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ПОДЪЕМНО-ТРАНСПОРТНОЕ ОБОРУДОВАНИЕ

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Целью пособия является формирование иноязычной компетенции в профессиональном общении, в частности, развитие навыков чтения и извлечения информации из литературы профессионального содержания на английском языке.

Пособие предназначено для студентов механико-машиностроительного факультета, аспирантов, соискателей.

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Введение

Учебное пособие предназначено для студентов механико-машиностроительного факультета.

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Пособие состоит из двух частей. Первая часть предназначена для аудиторной работы, содержит тексты с прилагающейся к ним системой тренировочных лексических, грамматических, стилистических упражнений. Это помогает снять трудности при восприятии материала и подготавливает обучаемых к последовательному анализу текста, предлагая алгоритм действий при работе над сложными профессиональными текстами. Особое внимание уделяется терминологической лексике. Терминологический словарь дается в начале каждого урока.

Представленные в пособии тексты взяты из оригинальных источников (журналы, интернет) и содержат исключительно техническую тематику. При отборе текстов авторы руководствовались следующими критериями: информативная ценность, насыщенность терминологической лексикой, многофункциональность, то есть возможность использования текстов для ознакомительного и изучающего видов чтения, для развития навыков перевода и аннотирования.

Вторая часть пособия содержит тексты для самостоятельной работы. Пособие может быть рекомендовано также для аспирантов.

UNIT I

More Cranes Less Parts

Part I. Introduction

1. Study the words:

approach	подход
commitment	обязательство
to appoint	назначать
scratch	рисунок, набросок, чертеж
benefit	преимущество
to develop	развивать, совершенствовать
to deliver	доставлять
reference	ссылка, сноска
launch	выпуск (продукции)
experience	опыт
to implement	приводить в исполнение, внедрять
truck	колесо, каток
crawler	гусеничный ход
customer	потребитель
high-flyer	занимающий высокую должность

2. Match English expressions and their Russian equivalents:

1) commitment to the strategy	супертяжелые гусеничные краны
2) exciting new cranes	в течение последних нескольких лет
3) super-heavy cranes	колесные краны
4) manufacturers' production facilities	старший менеджер
5) truck cranes	краны последней модели
6) over the past few years	изменения технической характеристики
7) product launches	одобрение стратегии
8) senior manager	производственные возможности
9) customization re-engineering	выпуск продукции

3. Translate the sentences. Study the functions of –ing-forms

1. A new approach promises simpler staff-training.
2. They committed to the project by appointing him a chief-engineer in charge.

3. This was an exciting new design.
4. The engineers from automobile sector were given leading development roles.
5. He has been working for a long time for the global engineering company before joining the US-based crane builder.
6. He led the re-engineering of all major processes.

4. Read the text. Put down its key idea

A new modular approach to design, developed in the car and aviation sectors, promises crane buyers more choice and cheaper cranes, with fewer parts, faster delivery times and simpler staff training. Two of the world's biggest crane builders have demonstrated their commitment to this strategy by appointing senior engineers from the aviation industry. Will North spoke to them both.

In the traditional research and development process, a crane is built from scratch, with each component designed specifically for the crane it will be used in. Modular design looks at the process differently, using the same components in different cranes in new ways.

The new approach makes it easier to build exciting new cranes, by changing which components are used together. The examples of the innovation made possible by this approach range from small truck cranes, all the way up to super-heavy crawlers.

The benefits for crane users of modular design don't end there though. As the same parts are used on many different models of crane, fewer parts will be needed by service engineers. Operators will see the same control systems on many cranes, and will need less training. The benefits within the manufacturers' production facilities will mean that cranes are developed faster, delivered sooner and will cost less.

The modular approach is old news for car and plane builders, but has only over the past few years made its way into the crane industry. Terex and Manitowoc have made their commitment to the new approach clear with frequent references to modular design during product launches, and with the appointment of two expert engineers from the aviation sector to leading development roles.

Terex director of research and development Ralf Ressel came to the company in December 2007 from a senior management position at Airbus. A graduate of EADS's corporate young manager programme, he has ten years experience with the aviation industry, and also spent two years at Daimler Chrysler. In has last role at Airbus he was senior manager for the A400M cabin and cargo. For two years, from 2003 to

2005, he was project manager for customisation re-engineering for Airbus.

Andreas Schwer, senior vice president of global engineering for Manitowoc's crane business, was another high flyer in the aviation sector, before joining the US-based crane builder in October 2008. As vice president of design and development for EADS Eurocopter, he developed a centralised, multinational, engineering organisation across France, Germany and Spain. As part of this process he led the re-engineering of all major processes and implemented standardised design and development processes throughout the organisation.

5. Agree or disagree with the statements. Use the expressions: "You are right", "It is so", "On the contrary", "I don't agree with you", etc.

1. Modular design is not often used in the car and aviation sectors.
2. Modular design will bring benefits of fewer parts, faster delivery times and simpler staff training to crane buyers.
3. Modular design helps to use similar components in different cranes.
4. A new modular design approach can hardly help to develop cranes faster.
5. Big components like Terex will never appoint experts from other than cranes sector to leading development roles.

Part II. A New Approach.

1. Study the words:

lean	наклон, уклон
enabler	способ
request (requestment)	просьба, требование
to handle	управлять, регулировать, обращаться с
robust	крепкий, прочный
chassis	шасси, ходовая часть
supply chain	система поставки (запасных частей)
to drive the push	стимулировать, стремиться
to aquire	приобретать, достигать, овладевать

winch	лебедка, ворот, рукоятка
slew bearing	подшипник
hydraulick package	система гидравлики
due to	вследствие
to keep ahead	быть впереди
proximity switch	переключатель близости
jib	клин
boom	балка

2. Translate the word combinations:

Tooling savings, staff training costs, supply of spare parts, operational usage, local market requests, competitor's better optimized crane, wide product range, global manufacturing company, natural move, significant cost saving benefits, overall reliability and quality, suspension system.

3. Read the text and suggest its main idea

A New Approach

Ressel says, "Modular design will be the trend for the future. If you want to do lean, you need modular design. It's a key enabler of the lean manufacturing process. At the manufacturing stage, there are benefits in tooling savings, and in staff training costs.

"In the car industry, there is a lot of modularity. It allows you to give more choices to customers, and to follow a clear manufacturing process. In the aircraft industry, in organisations like Airbus, sections like the fuselage are built in a modular way, in a lean process."

The potential for modular design varies depending on the machine you are building. Schwer says, "The more you standardise, the more you compromise on a technical level. You have to find the right balance, and determine what is finally of advantage for the customer.

"In the car industry, businesses like Volkswagen have developed a platform strategy, where different marques, like Audi, VW, Golf or Seat, use the same platform. We can't go that far, but there is a lot of potential for standardisation.

"There are limits linked to the different size and nature of the cranes, their operational usage and local market requests. For example, different requirements concerning technology level and robustness easiness in handling and cost will define natural limits to standardisation."

Ressel explains the limits: “There are differences with the car industry; with cranes, you need to optimise to be the best. If you had a too broad platform, your customers would buy a competitor’s better optimised crane, therefore smart modularisation is key. You also have to design modularity that can adapt to each country; for example, so chassis can be adapted to different rules on road regulations.”

The benefits of modularisation apply throughout the supply chain. Ressel says, “The benefits of modularity flow from the design stage, to the manufacturing process, to the customer. From the customer side, there are advantages in supply of spare parts. Components are more standardised, so you need to keep a lower number of parts in stock. For after sales support, you don’t need to train in as much detail for every crane. Training for end users is also easier, as the customer knows the component and its function already.”

Schwer says, “The push for standardisation and modularisation is driven by the need to reduce total cost of ownership for the crane operators. Manitowoc has more potential to do this, due to its extremely wide product range. There has been some standardisation across product lines. There are economies of scale: it reduces the cost of training and spare parts logistics and, furthermore, the need for engineering resources, and the development cycle is faster.”

As Schwer suggests, the most benefit can be achieved by crane builders with the biggest ranges. And as new businesses are acquired, seeing these benefits requires rethinking how the business operates.

Rüdiger Zollondz, senior manager, product marketing, for Terex Cranes, has been ideally placed to see how Demag, and then Terex, adopted this new approach. He says, “Adopting modular design is a natural result of moving from being a holding company, to being a global manufacturing company. You can imagine the power a company like Terex has. Across 15 acquired businesses, there are many benefits from standardisation.

“When you built a crane twenty years ago, components like winches or slew bearings were built into the crane structure. Then winches began to be designed as separate components, and later became modular. Now, whole systems, like the hydraulic package, are pre-assembly.

“In Zweibrücken, Terex is hiring from the car industry. We’ve got a new factory manager, who previously turned around a car factory in Cologne.

“In the automotive industry, this approach might be boring, but for the crane industry it is the rising trend. It’s a natural move for a company like Terex, that has such a widespread product range. It’s not

like in the past, when every crane was designed on its own. With the Chinese coming in as competitors, this is what will keep us ahead."

For both companies, standardisation and modular design started at individual businesses, but is now being applied across their ranges. Schwer says, "We did considerable standardisation within product lines, but standardisation across product lines has only become possible with the creation of Manitowoc's wide product range.

