S.A. including project cargo. "I was really happy to be involved in this project. We moved 24,000 m<sup>3</sup> of cargo by road from the port of Calais to the Eurotunnel construction site. About 80% of these 24,000 m<sup>3</sup> were heavy lifts with weights between 50 and 400 tonnes and with big diameters, 9 metres or so. It was a big job and it took quite some time. It was interesting as well because it was a really international project; one part of the contract was with Americans and the other part with Japanese. It actually was my first big project in which I dealt with Japanese people and that was a nice experience. It was not the biggest project in terms of turnover but it was very rewarding to perform the contract from A to Z without a problem or any damage to a single piece of cargo." Proof of that hangs in his office on the wall: a letter of congratulation in Japanese characters from Kawasaki in Japan, the manufacturer of the biggest tunnel boring machines for what some people describe as the project of the century.

## Change of business

According to Mr Thomas the heavy lift business has changed considerably over the years. "Exportation of heavy pieces in the early days was complicated because there were hardly any suitable ports and no cranes facilities. The usual way was to carry all the industrial cargo like gas turbines, alternators, and generators and so on almost only by heavy lift ships. We were not only carrying the heavy pieces but also all the connected cargo, in fact

general cargo. Moreover the clients were shipping big parcels; these were shipments of four/five thousand m<sup>3</sup>, almost a complete power plant in one go. After some time we saw the quantities reducing per shipment. Manufacturing companies realised that as soon as, let's say a thousand m<sup>3</sup> were ready, it was important to ship it right away, obviously for financial reasons."

"At the same time receiving countries invested in dredging work and had deep-water ports built with lifting facilities, like floating cranes. We saw the quantity of project cargoes slowly reducing and regular shipping lines with big ships going very fast to Singapore and Hong Kong took over. From there transshipment took place and the cargo was distributed on barges to other areas and their rates were very low." Mr Thomas explains that European construction companies had to accept strict delivery conditions from their clients in South East Asia, while they had to face competition from Japanese and Korean companies. Since these were producing much closer to the job sites, they could deliver the ordered goods to site within ten days. Short transit time allowances were the result and that presented a real problem for Mammoet.

## Shorter transit times

Faster Mammoet ships have reduced that problem although certain destinations never caught on again. Types of cargo changed and so did the sailing routes and destinations. As a consequence new markets and opportunities arose. Gilles Thomas: "Some of the cargoes, which were never carried by ship in the past, can nowadays be transported this way. Take for example these medium size offshore modules, weighing 500 to 600 tonnes. Size-wise they are big and our new ships can carry them, in the past only the "Happy Buccaneer" could do that."



"Some of the cargoes, which were never carried by ship in the past, can nowadays be transported this way."

#### Offshore equipment made in the USA

According to Mr Thomas many offshore modules are carried for oil companies from America to various destinations in Africa. "This is really surprising because everybody thought that America was very expensive for construction. Apparently in terms of offshore construction they are quite competitive. End of last year we had several shipments on Smit barges and Mammoet vessels to Africa. In Africa they are building modules as well, for instance in Nigeria, the Congo and recently also in Angola. A lot of construction

work is done there but these are mainly jackets. For that type of work you don't need big workshops, while production modules, because of their more complicated nature, are built elsewhere."

All major companies have an office or even their head office in Paris. Personnel who live in the country travel to work by high speed trains every week. "For a long time, in France everything is in Paris. All our clients are in Paris. If they have factories in the country, head offices are in Paris. Historically all decisions are made here. We have our office here because most of our clients are on the West side of Paris, so we are in the middle of them. We are not very far from la Defense and as a matter of fact we are not in the city of Paris, so during the day we can easily move from one place to another without losing too much time. When we travel outside Paris we go to a port for the loading of the cargo or we go to a job site or a factory. As an exception to the rule we had an operation here in Paris last October. The floating sheerlegs "Amsterdam" was working for a couple of nights to place sections of a pedestrian crossing over the Seine river just in front of what we call the Grand Louvre. It is in the middle of a historic place and people will be able to go directly from the Orsay museum to the "Jardin des Tuileries". The "Amsterdam" placed three times two spans, which were prefabricated a bit further alongside the Seine. "She was mobilised for this project from the Netherlands as it is the only floating derrick with detachable side pontoons and enough lifting capacity to do the job." Mammoth Transport France received the contract from the Eiffel company, well-known for the famous Paris landmark. ■



# Ship lengthening in Germany



**Bremerhafen** - At the Lloydwerft in Germany Mammoet E&I played an important role in two ship lengthening operations. They delivered the heavy skidding material which was used to assemble the new mid section and front part of the ship. The nose of the ship, the final part to be skidded weighed approximately 10,000 mt. The skidding track was lined up in the middle of the dock while hydraulic skid shoes were installed on both sides for stability and shaping the sections before they were welded together. ■



## Second MSG 50 under construction

**Etten Leur** - A second MSG 50, the successful containerised lifting machine of Mammoet E&I, is now under construction with various suppliers. Major parts are built by Hollandia who fabricate the so-called specials i.e. the base frame, the mast base and the mast head. The mast sections are constructed by KIN Machinebouw, whereas the hydraulics and the lifting units come from Hydrosplex and Hydrowa. They fabricate about 2000 different components, which, all told, add up to an enormous volume to be handled by the people on the shop floor. Mammoet E&I not only designed and prepared the shop drawings themselves, but also ordered most of the basic materials. According to Mammoet E&I the fully containerised crane will be ready for testing in June. The MSG 50 mark II will be fully self-supporting where power is concerned. A generator supplies the electricity, and all hydraulic

pumps are electrically driven. This makes for more functions and renders the crane independent of local power supplies which can vary per country. Furthermore, this MSG version will have a top beam

suitable for four lifting units. The first job whereby this top beam will be fitted onto an A-frame construction, will be the erection of the largest ferris wheel in the world, this Summer in London. ■





# The British Airways London eye

By Aad van Leeuwen

*When on 15 December 1999 Prime Minister Tony Blair inaugurates the British Airways London Eye, the largest ferris wheel in the world, on the South bank of the River Thames opposite Westminster Bridge, he will reveal to the public the result of a Pan European cooperation. The elements for this giant wheel are built in Germany, Italy, the Czech Republic, France and the Netherlands. Mammoet was contracted to erect the British Airways London Eye which will have a diameter of 135 metres. Both concept and design were conceived by English architects David Marks - Julia Barfield.*

Krimpen aan de IJssel/London – The management and construction of the big wheel was assigned to Dutch company Hollandia B.V. at Krimpen aan de IJssel last year. Hollandia did not have a wealth of production capacity spare, as they were already working on many other large commitments, but the solution was soon found in subcontracting a portion of the work to a company in the same line of business, Mercon in Gorinchem. Project Manager Chiel Smits, talking to Mammoet Mail, stems from this company. "Mercon builds a major part of the project and after consultation between the two construction companies I was appointed project manager. I take care of the coordination for the whole project and I am the client's

first contact. In fact it is a linchpin function; both the client and the subcontractors keep in touch through me. Weekly, we have an internal meeting with the project team, where all stages of engineering, fabrication and construction are monitored, always resulting in actions we need to take."

Our interview is interrupted by a loud noise announcing the coffee break and a stream of Hollandia employees in boiler suits moves in from every angle in the direction of the canteen. Once the noise has abated somewhat, Mr Smits continues: "The specification we received from the client was very general. We have calculated the actual specification ourselves. Usually, the sequence of engineer-



ing is as follows: one prepares a design, calculates the strength for the necessary materials, then makes the workshop drawings and in the end the material is ordered. After that, one can at last start building. With a delivery time of 6 to 8 weeks in this specific case we estimated the materials to be ordered from the concept drawings. Mind you, we had not had time to make any calculation nor did we have any final drawings. We then started drawing and in order to find out very quickly whether we were on the right track, we had calculations made by an engineering company in Papendrecht. Moreover, since everything is so time-pressed, this process is supervised by Professor Berenbak, Hollandia's senior design advisor and professor of structural design at the University of Technology in Delft. He also set up a committee with a number of people from TNO and Holland Rail Consult, who made a risk analyses and an inventory. They looked at what we are working on, what the bottlenecks are and whether we have given them sufficient attention. They checked all drawings to see if we had forgotten anything."