"Cross product line standardisation can bring much more than we see today. If a customer has a range of Manitowoc products, they will always see the same technologies. It will make training for operators and service teams cheaper and bring benefits to the certification process. There will be significant cost saving benefits for customers.

"When a customer buys a new crane, they will not have to pay the R&D cost of a new boom; that cost will already have been amortised across other cranes in the range. And, with the reduced number of different parts, the overall reliability and quality of the cranes will increase further."

Modularity isn't applied at a single level, but throughout the crane. Ressel says, "There are three levels of modularisation that can be defined. At the first level, there are simple parts, like proximity switches. Next comes basic modules, such as drivelines, jibs or winches. Finally, there are complete crane modules, such as the superstructure, boom or carrier."

Schwer says, "We can apply some standardisation across product lines like Grove's GMK range, our rough terrains, National's truck cranes and our Chinese mobile cranes. Many of these cranes use, for example, similar suspension systems, chassis, hydraulic components, tyres, wheels, brakes and control systems.

"But standardisation is not limited to a parts and component level: The new TMC540, on our Intermat stand, uses an upper structure from a US mobile TM crane mounted on a standard European truck. One of our TMS cranes, built in the the US, uses a GMK telescopic boom from Germany.

"Standardisation at the component level simplifies our parts supply logistics and makes it easier to maintain cranes in the field. It means less training is needed to service new components."

4. Comprehension check. Answer the questions to the text:

1. What are the advantages of modular design?
2. In what industries is modularity widely used?

3. What factors define limits to standardization with crane industry?
4. What are the benefits of modularity to the customers?
5. What are the ones to the crane builders?
6. What companies are readily adopting modular design?
7. At what levels is modularity applied throughout the crane?

5. Give the summary of the text. Use the key words:

Modular design, future, benefits, standardization, tooling servings, crane business, supply of spare parts, big companies like Terex and Demag, new approach, wide product range, staff training costs, global manufacturing company.

Part III. Unlocking Innovation

1. Study the words:

to break the ground	начинать новое дело
flexibility	подвижность
to consider	решать
make use of	воспользоваться чем-либо
lattice	решетка
terrain	местность, территория
common	общий
swing	размах, отклонение стрелы (крана)
jib	стрела грузоподъемного крана
prevalent	превалирующий, первостепенный
twin	близнец
slewing gear	шестерня, зубчатая передача, привод

2. Translate the word combinations:

Groundbreaking new design, plug and play system, to be under consideration, more commonality across ranges, full-all-wheel steering system, conventional construction crane, operator controls, huge load moment, capacity band, from the customer's point of view, counterweight cars, software modules, promising cost savings for maintenance, rough terrain.

3. Translate the sentences. Pay attention to the functions of the verb to have:

1. Both companies have demonstrated innovations.
2. Superstructures have been standardizes.
3. The idea is to have more commonality across ranges.
4. These rough terrains have a lot of common elements.
5. The customer had come to us and asked for a big crane.
6. When you design a new crane you only have to adapt the control system to the new features.
7. We are having the benefit of being able to order parts in greater numbers.

4. Form nouns from the given verbs. Use the suffixes: -ment, -tion, -ity, -er, -sion, -or, -age, -ing.

to demonstrate	to combine	to manage	to work
to innovate	to consider	to suspend	to operate
to module	to carry	to construct	to present
to use	to rely	to deal	to mean

5. Read the text. What ideas have you found the most interesting?

Unlocking Innovation

Both companies have demonstrated the innovation made possible by modularisation with groundbreaking new crane designs. Schwer says, “Modular design offers a higher level of flexibility, and more plug and play systems. We can make use of existing components, and combine them in clever ways to create new lifting solutions. One example of that is the new GSK range, which uses a GMK superstructure mounted on a trailer. Another was the GTK, which mounted a GMK7450 upper on a telescopic tower.

“Further options are under consideration. For example, we may combine existing telescopic crane elements with crawlers, or lattice sections with mobile carriers; it’s something we are investigating.”

Neil Hollingshead, Manitowoc global product manager, all terrain and rough terrain cranes, says, “Superstructures and booms have been

standardised on many Manitowoc cranes. For example, the TMC540 is based on the RT540E superstructure. The TM9000E is based on the GMK4080-1 superstructure and boom. We also share swingaway jibs and inserts across our range: the TM9000E and GMK4080-1 use the same swingaway jib.

“There is a lot of commonality in the GMK range. The idea is to have more commonality across ranges. Modularity is also very prevalent within product lines.

“The E series rough terrains have a lot of common elements and in the GMK range, for instance, the GMK5095 and GMK4100-L share the same superstructure and boom, and the GMK5095, 5110-1 and 5130-2 have a common carrier. There are also a lot of common features such as Megatrak suspension and a full all-wheel steering system, operator cabs and Megaform boom elements.”

Terex has used the modular approach to build one of the world’s biggest conventional construction cranes, in a striking and imposing new design: the Terex Twin dual-boom crawler. Ressel says, “We’ve used PPM booms and all terrain booms in our rough terrains. The RT 1120, for example, is built in Waverly, but has a boom made in Germany. One of the most notable examples is the Terex Twin, which reused most components from a standard CC 8800.”

Zollondz adds, “With the Twin, the customer had come to us and asked for a big crane. We initially designed a ring crane, with a huge load moment, but they said, ‘What will we do when it isn’t working?’ By using modular components, they can use parts of it as a standard CC 8800-1 when there isn’t a job for the twin option.”

Increasingly, the same components can be used across a crane builder’s range. Zollondz says, “It’s about taking equipment that is there, and reusing it for a new application. If you take the Zweibrücken [former Terex-Demag] family of ten crawler cranes, you can see some components are shared across the entire range, and some across different capacity bands. Some models use the same booms, some use the same crawlers.

“We use the same slewing gear on eight different models, and the same gear is even used in some counterweight cars. We have the benefit of being able to order parts in greater numbers, and the customer feels that benefit in the price of the crane they buy.”

While modularity brings a wealth of new crane designs, it can also bring uniformity. Ressel says, “From the customer’s point of view, one of the most widespread modular components across the Terex crane range is the IC-1 control system [used in Terex’s all terrain cranes, city cranes, and on some crawlers, including the Twin]. They will see the same look and feel on every crane that uses the system.

“When we design a new crane, we only have to adapt the control system to the new features. At the backend of the system is a CANbus network, so we can add sensors and other components as needed.”

Zollondz adds, “IC-1 presents customers with the same diagnostic systems, and the same software modules.”

Hollingshead says, “There is a common operational system on the GMK range currently. Operational systems are a future candidate to go across different Manitowoc ranges.”

Schwer explains, “Operator controls are one of the hottest candidates to be standardized. They offer some of the most promising cost savings for maintenance, and offer safety and reliability benefits. Today, our Crane Care staff can help customers operating different types of Manitowoc mobile cranes by using the same diagnostics system. This advantage needs to be systematically exploited. For customers and dealers too, it means less training is needed.”

6. Comment on the following. Use the expressions: “It is quite so”, “I’m of the same opinion”, “I can’t agree with you”, “Not at all”, etc.

1. With new crane designs we can combine the established components to have new advantages.
2. Many Manitowoe cranes have got a lot of standardized elements.
3. It is impossible to standardize such elements as suspension and full-all-wheel steering system and operator cabs.
4. Unfortunately, we can’t use the same components across a crane builder’s range.
5. With modular design the customer has the benefit in the price of the crane.
6. At present all crane systems have been already standardized.

Part IV. Thinking Ahead

1. Study the words:

fix (v)	зд. внедрять, вводить
challenge	сложная задача, проблема
to multiply	умножать(ся), увеличивать(ся)
to purchase	покупать
to investigate	исследовать

target	цель
take off	снимать
to think ahead	обдумывать заранее
scale	шкала, масштаб
assembly	сборка, монтаж, агрегат
to dedicate	посвящать
issue	вопрос, тема

2. Translate the word groups:

Multi-billion dollar global business designs, an established modular component, to standardize components and platforms, dedicated engineering staff, standard data bases, product data management tools, deep and wide product ranges, expert engineering teams, issue of communication.

3. Form new words from the given ones with the help of suffixes and prefixes according to the model. Translate them.

Model: new – to renew – renewal

start	place	pay
store	produce	make
invent	build	create

4. Study the functions of –ing forms

1. Changing the way business designs its products takes considerable forethought.
2. There are scale effects in purchasing that help.
3. There is something that makes engineering more difficult.
4. You think of modularity right from the very beginning.
5. You are not reinventing the wheel; you just take the product off the shell.
6. This thinking ahead takes efficient systems.
7. How are you going to implement a new approach?
8. By having a showcase project you can motivate your staff.
9. There's an issue of communication between engineering departments.

5. Read the text. Put down its main idea

Thinking Ahead

For all its benefits, modularity isn't a quick fix: changing the way a multi-billion dollar global business designs and builds its products takes considerable forethought. Ressel explains, "The advantages multiply, but so can the challenges multiply in the same way. There are scale effects in purchasing that help. Something that makes the engineering more difficult, is that if you change a modular component, you have to investigate what that change means for every crane.

"When you design a crane using an established modular component, the component has already been tested in the field. It helps the design process, as you don't have to design a new component every time. And, you benefit more, the more you think of modularity upfront. We try to think of modularity right from the beginning."