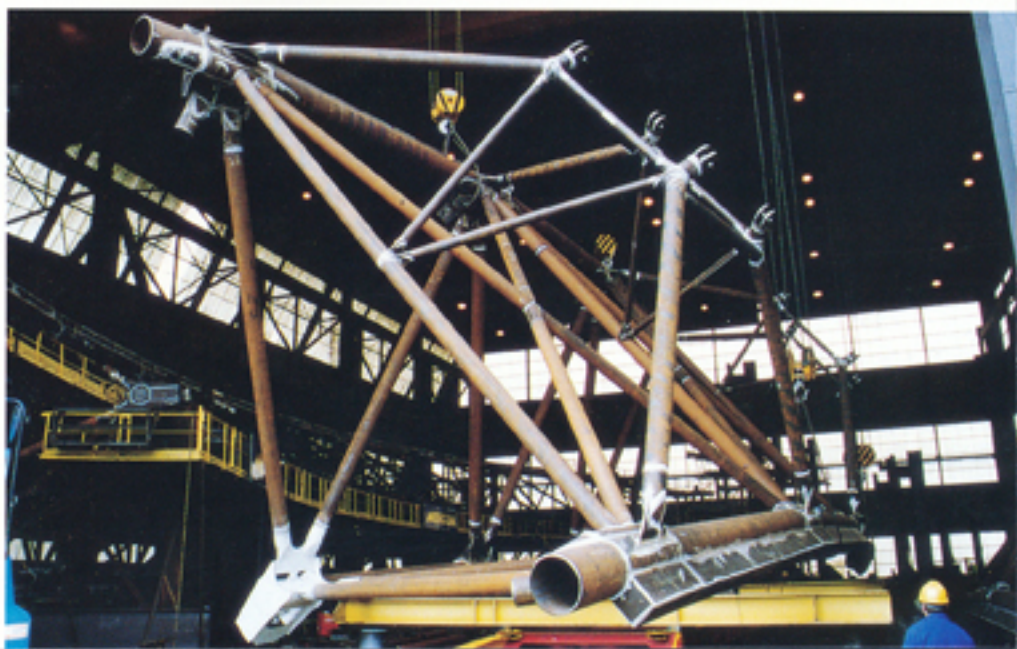
In order to preclude all risks, checks and load tests are carried out. Mr Smits explains that thorough investigations have been put into fatigue stresses and mechanical vibrations that could occur within the construction.

"The cable of the Ferris Wheel could start resonating at a certain wind force. The supplier of the cable system takes care of the detailed design and we hired the public works department of Rotterdam to look over their shoulder. These people know what they are talking about and have a good solution for this problem, should it occur. One must use such experience."

Throughout Europe sub-contractors are working on parts of the British Airways London Eye. "Hollandia is the main contractor dealing with management and engineering. Mercon fabricates the boarding platform and the complete ring, which forms the rim of the wheel. The legs for the A-frame are made by SIF in Roermond. The axle and the hub are cast, and made at Skoda in Pilzen in the Czech republic. They also make the hinge for the legs, which is included to enable the erection of the frame by Mammoet. The 32 capsules are supplied by the Poma company in France. They are specialised builders of ski-lifts and such items. The ball-bearings come from the Fag company in Wuppertal, Germany, whereas the cables are made in Italy. Coming full circle, Hollandia makes the wheel and the propulsion mechanism. The contractor for civil work in London is Tilbury Douglas, but they work directly for the client. They are well on track, even if they did come across an archeological site when they started digging. A total of some 2000 tonnes of steel must be shipped from Hollandia in Krimpen to London on a barge. Again a feasibility study was made, in cooperation with the tug organisation. The Port of London Authorities were involved so that we now know all the bridge heights and water depths."