Schwer says, "When you design a new crane, you might target to standardise components and platforms/assemblies across a group of cranes. Then, when you design the next crane, there is no need to restart the process: you're not reinventing the wheel. Instead, you can just take the product off the shelf."

That thinking ahead takes skilled, dedicated, engineering staff and efficient systems. Ressel says, "You have to work out how you're going to implement a new approach. By having a showcase project, like the Twin, you can motivate your staff, and show them how the design process changes.

"The R&D impact is that you will need better product data management. Any designer needs to be able to find the properties of all parts and pick from standard databases. Your product data management tools need to be better to allow you to do that. There's an issue of communication between engineering departments worldwide: engineers must be able to communicate effectively with each other."

With their global presence, deep and wide product ranges, and expert engineering teams, these two companies are ideally placed to deliver on the promises modular design offers. As newcomers to the international crane market try to make purchase price the only factor that matters, it will be up to them to demonstrate that a wide choice of reliable, highly optimised cranes can be delivered at a whole life cost that customers are happy to pay.

6. Match English word combinations with their Russian equivalents:

for the benefits	вместо этого
every time	друг с другом
right from	несмотря на преимущества
with each other	единственный фактор
the only factor	непосредственно
up to somebody	каждый раз
upfront	наперед, заранее
instead	зависит от кого-то

7. Speak on the problem: "Modularity takes considerable forethought".

UNIT II

Terminal Velocity

1. Study the words:

gantry cranes	портальные краны
pattern	рисунок, система, структура
to pose	представлять собой
down time	вынужденное бездействие (простой)
hub	центр
consession	концессия, уступка, договоренность
draught	водоизмещение
to dredge	углублять дно
disruption	разрушение
to pick up	бросить, оставить
to corner	загонять в тупик
truss	связка, пучок, гроздь
to pin	собрать вместе, сколоть
dolly	грузовая тележка
to rig	оснащать, использовать
rail gauge	межрельсовый промежуток
blue (white) elephant	обременительное, ненужное имущество
sill beam	нижняя (опорная) балка

2. Translate the following word combinations

To handle changing patterns of world trade, giant pieces of equipment, to pose a considerable challenge, a major transshipment hub, under a concession from, is continually in use, to shut the port down for a long time, the bending force, throughout the whole operation, self-steering hydraulic dollies, over a period, projected schedule, remote areas of the port, to interfere with operations.

3. Read the text and express its main idea

Terminal Velocity

A new containerised transporter makes it easier and quicker to move 2,000t gantry cranes around busy container terminals. Will North reports

Ports around the world are buying new container cranes in large numbers, both to handle changing patterns of world trade and to reach over new, wider, container vessels. When they do, their existing cranage often needs to be reorganized to make the most efficient use of their new cranes. Moving these giant pieces of equipment poses a considerable challenge, particularly as the busy port environment doesn't allow for any down time.

Malta Freeport was established in the late 1980s. The Maltese archipelago sits in the middle of the Mediterranean, and the port has quickly become a major transhipment hub, where the cargo of oceangoing ships is loaded onto smaller vessels for delivery to shallower harbours around the Mediterranean. The port is operated by French company CMA CGM, the world's third largest ports specialist, under a concession from the Maltese government. Since 2004, the company has been working to increase the capacity of the port, with a target of handling three million TEUs a year. Dredging works are being carried out around the port, with the aim of allowing ships with draughts up to 16m to dock at the port. CMA CGM is also investing in new cranes.

The company planned to have 23 cranes operational by this August. As part of the development, three giant ZPMC ship-to-shore cranes would need to be moved around the port. The port company entrusted the job of moving the 1,900t cranes to Global Rigging and Transport (GRT), a Virginia, USA port movement specialist.

GRT general manager Tommy Felch, explains why the company got the job: "We specialise in moving and modifying container cranes and other large marine equipment. This year, we've had jobs in Buenos Aires, Brazil and South Asia. Malta was the first job we've had in Europe. We'd worked with the engineering manager at Malta Freeport on moves at other ports. He knew this wasn't an ordinary job, and asked us to do it."

The problem at a port like Malta is that space, both landside and at the dock, is continually in use. Port operators don't want to stop work for any longer than is absolutely necessary. Felch says, "Malta is a very busy terminal. Only three or four per cent of the containers there go out of the terminal: the rest is transhipment, from big ships to smaller vessels taking cargo on into the rest of Europe. We had to limit disruption to the port.

"We couldn't use barges. That would have been easiest, as we could go straight to where the crane was needed, but would have blocked the dock. The move needed to be land- based. The whole terminal is covered with containers, stacked everywhere. We moved containers to make a route through, but the cranes would still need to be able to corner tightly.

"You could jack the crane up, and add beams and dollies, but that shuts the port down for a long time and they wanted to get the job done quickly.

"That's why we developed the containerised transport truss system. The truss transporter drives under its own power. The big 20t beams on each truss support the crane. The truss keeps all of the wheels in between the sill beams, at the front and back of the crane. It makes the crane manoeuvrable. A single beam big enough to take the bending force would need to be very big: something like 4m x 4m. The truss is designed to compress the smaller beam, and take the bending force of the dollies. It can lift and carry up to 2,000t.

"The entire system can be transported in eight containers. The truss is pinned together in a quiet area of the port and pulled by a tractor to the crane that needs moving: it is self powered, but the dollies aren't as fast as the tractor. The truss stays assembled throughout the whole operation, and is just moved between cranes as needed."

One of the ZPMC cranes moved by GRT weighed 1,900t and traveled 1,200m through the port, on a route consisting of four 90° corners through the heart of the port. Following a detailed route map, the truss and crane were transported using a group of self-powered and self-steering hydraulic dollies. The truss can also be rigged for transport using platform trailers, depending on which option is the most cost-

effective. In this case, GRT completed the movement of all three cranes over a period of ten days, three days ahead of the projected schedule.

The primary function of the truss system is to reduce the time required for moving cranes within shipping terminals. GRT says that 95% of the preparation work involved can be performed in remote areas of the port so as not to interfere with normal port operations. Additionally, the crane set to be moved remains fully intact throughout the entire process. So from start to finish, a container crane can be moved within a shipping terminal in a period of 72 hours.

"We designed the truss ourselves, and had the design reviewed by an independent engineer," Felch says. "We have a fabrication company we work with, the Riggins Company in Hampton, Virginia, who fabricated the truss for us. They've built a lot of equipment for us.

"The truss is designed to be used with cranes with a rail gauge of at least 30m. It could be adapted for smaller cranes, but cranes keep getting bigger and bigger. On smaller cranes, its easier to pick them up and manoeuvre them with existing equipment like beams and dollies. It was a big investment: I hope it's not going to a 'blue elephant'. We've already got one port operator in Panama who is interested."

4. Comprehension check. Answer the questions

1. Why do ports around the world buy a great amount of container cranes?
2. Why do they at the same time have to reorganize them?
3. How are the cargoes in great ports unloaded?
4. What problems do the great ports like Malta have?
5. Why can't beams and dollies be used to unload goods?
6. What system has been developed to move containers?
7. Why was the truss designed?
8. What is the primary function of the truss system?

5. Comment on the following

1. Malta Freeport and its operation.
2. The problems at the Malta port.
3. The new technology development in Malta port.

6. Translate into English

Перегруженные европейские порты испытывают большие сложности с перемещением такого крупного портового оборудования, как портальные краны. Дело в том, что территория порта активно используется круглые сутки, потому что больший объем работ порта приходится на трансшипмент. Чтобы избежать столкновения контейнеров и оборудования, разрабатываются новые технологические проекты, связанные с деятельностью портальных кранов. Одним из них является трассовая система, позволяющая перемещать одновременно несколько кранов.

UNIT III

Hot Iron, Heavy Towers

1. Study the words:

pre-cast building	сборная технология (в строительстве)
tower crane	башенный кран
self-erector	самоходный кран
crawler	гусеничный (кран)
site	строительная площадка
joint venture	совместное предприятие
hoist	подъемный механизм
beam	балка
capacity	грузоподъемность
trolley	троллей (токоподводящий механизм)
luffer	люфер (от luff - перемещать по горизонтали)
sewage	канализация
slewing	поворотный механизм
fleet	парк, грузоподъемная техника
to rent	арендовать

2. Read and translate these geographical names

The Netherlands, the Dutch, the Benelux countries, Luxemburg, Northern Europe, Belgium, Brussels, the French market, Hirschberg Plateau, Germany, Manhattan, the Hague, Holland.

3. Find Russian equivalents to the following word combinations and phrases

find out	много
call for	зависеть от
as well as	отмечать
point out	как только
as soon as	так же, как и
account for	для того, чтобы
a lot of	искать
depend on	чаще всего
in terms of	насчитывать
most of the time	требовать
to look for	выяснять
in order to	в выражении

4. Translate the following word combinations and phrases:

The advantages of pre-cast construction, tower-crane markets, apartment and renovation works, without a permit, short building time, to need a license, tend to be heavy duties, rental fleet, for the same reason, a complete range of construction equipment, limited access, to think in terms of concrete, a complete finish, different capacities, windows frames, electric and sewage systems, to answer the needs, the best quality/price ratio, building regulations, frequency control, high-riser.