Hollandia's client is the Millennium Wheel Company, a joint venture of five organizations, British Airways, the company of architects David Marks - Julia Barfield, the Tussaud's group, known from Madam Tussaud's, and a Japanese and a German bank. Madam Tussaud's will be running the ferris wheel commercially. "The British Airways London Eye is designed to last fifty years and there is a licence to place the wheel for five. It is, therefore, possible that the contraption will be moved to another spot somewhere in the world. At least, that is what is stated in our specifications, but then," Mr Smits concludes, "The Eiffel tower was actually also built as a temporary feature." ■

"The British Airways London Eye is designed to last fifty years and there is a licence to place the wheel for five. It is, therefore, possible that the contraption will be moved to another spot somewhere in the world."



# Troll, the



*Troll derives its name from the supernatural giants of Norwegian folklore, thereby reflecting its status as the largest North Sea field in both gas and petroleum reserves.*



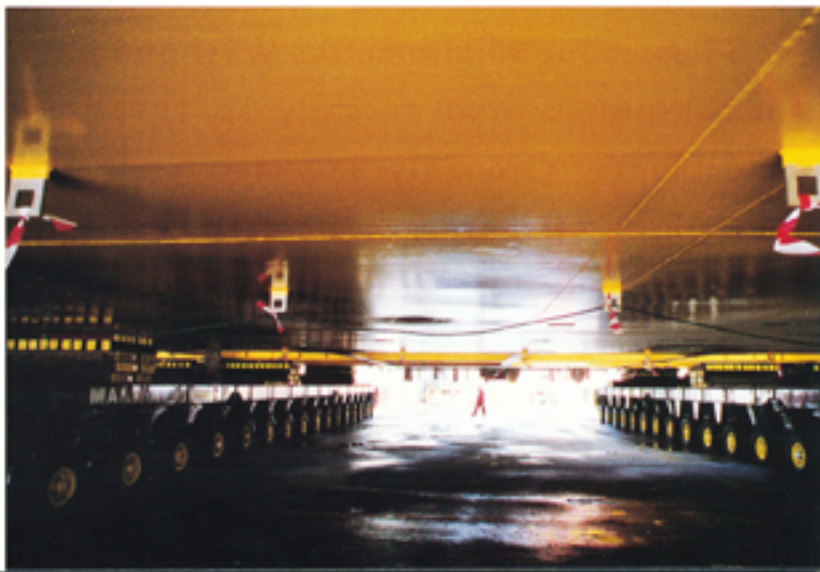
# supernatural giant

**Stavanger** - Large quantities of oil are found under the gas cap in Troll West, but they are embedded in thin layers. These layers are 22 to 26 metres thick in the Troll West oil province. Regular oil production began in the Autumn of 1995. Extensive utilization of advanced drilling technology and experience from production of the initial wells in the Troll West gas province - where the zones are only 12 to 14 metres thick - provided the basis for a further development of Troll's oil resources.

Overall, oil recovery from Troll is put at 1,2 billion barrels, representing 50% recovery factors from the oil province and 25% from the gas province. Only 12 years ago, Troll was regarded strictly as a gas field. The oil was not considered worth recovering. Over the years, however, the many technical challenges were overcome and the result is obvious. Troll was Norway's fifth largest oil producer in 1998. Advanced technology means that the horizontal sections of up to 2,500 metres long inside the wells are now being drilled with great accuracy. Improved techniques enable exact drilling per specific well and have reduced the investments below the estimate made in the Troll Oil development plan 1992. The Troll West oil province is being developed by a floating concrete platform which holds processing facilities and living quarters. Oil is assembled at the platform from 18 horizontal sub-sea wells through four seabed manifolds and flexible risers. Of 62 wells planned in the gas province, six from the southern flank of this area are already producing and are tied back to Troll B.

A further development of Troll oil reserves - Troll C - was approved in 1997 and includes more than 50 additional wells in the gas province. The project entails a steel-hulled floater with living quarters and processing facilities. Thirty-two of the fifty wells will be tied back to this C installation, the rest will connect to Troll B. Last year the first part of the integrated deck was loaded out on Mammoet's skidding system for ultra heavy weights at the Leirvik Sveiss yard on the Isle of Stord. Later that year the

second and third part of this deck followed, being rolled out on SPMTs at the Umoe yard in Haugesund. The semi-submersible Troll C platform is scheduled to come on stream in the Autumn of 1999 and expected to produce 120,000 barrels per day. Processed oil is piped from Troll B and C to the Mongstad terminal. Time is the critical factor for oil recovery on Troll. Reservoir pressure in the Western part of the field will decline as gas production from Troll East continues, reducing the possibilities to bring the oil to the surface.





The bulk of Troll's massive gas volume lies in its Eastern section, where the giant platform Troll A was installed. Measuring 472 metres from top to bottom, Troll A is the tallest platform in the North Sea and the tallest structure ever moved by humans. It was towed out from Stavanger in the Summer of 1995. While the deck was constructed at the Aker yard on the isle of Stord, the drilling tower and living quarters for this structure were transported by Mammoet Stoof. They were lifted and installed with Mammoet's HydraJack system.

In 1996, gas production began. The output was piped to Kollsnes for processing before it was transported onward through the Zeepipe system to the European markets. Production totalled 14,3 billion standard cubic metres of gas in 1997 and is due to reach 23,7 billion standard cubic metres per year in 2005. ■

Source: Hydro Oil and Gas

Troll lies about 80 kilometres West of Bergen and was discovered as early as 1979. The water depth is roughly 330 metres. This is the largest offshore gas field in the North Sea and long-term sales contracts were agreed on with gas buyers in continental Europe before development began.



# Characters in (heavy) transport

*Lorraine Stanton is Commercial Manager with Mammoet Ferry Transport UK. In Nedscope Magazine of December 1998 she reflected on the Euro and the year 2000.*

"Change is inevitable. We live in an almost chameleon-like society where it is necessary to adapt constantly to new situations. Changes seem to be following each other more rapidly as well. Some people would probably feel that too much change too quickly means that the benefits that were intended are not always realised, it can almost feel like a "fire fighting" situation."

"For a company such as Mammoet Ferry Transport, change can be dictated by many factors, both internal and external. Some can be controlled, others cannot. The Millennium, for example, cannot be avoided. Some people expect the turn of the century to bring about a sudden change, some fundamental differences. Personally, I cannot understand the level of the so-called euphoria associated with this event. We shall have to wait and see. What I do feel is that the world in general is moving and developing at a rapid pace and the 21st century will undoubtedly reveal huge commercial, social and technological advances across a broad spectrum of our lives."

"The introduction of the Euro will be responsible for the biggest changes of the foreseeable future. Initially it could cause quite a few administrative and technical problems, although the Euro will make business and transactions considerably easier. At Mammoet Ferry Transport we are ready for the Euro. Many of our clients have indicated that



Photo: Ben Wind

they would like to be invoiced in Euros in the future. Others are not quite ready to use Euros and we respect that. People need and must be given time to adapt to change. One must always approach change as positively as possible, difficult as this sometimes might be. Change creates new challenges, and new challenges keep you on your toes."

"Like most people, I guess there are things I would like to change in my life. Some are possible, others are not. The key is to focus on changing the aspects that have the most impact on the situation." ■

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*Singapore - From the moment the contract was awarded in June 1997, intensive pre-engineering studies were carried out at Foster Wheeler in Reading and Walter Wright Mammoet in Singapore. A planning concept was established for the transportation and installation of 59 modules within a maximum time span of 14 weeks, to be carried out towards the end of 1998.*

# The TARP project

By Maurice Perry

## Site transportation and installation of 59 modules

There were various issues to be considered during the pre-engineering process, such as the short period of installation, the plant's confined space and a congested site due to other on-going sub-contracting activities. The anticipated period for site transportation and installation was 7 weeks for the M1200R ringer crane and 14 weeks for the CC3800, the M4100 (S2) crane and 40 axle lines SPMTs. Two more cranes, the Krupp

5090 and the Grove RT58, were also used to assist in the preparation work. All this formed the basis of the development of the contract schedule using the critical path method, the agreed installation philosophy, establishing the predicted installation dates from unit delivery dates, the predicted completion of installation activities and lastly, transportation and installation studies of the heaviest pieces.