5. Translate the sentences

1. Once the job has started it must be completed in time.
2. The experiment was carried out more than once.
3. Once upon a time you would need to find a solution.
4. They had to check the engine once again.

5. These heavy elements need to be lifted at once.
6. All at once the failed to implement the project.
7. This pioneering technology was used never once.

6. Read the text

Heavy Towers

Frank Crombe, marketing manager for Kranenbouw explains, “Belgium tends to use a lot of self-erectors of all sizes, mainly for private houses and small buildings. It uses a lot of city cranes from 70tm to 120tm for apartments and renovation works in cities and at the Belgium coast, in cities like Oostende and Knocke. As thesecranes’ operators can work without a permit it has made the use of this size of cranes popular.

“Brussels is an exception, where big projects using pre-cast concrete and with short building time call for heavy duty cranes. This is a mixed market with contractors still purchasing cranes. Rental in Belgium accounts for approximately 70% of the market.

“In the Netherlands, it is the contrary. Up until recently, crane drivers were very expensive to use in the Netherlands: up to EUR1,600 a week. The reason is that crane drivers needed a license, which was a long (1 year or more) and difficult process to get. This has favoured the use of heavy pre-casts and heavy benches, forms and even some special techniques such as the’ tunnel forms’’ for apartment building. Therefore, tower cranes tend to be heavy duties. For example, the rental fleet of Kranenbouw in the Netherlands is mainly composed of 120tm–400tm tower cranes.

“Self-erectors are seldom used in the Netherlands, except on crawlers or on trucks (Spierings, MTC) for the same reason: crane drivers are too expensive to be used on self-erectors. Around 90% of the Dutch tower crane market is rental. Nowadays it is much easier and quicker (about three weeks) to get a crane’s license, so we see more and more self-erectors coming to the Netherlands.

“Luxembourg is more like the French and Belgium market with a mix of self erectors and standard tower cranes. The construction market here has been very good and stable for the last ten years with a lot of official and office buildings: the Kirchberg plateau [home to many European banks and EU parliamentary buildings] near the airport is a good example. The Luxembourg tower crane market is 90% rental.”

Van der Spek sells and rents Liebherr's complete range of tower cranes in the Netherlands, as well as batching plants and truck mixers, and a complete range of other construction equipment. In Belgium it also sells Liebherr mobile cranes. Managing director Erik Lubbers says, "Pre-cast concrete is used a lot in the Netherlands, a lot more than in Belgium and Germany.

"Most of the time, customers try to do everything in pre-cast pieces: beams, walls and floors. The only pouring that takes place on site is the connections between the pieces.

"A good example of this type of construction is the Het Strijkijzer (the 'Hot Iron' or, as in the famous Manhattan building, 'Flatiron', because of the footprint of the building) project in The Hague. On this project they were able to build two floors a week. A job like that, in the middle of a busy city like The Hague, with limited access, takes very detailed planning. They could only have one truck on site at a time; as soon as one truck left, the next was waiting to enter the site. It shows how quickly you can build using pre-cast if you get the logistics right.

"Everything has to be just in time. The elements have to be right every time. There is no chance to change anything once the job has started. The preparation is longer, but the execution is shorter.

"The Netherlands is a typical concrete country. Contractors don't use steel in high-rises, and don't have much experience working with it. They think in terms of concrete.

"The advantage is that, once the job has started, it is much quicker. You also need less labour on site," Lubbers says. "Labour is very expensive in the Netherlands, particularly over the last few years.

"As well as the price advantages, there are a lot of established suppliers that can make the concrete elements.

"The contractors want to make the elements as big as they can transport, so up to 25t. Sometimes we have to tell them that the crane won't be able to lift that: you can lift up to 25t, but not at all the distances they want.

"The biggest elements will be the beams and floors. Elements can have a complete finish, such as a layer of bricks, on the exterior. They can even include windows frames and glass, the water, electric and sewage systems are already in the floors and walls sometimes."

The sizes of the pre-cast elements that need to be lifted influence the type of cranes popular among Dutch contractors. Crombe says, "At Kranenbouw, we have seen that cranes with capacities of 300tm and above, such as Liebherr 256 HC, 280 EC-H, Comansa 290 LC and 400 LC, Jost JT 312.12, Peiner SK 315 and SK 415 are almost constantly rented. We have, for example, rented recently two Comansa 400 LCs

on the Rijks museum in Amsterdam, which is quite a prestigious job site. Half of our fleet is over 300tm cranes, so we are also able to answer the needs for big job sites in Belgium and Germany. We have provided the cranes for the Leverkusen Stadium in Germany, all 300tm cranes and above.

"This is the reason why Kranenbouw started a joint venture with Jost Cranes in 2006, assembling the JT 312.12 (300tm) and JT 352.12 (350tm) which we believe to be the best quality/price ratio tower cranes in the market."

Lubbers agree: "These jobs call for cranes with capacities over 400tm: the Liebherr 420 ECH 16 or 20, 550 ECH 20, or 630 ECH 20, 25, 40 or 50. The model used depends on the distance the heavy elements will need to be lifted to. The Strijkijzer project just used one crane, but it was a small site: other sites may use multiple cranes. The building regulations in Holland allow you to fly over other sites, so there's rarely a need for luffers, except where there are space restrictions."

Jacco Veldhuizen, Van der Spek's international rental and used tower crane sales manager, points out that the cranes for these don't just need to be big, they need to be precise: "Positioning the elements needs to be very precise. This is where the Litronic system on Liebherr cranes is a big advantage. It has frequency control of the hoist, trolley and slewing, for easy, millimetre-precise, positioning. If the crew where the load is being delivered wants the load lifted or lowered by a millimetre, they can signal the operator, and he can do this easily."

7. Answer the questions

1. What countries are included in Benelux?
2. What kinds of cranes are used at the Belgium coast?
3. Is the crane market similar in the Netherlands?
4. Why are self-electors seldom used in Netherlands?
5. What are the advantages of pre-cast construction?
6. What factors influence the types of cranes used in Holland?
7. What is Litronic system?

8. Match the name and the function of the crane:

1) self-elector of all sizes;
2) city-cranes from 70 tm;

3) tunnel forms;
4) truck mixers;
5) cranes with capacities on 300 tm and above;

a) apartment buildings;
b) renovation work;
c) private houses;
d) windows frames, electric and sewage systems;
e) pre-cast construction.

9. Supplementary reading. Read the text. Name the benefits of the technology

Hot Iron

For the architect and contractor that Vander Spek worked with on the Strijkijzer, the benefits of the technology are clear. A P Bontebal, lead architect for the project at AAArchitecten, was trying to achieve something very special with the building, on a narrow, restricted site: "Architecture is always an adventure; you're taught to think differently about traditional ways of building. This was the first time we'd worked on a building this high, and it was very well-received, both by the city and by our colleagues[the tower won the 2007 Emporis skyscraper award].

"The choice of building techniques has to do with the market. You have to consider the availability of suppliers, the qualities of the building, its height, and the time available for the job. This building, in our view, was made for pre-cast.

"The housing association, Vestia, had wanted a building that made a statement, and the city had planned a view of the city that made a disposition for this type of high rise building. We were looking to create a building that reacted to both daylight and night. At night, you just see the windows. In the day, the special shape reflects the light in different ways through the day: the building changes colour from pink, to blue, to black, to white. We were able to do that because of the shape of the building, and because of the cladding.

"I'm pleased with the unusual picture the building delivers. The black building, with its iron cladding, on a 33m x 33m ground plan, is remarkable. It fits the country it is in, and makes the public space more live able; it makes what was an undefined place more certain.

“It is important that it is not an office, but housing, that it is not a monoculture, but that it offers a range of facilities for the students, and public spaces like restaurants. The ground floor of a building should contribute to the public space. We did a lot to make it open and transparent. That was quite a job: on a building like this, the delivery of energy, of municipal facilities, of fire brigade access, all need to take up space. We were able to move these out of the way, and keep the front of the building.”

Although Bontebal’s vision for the building had been that it would be built in pre-cast, the original contractor had insisted that it would have to be built in poured concrete. Marcel Poolman, spokesman for Boele & van Eesteren, thecontractor who eventually built Het Strijkijzer, says, “The initial contractor had insisted that it could only be built with in situ pouring: they had refused to use pre-cast for a residential building over 75m. We had to demonstrate to the client that we could build this high in pre-cast; we really had to convince them.

“The original contractor had thought it was possible to use pre-cast at this height for an office, but not for a residential building. Residential buildings need to be a lot more rigid: if an office sways by a metre or so in the day, it doesn’t matter, you will barely notice it; if a residential building does the same, you will get seasick when you try to sleep in it.

The original contractor did not think you could get a building this high rigid enough in pre-cast.” The original contractor backed away from the project, before building started, giving pre-cast another chance. Poolman says, “Vestia gave us drawings for an in situ poured concrete structure, but said that, if we could find a faster way to do the job, we were free to offer alternatives. For every month earlier that the construction work was complete, they would subtract a certain amount of money from the price of the bid, to reflect the extra rent they would be able to earn.

“Wemade one bid for in situ construction working in single shifts, as the owner insisted on including that option. We offered three alternatives: in situ, working in double shifts, and pre-cast in both single and double shifts. The precast double shift option was 12months faster than the in situ single shift bid.”