Pre-engineering in Reading and Singapore formed the foundation for comfortable engineering on site. Pre-formulated data for all transports and heavy lifts provided quick solutions for any changes or problems which arose during ongoing site activities. It turned out that no problem was too big and everything could be solved. All in all, the pre-engineering stage took 4500 man hours and some 700

drawings were produced. Foster Wheeler's fast track concept to modularise construction on site meant that the schedule for the project, including the positioning sequence of the pieces, was of prominent importance. It may be said that Foster Wheeler have a very good track record in modular construction. This was evident when the project proceeded. Through the professional approach of the Foster Wheeler management team on site, they always achieved the required modular construction milestones prior to the planned installation of heavy lifts.

The contact became project driven when the equipment could be delivered earlier than was predicted in the pre-engineering stage. The stick-built site modules had also been completed earlier as was the dressing of heavy columns which originally had been a



point of concern whether or not the completion dates could be achieved. The overall consequence of all these early deliveries was that the transportation and heavy lift installations did not require the anticipated 14 week period. The schedule was restructured daily to suit delivery date movements and completion of on-site modules. This yielded significant economic benefits and opened opportunities for other sub-contractors to start their work earlier, once the installation of modules was completed.

A total of 59 modules was installed, varying in weight from 50 metric tonnes upwards. The heaviest piece was a column of 772 tonnes whereas the heaviest pre-assembled unit weighed 500 tonnes. Maximising the M1200R ringer crane to only 3 locations indeed kept its

jack arrangement placed into position at 8 points, the module was then successfully lowered some 2,5 metres onto its foundation.

In the pre-engineering studies on estimated weight reports it was established that there were 8 modules which exceeded 80% of the crane's capacity. This 80% is always used as a safety margin. It was then decided to weigh these modules on site to ascertain their exact weight. Climbing jacks and calibrated load cells were used to determine each module's accurate weight. With these actual weights the engineering data could be developed for an accurate assessment of the lifting parameters.

The stringent constraints applied to by Esso/Foster Wheeler on all site safety issues meant that WWM had to

## Pre-engineering in Reading and Singapore formed the foundation for comfortable engineering on site.

time on site to only 7 weeks as planned. This was inclusive of moving the crane twice, taking on average 7 days per movement including de-rigging and re-rigging. The flexibility of the M1200R proved its worth since the crane did not have to be moved after every single lift. This permitted the lifting and installation of two or three modules per day.

The Demag CC3800 crane assisted in the tailing operations of the heaviest pieces and installed some modules up to 200 metric tonnes. The M4100 (S2) assisted in the tailing of modules of moderate weight and installed lighter equipment. Only once was installation by crane abandoned for the use of the jack down technique with climbing jacks to place the 458 tonne PAU-AD module onto its foundation. Since the base levelling pads for the PAU were a metre below floor level, a supporting bridge structure was built to give level access throughout the installation area. Two sets of SPMT with 16 axle lines each were used to move the module directly over its foundation. With the SPMT's hydraulic system the module was then lowered onto temporary steel supports and the SPMTs were subsequently removed from the area. After the supporting bridge structure was removed from the foundation well and the climbing

be even more vigilant in the control of these issues. Tool box talks were conducted every morning with operators and staff yielding advice and feed-back on operational field performance. During the 14 weeks on site, not counting mobilisation and demobilisation of equipment, over 30,000 man hours were necessary to fulfill the contract requirements. Not one injury incident was recorded during that contract period which confirmed that the continual surveillance and instruction on safety paid off. For this excellent safety record on site Walter Wright Mammoet received from Foster Wheeler the safety contractor of the month award for December 1998.

The transportation and installation of heavy lifts for this project were completed in accordance to the requirements of the contract and to the complete satisfaction of both Foster Wheeler and Esso. Mr John Donachie, Site Construction Manager for Foster Wheeler stated: "The project activities carried out by Walter Wright Mammoet were completed to the required scheduled milestones which were conducted in a very professional manner on all aspects of work including engineering, quality, transportation, installation and above all: safety". ■



Pre-formulated data for all transports and heavy lifts provided quick solutions for any changes or problems which arose during ongoing site activities. It turned out that no problem was too big and everything could be solved.



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\* complete list of subsidiaries on page 27

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