WillemThoen, Boele & van Eesteren‘s project manager on Het Stijkizer, says, “The developer chose our pre-cast bid: it was a bit more expensive, but a lot faster.

“It was more expensive because of the market for pre-cast concrete. The costs depend on how many suppliers are available, and there are less suppliers of pre-cast than of in situ. The engineering can make pre-cast more expensive too. On a project like this, we had to

reengineer the whole building. On in situ poured buildings, the forces can go every way through the building. On a pre-cast building, you have to work out how the forces will pass through each element and be transferred to the ground.

"It was quite unique to build a tower of this height in pre-cast. It takes a lot of engineering planning, which requires a lot of computer-aided design. Without modern computing power, you couldn't engineer a building of this size in pre-cast. We're lucky that one of our sister companies, through our parent Volker Wessels, is an engineering firm with a lot of experience with pre-cast structures.

"We've built four or five buildings this way, but this was the first of this height. We also recently built a pre-cast building in Rotterdam that was 110m high. Each building shape is different; we have to make sure that the engineering will work each time.

"As well as engineering the structure, the two biggest challenges were engineering the elements and the logistics of delivery. Het Strijkijzer is a very narrow building on a very tight site, so it would have been logical to have to think closely about the materials delivery schedule anyway."

Poolman says, "We worked a six day week: we built one floor on Monday, Tuesday and Wednesday, then the next floor on Thursday, Friday and Saturday. On the first day of each floor—Monday and Thursday—the crane was lifting the floor elements; on the next two days, it was lifting the wall elements."

Thoen adds, "The schedule was so tightly planned, if I looked out of my window and saw an element going up, I could tell which day and what time it was. "We were able to build two floors a week, taking about 80 deliveries a week. For many of the elements, we could only carry two elements per truck. Some elements needed to use special transport, so we could only deliver them before 6am. To attach some of the façade elements to the front of building, we had to stop the tram, so we couldn't work on them in the rush hour between 7am and 9am." Poolman says, "We only had to close—rather than stop—the trolley for a few night shifts. We had to build a steel shelter over the trolley line to protect it from small pieces falling from the site, which took five nights. When we installed the crown of the building, we had to lift some pieces that weighed as much as 25t. We had to strengthen and increase the power of the crane to do that, and had to close the trolley for another six nights while we worked. On the 26th floor of the façade, there is a 24t iron structure. That was welded on site, and then put up at night; again, the trolley had to be closed for that.

“When [local trolley operator] HTM closes the trolley, they only allow a tight schedule: the power goes off at 1am, and you can start work at 1.30. At 5.30, you have to stop; the power goes back on a 6am, and five minutes later the first trolley runs past the building. You only have five hours to complete the work.”

Most of the elements lifted in pre-cast construction are heavier, but they are also smaller. Thoen says, “One of the advantages of working with pre-cast is that you have fewer problems with wind and rain: you can always set the elements, whatever the weather. It’s a lot better for safety: because the elements are smaller and heavier they can be lifted very smoothly. When you pour concrete in situ, you have more iron, more air and electricity supplies, and more formworks that have to go up, so you have a lot more lifts. The weight and form of the pre-cast elements gives you much more control of the lift.

“It’s the best way to make a building of this height on such a small site. You have much more control of all the lifts.”

That consistency of work benefits the architects. Bontebal says, “With poured concrete, you need to use large formworks, and in a windy city like The Hague that adds risk. With pre-cast, you can use smaller elements, which are less likely to sway in the wind.

“We can make much more advanced details, working in pre-cast with millimetre precision, rather than to the centimetre. Pre-cast offers continuous quality, not just dependent on the weather conditions on the job site.”

Achieving millimetre precision takes planning. Thoen says, “Each element needed to be engineered to precisions of 10mm; the window frames and façade had even lower tolerance, of 5mm. The pre-cast supplier delivered great quality, and our engineering team did a very good job as well, so we had no problems. For a job like this, you need the right people doing the right tasks.”

Bontebal adds, “Using pre-cast elements saved us more than a year in construction time. We have to do a lot more in the office: we have to make all the drawings and decisions in advance. All of the insulation, the connections, need to be put into place in the element before it is positioned. But, time spent in the office is a lot more agreeable than time spent on site.”

Building in pre-cast doesn’t just make each lift safer and cut the number of lifts needed, it cuts risk across the job site. Poolman says, “When you work in precast, you only have five people working at the top of the building. When you pour in situ, you might need 30 people working on the top floor. That is something else that makes it a lot safer. You’re only ever working on one floor at a time when you work in pre-cast, rather than two or three floors at a time with in situ pouring.”

UNIT IV

Boom Trucks

1. Study the words:

telescopic boom	стрела крана
boom section	части крана
case-by-case basis	сложенное состояние
option	способ перемещения
trailer	трейлер, прицеп
eight-axle semitrailer	восьмиосевой полуприцеп
patchwork	мешанина, множество
to handle	управлять, обращаться
self-steering dolly	самоходная тележка
support leg	подставка, опора
to require	требовать
forthcoming	последующий
compatible	совместимый, уравновешивающий
Y-rigging	такелаж
gross weight	вес брутто (общий вес)
flatbed trailer	прицеп с плоским дном
truck	тягач
counter	противовес
assign	предназначать
smart to make	быстро и хорошо выполнить
stringent	обязательный, строгий
workload	рабочая нагрузка

2. Pronounce correctly the names of the companies producing cranes

Liebherr, Terex, Nooteboom, Mammoet, Goldhofer.

3. Translate word-combinations and phrases into Russian

Operating costs, transportation expenses, to manage road-regulations, to meet diverse restrictions, sacrifice convenience, to look for a way, to provide better maneuverability, in terms of purchasing, to spend on fuel and maintenance, to be largely dependent on, logistical cost, to make the profit, to decide against the idea.

4. Read the text. Define its main idea

Boom Trucks

A new class of super heavy mobile cranes uses telescopic booms so big that they must be transported in two parts, requiring special transporters for the second boom. Nicole Robinson reports

The Liebherr LTM 11200, like Manitowoc's GTK 1100 and the forthcoming AC 1000 from Terex, is only allowed to drive on roads if its telescopic boom travels separately. These bigger cranes and much of their operating costs are dominated by transportation expenses, says Rüdiger Zollondz, senior product manager for Terex Cranes. Boom sections must fit into different countries' varying regulations that are usually limited by width, height and weight, and each must be managed on a case-by-case basis.

Road regulations worldwide are extensive enough that it is a science in itself simply managing all regulations within each country while transporting these boom sections, Zollondz says.

While there are numerous options to transport these booms, when it comes to meeting the diverse restrictions as well as choosing an option that is easy to handle, the list narrows. Klaus Baehr, a project engineer for Goldhofer, explained it is possible to use a fairly normal eightaxle semi trailer or any product in the company's range that can carry the actual weight, but choosing one of those options, users will be sacrificing convenience because the handling is much more awkward and securing the load is much more complicated. "It's a question of time and handling and the effort you have to spend securing and fixing the load," he says.

New products are being developed as solutions to this patchwork of weight limitations, and the associated costs. Nooteboom and Mammoet have worked together to create the Masttransporter (also called the Boomtransporter). Goldhofer also released its STZ-DH 7 and DH 8 flatbed trailer earlier this year. Both companies have developed these trailers to be used with Liebherr's LTM 11200.

Mammoet approached Nooteboom looking for a way to transport the LTM 11200's main boom throughout Europe. The solution would need to add as little weight as possible to the combined weight of a truck and trailer in order to stay inside of the 100t gross vehicle weight.

Philippe Chavernac, sales director for Nooteboom, says with the boom weighing approximately 80t, the team working on the project was able to calculate how many kilograms were still available for the trailer.

“And that’s where we saw that there was not enough room left to fit a trailer,” he says.

“A truck and trailer combination that can carry this weight would weigh more than 20t.” The conclusion was that for Mammoet, Nooteboom would have to build a dolly.

The LTM 11200’s boom, including the support leg and Y-rigging, is used as the trailer. “We just add wheels to it to transport it,” Chavernac says. During manufacture, Liebherr welds a support onto the boom, making it compatible with the self-steering seven-axle dolly and four-axle tractor. The support is optional but necessary if customers want to use the Masttransporter, and it can’t be added later on.

A self-steering dolly provides better manoeuvrability, Chavernac says, with the first three axles counter steering against the rear axles and providing an “ideal turn.”

The biggest advantage, after the reduced weight and increased ease in obtaining permits, is that there is less investment cost, Chavernac says. Interms of purchasing, it is cheaper than a big trailer and in the long run, users will spend less on fuel and maintenance: “This is the lightest and cheapest way to transport this crane part.”

Profits in the crane industry are largely dependent on the logistical costs of moving equipment, he says. “Everybody’s always focusing on the crane job. But it’s the company that is the smartest in getting the crane at the right moment at the right place. That is the one who makes the profit and who gets the job.”

Dutch rental firmVan Marwijk Kraanverhuur considered purchasing the Masttransporter, but has decided against the idea, says Corina Koetsier, the company’s planner in charge of assigning available cranes among the workload. Van Marwijk has a six-axle trailer to carry the boom for its Liebherr 11200, and chooses to use that rather than a dolly. Most of Van Marwijk’s jobs are located in Holland where it is legal to drive with a six-axle trailer, compared to Germany, France and Belgium, where a dolly is required because of the weight, Koetsier explained.

Not all European countries are as lenient as Holland. And users may want to transport other crane parts as well as the boom. Nooteboom has eight- or nine-axle extendible semi low-loaders that are an alternative to this. These can also transport the boom within the legal four metre transport height and can be used for other cargo that is loaded with a crane.

Mediaco chose an eight-axle extendible semi low-loader from Nooteboom because it meets France’s standards, says the company’s president, Christian-Jacques Vernazza.

In Germany, a nine-axle semi low-loader is necessary due to the more stringent allowed axle load.

This is a very complex topic, says Wolfgang Beringer of Liebherr's sales promotion department. Besides the weight restrictions, axle distances and total weights also vary. "We as crane manufacturers have to design the equipment and booms in order to be able to transport it within standard dimensions and standard weights,"he says. "Only then can cost effective transportation be realised by the crane users."

To help with this, the LTM 11200 boom has been designed so that boom sections are easily disassembled so the customer can transport the boom in sections in order to reduce the weight.

With the new Goldhofer trailer, telescopic booms up to 105t can be loaded onto crane supports done by the crane manufacturer. These are fixed to the flatbed by inserting consoles. The frames and lashing options on the trailer have been especially adapted to the LTM 11200 boom's contours and centre of gravity. Goldhofer says that more than four customers are using this option.

Both Goldhofer and Nooteboom are open to working with other crane manufacturers who develop products of this size. Baehr says it would be fairly easy for Goldhofer to adapt the new trailer, assuming that the overall dimensions are similar, "meaning we can adjust the length of the trailer without much problem," he explained. "We can adjust fixation for any holding device.

"So more or less any boom that comes along which is in the same payload class [the trailer] would be fairly easy to adjust."

5. Comprehension check

1. What special characteristics must super heavy mobile cranes possess?
2. Why will the users sacrifice convenience while choosing a normal eight axle semitrailer?
3. What products are developed to be used with Liebherr's trucks?
4. What ways are the companies looking for to transport big telescopic booms throughout Europe?
5. Which is the cheapest way to transport this crane past?
6. What are the profits in the crane industry dependent on?
7. What alternatives do different use for transporting the weight?

TEXTS FOR SUPPLEMENTARY READING

Size Matters

Many best selling crawler crane models have seen sales and orders decline over the past year. However, as David Wheeldon reports, there is work out there for bigger units.

Most of the significant action in the crawler crane segment continues to centre on the larger models. In particular, interest is building in the US where industry is awaiting the allocation of federal stimulus funds into various infrastructure projects. There is also speculation as to the manner in which the funds are rolled out, as it will dictate the number of crane units necessary to carry out the work. Equally, there is wide interest in the type of crawlers that will be available to carry out the jobs.

Construction work will rely to a large extent on existing crane models as 2009 has seen little released in medium to large crawlers from the leading manufacturers. Besides the impact of the economic downturn on research and development investment, there are also indications some manufacturers may hold off such work for the next 18 months as new environmental standards for engines are impending in the US. The more stringent requirements are also expected to be replicated throughout the rest of the world, making it less likely that manufacturers will release new models until they are ready to include the new engines.

Despite a slump in construction activity, some manufacturers and rental companies report reasonable performances in recent months. In results just published for the fiscal year 2008, Kobelco Cranes reports increased sales along with the launch of new models in its crawler crane range. Global net sales increased by nearly 20% over last year (up from JPY71.2bn to JPY85.2bn), with unit sales up 8%, from 850 to 920. The company says this has been achieved, in spite of the weakening market, by sales of newly-launched large crawler cranes, a steady shipment of backlog orders and focused effort in certain markets such as North America, as well as accelerating development of new models, and reducing costs.

Kobelco's latest new large-sized crawler crane, the 400t-capacity SL4500, was launched at Intermat in Paris, and the first machine was presented to Inverness-based crawler crane specialist Weldex. This was is in addition to four 550t-capacity SL6000 cranes which Weldex have taken over the past two years. They are in operation in the UK

and elsewhere on a number of large-scale energy and infrastructure projects.

The SL4500 was the largest new crane to be launched at Intermat and, according to Kobelco, as one of the most prominent exhibits at the show, drew much attention. The crane's first assignments will be on wind farm projects in North Wales and Scotland. The new 400t SL4500 also attracted many enquiries. Sales and marketing manager Jos Verhulst comments: "It was an ideal platform for the introduction of this brand new model, and we had an encouraging attendance by many established customers and friends, and new enquiries as well from Europe and Africa."

The manufacturer also handed over a 60t CKE600 to the Belgian specialist joint contractors Benelmat and MBG (both part of the Vinci Group) at Intermat. This crane will go to work initially on the EUR680m Liefkenshoek Tunnel underneath the canal dock in Antwerp, Netherlands. Another crane, a 135t CKE1350, destined for international oil field and energy industry contractor Saipem, was also shown at Intermat.

Benelmat and MBG's new 60t CKE600, which was on display at Intermat, is equipped with triple grouser tractor-type tracks. The company already owns one other CKE600 and a 135t CKE1350, both of which, they say, have performed utterly reliably during their first 10,000 hours, despite extensive on-site travelling. They praised the smoothness of operational control, reliability and low cost of operation. Benelmat also confirmed a further order for an 80t capacity CKE800. The new CKE600 will start work immediately on the new Liefkenshoek Railway Tunnel project (Liefkenshoekspoorwegtunnel) beneath the canal dock in Antwerp. Total project value is EUR680m over 35 years, including maintenance.

Another Kobelco model launched in Europe last year is the 110t capacity CKE 1100. The first unit was sold to SETH in Portugal (part of Danish Hoygaard group), and the second unit has been delivered recently to Q-Plant Hire in the UK. Q-Plant Hire has invested around £2.5m in new Kobelco crawler cranes, having recently taken delivery of six new cranes, including four 80t CKE800s, and another 135t CKE1350. The bulk of its 30-strong specialist crawler crane fleet is now Kobelco.

For Manitowoc, global product manager Mike Wood says the 2,300t capacity crawler crane, Model 31000, is generating the most interest. The crane is still in production, although officially released last year. He comments: "It looks like it will be very successful; it is designed for these heavy lifts at reach and height. For a lot of power

plant jobs, nuclear work, refineries and anything on power plants with coal cleansing of exhaust: it will match this machine's specific capacities."

He adds: "Right now the larger cranes, 300 tonners and up, are most successful, with power plant and energy work; refinery work, which is ongoing, any model from the 2250 up. We've also had some success with the 14000 we have launched, in this case for infrastructure investment-based projects like bridge jobs. We are really fortunate in this regard to have the right cranes to suit demand."

The 31000 is the largest capacity crawler crane Manitowoc has ever designed or built. The single-boom Model 31000 comes in a variety of configurations. The main boom ranges from 55m to 105m. Fixed jibs range from 24m to 42m, with a maximum combination of 95m of main boom and 24m jib. Luffing jib configurations range from 36m to 102m. Maximum combination is 90m main boom and 102m luffing jib. It employs an innovative lift-enhancing mechanism, which eliminates the need for a counterweight wagon. This feature, called the VPC (the Variable Position Counterweight) never touches the ground and extends or retracts as needed by the crane's lift. It also offers four trunnion-mounted crawlers, which allow the crane to oscillate during travel and provide even weight distribution during lifts. Dual 600hp Cummins engines provide ample power for multifunction operation. The swing assembly is mounted on a roller path system, rather than the typical turntable bearing. This system helps maximise load distribution and decrease ground bearing pressure.

South Carolina-based crane hirer Bulldog Erectors president Bob Shirey, whose company made the first order for the 31000, says he was buying the crane because of confidence in Manitowoc and that he is selling his customers confidence in his company and the products it places on a project site. A major drawcard was that it fills a gap in the market for the size of machine and capabilities. Shirey also cites an advantage being that the crane is built by a major worldwide manufacturer, with the associated access to product support and access to parts replacements.

Demand for additional 31000 units will be somewhat dependent upon the pace at which projects are let, probably increasing a great deal if project lettings occur simultaneously. But need for additional units may not occur if project lettings are spaced out. Shirey says: "I think if the work is released concurrently, the answer is yes, there will be demand for more; if the work is released in a consecutive order, I would say, maybe not."

Other very specific reasons for the purchase were the ability of the 31000 to pick and carry of all rated loads in any of the crane's boom configurations; to walk without having to disassemble any equipment or counterweight; the VPC system; the fact no constant support crane is required for the 31000 once it is erected; and only one operator in one location is necessary, as opposed to comparable lifting equipment.

Earlier this year Link-Belt finished capacity and luffing configuration tests on its 500t Link-Belt 548. However, Pat Collins, senior product manager for lattice boom cranes at Link-Belt, says the 298 model is the biggest success this year. He puts this down to the spec-on-spec comparison with competing models. The crane has a jib length of 18.3m+9.1m through 91.4m+27.4m. The conventional boom becomes a luffing boom, with a maximum luffing boom of 54.86m and luffing jib of 60.96m. Main transport load under 88,000lbs includes the mast and all ropes. Collins says: "Another thing we do is keep the live mast working within the tailspin of the machine; this allows it a nice tight working envelope".

Midway through May, Collins says Link-Belt was seeing a downturn that had been evident for about 90 days. He says the areas that remain strong are the same as would be the case during boom times, citing in particular the US the East Coast, South Central and Southwest regions as home to some of the better markets.

Some of Link-Belt's smaller model crawlers, including its 108, 138 and 208 size rigs, are expected to see more demand as flagged infrastructure investment comes through, particularly bridge construction work. Collins adds: "There's more happening for the larger models; wind farm construction is picking up, and a lot of people are waiting for the major investors to give the green light on developments that are in the planning stages".

He says Link-Belt does have plans for new models, although it was too early to elaborate on any details. However, he says those models would incorporate new Tier IV engines, which will be required by the Environmental Protection Agency in new models sold from 2011.

Introducing the US federal regulated mandate for engines will usher in more stringent pollution controls for all off-road vehicles, although do little in terms of added performance for end users. Collins says the change represents a major engineering challenge which would necessarily divert manufacturer resources: "Because new models have to be introduced with that in mind, it will create a bit of a deadband in new product announcement from now until the end of 2010. I'd be really surprised if anybody comes out in 2011 with anything too big. I believe there is a similar time schedule for European standards."

Announcing first quarter results for 2009, Essex Crane CEO Ron Schad explained the company's strategic focus on big crawlers. Schad says that as funding from the US federal stimulus package is only now being appropriated "to discreet projects", he predicts job starts will be months away.

In a statement from Essex, Schad says: "In the latter part of the first quarter of 2009, we started to experience a pick up in quoting activity to levels that were experienced in the same period of 2008. We anticipate an increase in bookings in the second half of 2009 as recent inquiry and quoting activity has led us to believe that orders are close to being released for infrastructure projects. This is specifically related to heavy highway work and other projects included in the Federal Stimulus Bill that targets many of our end markets."

Speaking to analysts as the results were announced, Schad says: "the Act has allocated approximately USD50 billion in funding for transportation related projects of which a significant portion will be for a large bridge construction that will demand the use of crawler cranes… At this point in time, approximately 90% of the specified and approved projects are in the planning stages, which we anticipate will result in an increase in the level of firm orders placed for crawler cranes later this year. We are actively engaged in monitoring and/or quoting on a significant number of these situations and believe that given the size of our fleet, we are well positioned to meaningfully participate in the rewards."

The slowdown in the booking environment means Essex "feels it is prudent to temporarily slow down the purchase of new cranes. Accordingly, while we took delivery of USD8.6m of new cranes and attachments in the first quarter of 2009 that had been ordered in 2008 and earlier, we are re-evaluating significant further crane investments in 2009 until we see improving demand in our end markets."

Asked whether there were any end markets that were particularly strong, and about stimulus dollar flows, Schad replies: "All through last year, although we had a fabulous 2008, we were somewhat disappointed in our public works projects, infrastructure-related projects driven by federal and state dollars (primarily the heavy highway bridge jobs) and many of the civil works projects on levy construction, dam and water construction water treatment facilities. Those types of projects were not as robust as we had expected and I will say that early indications are that the stimulus funds will help at least get those projects back on track.

"So although I won't say they are extremely strong they're improving over last year. And that's a market we're very hopeful of

continuing to move along. Additionally, the wind power market slowed down towards the end of last year, primarily caused by credit concerns and availability of credit for those projects. Early indications are that that's being resolved."

Talking Telematics

Manitowoc is hailing its CraneSTAR asset management system as a major breakthrough for the crane industry. David Pittman looks at the history of telematics and its role in the increasingly global crane market.

Telematics can be described as "the integrated use of telecommunications and informatics". Or more specifically as "the science of sending, receiving and storing information via telecommunication devices".

For crane operators, it enables important information and operating data to be sent back from equipment working in the field for analysis and assessment to ensure equipment efficiency is maximised and operational downtime minimised.

The effective use of telematics is best evidenced by the technology's central role in the modern automotive industry, particularly F1 motor racing, where engineers and pit crews are able to keep a close eye on the performance of their multi-million dollar cars as they hurtle around Silverstone, the Nürburgring or the streets of Monaco.

This data includes vital information about engine performance, aerodynamic efficiency, oil pressure, tyre grip and brake wear, as well as numerous measurements taken from the car regarding the driver's progression on the track.

The use of telemetry is also evident in the commercial car market, where companies such as Toyota and General Motors (GM) use it as a safety and convenience features tool.

GM's OnStar system produces a monthly diagnostic report that provides vehicle owners with information on key operating systems, such as the antilock brake system, air bag system and engine/transmission system; maintenance information to maximise vehicle performance; and notification information for recalls, services and account information.

Other features of OnStar include automatic crash response, which uses sensors to detect incidents and alert an advisor who checks on the vehicle and alerts the relevant emergency services; one-push

button access to emergency services should a passenger require emergency help; and crisis assist, which during severe weather or natural disasters connects the vehicle to a crisis advisor who can provide information on evacuation routes, connect the driver to family and friends, and help find food, water, medical supplies or shelter locations.

Convenience features include remote door unlock, in case the driver becomes locked out of the vehicle; remote horn and lights, should the driver be unable to locate their vehicle; and built-in hands-free calling.

Toyota's Safety Connect system will offer comparable features, including automatic collision notification, one-push button emergency assistance and stolen vehicle location.

Construction equipment

Other construction equipment sectors are advanced in their use of telematics in day-to-day operations.

MiX Telematics' DataTrak system provides UK plant and construction equipment operators with a range of information on their equipment, such as location, speed, direction, position and status. It uses a GPRS locator and reports via a web-based application, DataTrak Online, which produces a range of reports useful for managing assets.

It can be employed on both mobile and static items with Kent, UK-based MEMS Power Generation using it for both tracking of mobile machines and telemetry on installed equipment, including as an early warning system for equipment malfunctions.

The crane-equipped heavy trucks and fuel tankers in MEMS's delivery and collection fleet are all fitted with DataTrak, which is used to confirm locations, movements and secure its fleet, while telemetry on static items allows the company to provide an improved customer service.

"The primary service we provide is disaster recover, which means our generators are frequently used in business critical situations," says Paul Knight, procurement director for MEMS.

"Once switched on our customers depend upon us for continuity, which in turn demands a rapid response from our engineers should any problems occur. DataTrak is excellent in this respect as it immediately alerts us to any potential issues that may arise."

Taking the technology cross-continental, Komatsu uses its Komtrax OEM-developed system across its product range. Fitted as standard on most of the company's machines, Komtrax lets managers monitor essential information about their equipment directly on a computer.

“Komtrax is a tool that helps you manage your whole fleet of Komatsu machines easily and cost effectively,” says Komatsu. “You can track them in the field and optimise their output through increased efficiency and proactive maintenance.”

The system was launched in Japan and the US in 2001, before being extended to European customers in 2006. Komatsu says the system is active on more than 130,000 machines worldwide, with more than 17,500 users in Europe.

The system works in any country where Komtrax transmission is allowed, and when the system is activated the data is downloaded regularly via satellite. The data is accessed through a standard web browser, with a variety of search parameters available to precisely determine the status of Komtrax-equipped machines.

“It’s the way to go forward, especially for larger companies,” says Wayne Burns, contracts controller at Marubeni-Komatsu, the sole distributor for Komatsu equipment in the UK.

“It’s available now on virtually every model. It can be retrofitted and we also offer a universal system that can be used on other manufacturers’ machinery, but this only uses the ignition circuit to monitor basic systems.”

Crane catch-up

The crane industry is moving to catch up with other construction equipment sectors with similar systems that allow a crane’s operation and performance to be remotely monitored.

REDIview, developed in the US by Remote Dynamics, is a GPS-enabled system that allows crane and hoist users to monitor a number of data streams in real-time. Customers are using it on Comedil, Liebherr, Potain, Wolff, Sun, and Peiner tower cranes, as well as Alimak, Hercules and Pecco hoists.

It produces a number of reports based on important data that is used in asset management, including trip reports, travel history, cost analysis, ignition, exceptions and time at shop.

This provides operators with information that they can use to check on the location of their cranes, audit customer invoices and time sheets, see how much trips are costing the company and monitor hour meters.

Data is transferred using the AT&T GSM network and Orbcomm and Globalstar satellite networks to maximise subscribers’ remote access to their equipment, which Remote Dynamics says helps them keep on top of maintenance operations and the service they offer their customers.

Next step

For Manitowoc, its CraneSTAR system is the next step in asset management for the crane industry; and refers to it as “the most extensive OEM-produced crane asset management system available today”.

“CraneSTAR came about from Manitowoc asking what we can do to be more proactive and provide better customer service and customer care,” says John Bittner, director of global marketing at Manitowoc Crane Care.

Both Bittner and Scott Blair, Manitowoc’s director of global telematics, laud the advance of technology and electronics for the development of telematics and systems like CraneSTAR.

“Technology got to a point where these things were possible,” says Blair.

“I like to describe it as the sun and moon aligning,” says Bittner. “We couldn’t have done this kind of thing ten years ago for a number of reasons.

“There weren’t the electronic systems in place to handle it as it was all hydraulic. And cell service providers realised they could make a lot of money from the transmission of data. The technology has come around to allow us to transmit data with bandwidths growing to supply more data. The technology is also now portable.”

Manitowoc models equipped with CraneSTAR are fitted with a terminal control unit (TCU) that monitors the crane’s electronic systems and transmits the required information back to a secure data bank (“back office”), much like Komtrax and REDIview.

“It’s a way to see what’s going on with the crane remotely,” says Blair. “It uses the existing data that is produced by the crane’s systems and picks out certain bits of data and sends it to us. This can be done periodically or with a trigger that starts a countdown to something.”

“It is an asset management tool for end users,” says Bittner. ”We distribute products through dealers so we really look at it as a tool for the end user who can download the information and use it as they wish.”

What sets CraneSTAR apart from other systems like REDIview, according to Manitowoc, is the use of a global, quad-band SIM that allows it to work across the world. According to Manitowoc, this is “a feature no other system in the construction equipment industry currently offers”.

This opens up CraneSTAR to working on a range of local GSM networks and, coupled with connection to Orbcomm’s satellite network, provides comprehensive dual-mode global communications coverage.

Maps on the CraneSTAR website shows Orbcomm's satellite network is authorised in North and South America, Europe, South Africa, parts of the Middle East, Australia and Japan. It also reports Orbcomm has filed an application to use its network in China and the Asia-Pacific region, and is extending its system to cover Russia and Greenland. Research is still in progress for much of the African continent. GSM and 3GSM coverage is prominent in North America, parts of South America, Europe, South Africa, India, China, Japan, the east coast of Australia and other areas around the world.

"It is the only global OEM system available," says Blair. "There are other OEM telematics systems but what we're doing differently is offering a dual-mode system that can transmit through both GSM networks and satellites. It is a hybrid solution; the TCU will connect via satellite if after a few attempts it cannot connect through GSM.

"We're also the first people in the construction equipment industry to have a global SIM that allows the crane to be deployed anywhere in the world and the CraneSTAR system will still operate as normal."

Data selected for transmission is fully definable by the end user in order to maximise their experience with the system, and this selection process can be carried out remotely. However, the system doesn't transmit every piece of data if operating across a satellite connection as this increases the cost. Instead, it transmits priority information in order to reduce its use of bandwidth and the cost of transmission.

"Cost is a factor, as is transmission speed, " says Blair. "Transmissions aren't instantaneous despite what you see on TV shows like CSI. The system is only as good as the data. Networks aren't good enough yet to handle instantaneous communications."

Once transmitted, the data is available for access by authorised personnel via a web-based interface. It can be exported into a number of file formats allowing users to integrate the information into their own business systems and make the most of the information.

Manitowoc also has access to certain parts of the data as part of its service agreement with crane operators. The intention is that its customer service team will be able to use this limited information.

"Manitowoc's access to the data allows our customer service team to use some information that brings another level to their service," says Blair. "Like where the crane is and what it's doing. It allows them to investigate some elements and issues with the cranes."

Blair says the information stored as part of the CraneSTAR system is covered by the same US standards that cover storing corporate information, so there is no need for concern over the data being lost, misplaced or falling into a rival's hands.

Equally as important as what it can do is what CraneSTAR can't, add Bittner and Blair.

"It's important that it's not seen as a safety item," says Bittner. "We want to make it very clear that the operator is still 100% responsible for the operation. It doesn't allow live updates that let you look over their shoulder and give them directions or recommendations."

"It's not a real-time system," adds Blair. "It uses historical data as an information point." Blair says it can't be used to directly record maintenance operations but records information that can be used to extrapolate the service life of components. "For instance if a crane operator replaces tyres, which is a big maintenance factor, it doesn't measure the tyres themselves but can measure the distance the crane has travelled so can be used to work out the service life."

CraneSTAR will be introduced on Manitowoc's cranes in the third quarter of 2009, and will be available across most models within nine months. Blair says some crane types will be omitted from the rollout of the technology, most notably those that aren't equipped with digital sensors and transmitters or those using hydraulics.

"The plan for CraneSTAR is that on cranes with higher-end electronic systems it will be delivered as standard," adds Bittner. "The owners will get access to the system for three years. After then I imagine there will be some kind of renewal system in place. Costs depend on the state of technology then but what I can say is that it will be competitive and offer our customers best value."

Blair says the role of telematics will undoubtedly become an increasingly important part of everyday business, as well as our everyday lives.

"It is a major step for the crane industry," he says. "In five years, I'm sure all manufacturers will offer telematics. It'll be a bigger part of our daily lives. It's not about Big Brother but about how you manage your business and your fleet."

Rebuilt for Success?

In the current economic climate, does buying a rebuilt tower crane make good business sense? David Pittman speaks to the companies 'recycling' tower cranes, and safety professionals, to find out the benefits and risks associated with breathing new life into older equipment

South African tower crane dealer SA French says many companies have been faced with the difficult decision of investing in new machinery, or taking the less expensive route and acquiring existing equipment rebuilt and reconditioned to give it a new lease of life.

SA French offers rebuilt Potain tower cranes, as well as rebuilt Merlo telehandlers. This is founded on its role as the dealer for Potain in South Africa, and its experience working with various Potain models, such as the MC85, MD125, MD175 and MD208.

Prior to 2004, SA French says the trend for rebuilt tower cranes was on the rise with equipment of all sizes and ages being given a new lease of life. In 2004, it rebuilt one a month, such was the demand, although its average workload is five or six a year.

As the construction market grew, and crane users'wallets and credit lines grew with it, demand for rebuilt cranes fell. Now, declining revenues and increased caution among bankers and leasing companies has put rebuilt cranes back in the equation. As a result, although rebuilding activity is down on the volume that was occurring at the beginning of the last decade, says SA French CEO Quentin van Breda, there are growing market opportunities for this equipment.

Dutch crane rental company Kranenbouw offers renovated Liebherr tower cranes to its customers. This is the third division of its business, after rental and sale of used cranes, and was introduced in response to demand from customers for cheaper equipment.

"Not being the distributor of Liebherr, Kranenbouw was facing the problem of purchasing, at a good price, recent Liebherr cranes for its fleet and getting parts and spare parts for them," says Frank Crombe, marketing manager for the Kranenbouw Group in the Netherlands.

"As the official Liebherr distributor was not willing to provide Kranenbouw these cranes, parts and spare parts, Kranenbouw was obliged to find other solutions. Renovating cranes was then a way to answer the need of the customers of the rental business with reliable Liebherr cranes, and customers of the trading business with good and inexpensive Liebherr cranes compared to new ones."

Benefits

For those considering acquiring new equipment, the main benefit of buying a reconditioned crane is obvious, according to van Breda: cost. "With a reconditioned crane there is a reduced purchase price, making them more affordable."

"For some customers it is cheaper to renovate their cranes than to buy new ones," adds Crombe.

Crombe says that as well as traditional construction companies, customers in the industrial and shipyard sectors, where tower cranes

offer a viable alternative to other forms of lifting equipment, are also finding rebuilt cranes a useful tool in curtailing costs.

"More and more industrial customers have seen the advantage of using tower cranes for their lifting problems compared to gantry cranes and other mobile or telescopic cranes.

"For them, the price is important, the manufactured year second. In that case, a good old renovated, strong Liebherr crane is a good solution for their purpose.

"Shipyards have the same interests as the industry. However, they often request tower cranes adapted to their needs, such as travelling or on a portal. As Kranenbouw has an extensive workshop and know-how for renovating the cranes, including sand blasting, painting and an extensive spare parts stock, it was just a small step to be able to offer special tower cranes for shipyards. Kranenbouw has established itself as one of the few specialist in that field."

Crombe says the extra life users can get from reconditioned cranes varies depending on the application, but van Breda says companies can typically get five to six years extra work life from a crane less than 10 years old, and, if reconditioned properly, can be guaranteed a quality product.

Kranenbouw employs a mixture of Liebherr components bought in Germany, as well as smaller components such as electrical panels and ropes from the market, and its own components built under its own'high quality supervision'.

SA French only uses OEM parts, as well as working to ISO 9001, the international quality management standard. "To adhere to a strict quality control procedure, we are ISO 9001 certified by assessment body TÜV Rheinland," says van Breda.

On completion of rebuilding, SA French presents its customer with a full service life of the crane that catalogues what components have been replaced, and provides serial numbers where applicable. "In this way, both the customer and SA French have a complete history of the machine's new service life in order to predict when regular maintenance checks should be carried out," says van Breda.

"As with all these things, they are fine if done properly, if done in consultation with the OEM and using OEM parts," says tower crane safety consultant and CPA Tower Crane Interest Group (TCIG) adviser Tim Watson.

"The problem with tower cranes is that they are constructed from components. Major tower crane firms regularly carry out overhauls and inspections, looking at electrical panels and making sure the pins are still ok.

“Remanufacturing is certainly more than giving a tower crane a new lick of paint,” Watson says.

Risks

Many agree that safety is the main issue with rebuilt cranes.

“There is a view that you shouldn’t be using tower cranes that are over 10 years old,” says tower crane consultant, and company secretary of Tower Cranes Consultants Ltd, Paul Phillips. “This was voiced by the Battersea Crane Disaster Action Group, who wanted all tower cranes over 10 years to be scrapped.

“My view on this was ‘great’, but lets extend it to lorries and cars as well. A car is more likely to kill someone than a tower crane.”

Watson adds that, alongside safety, reliability of the rebuilt crane is a key concern: “If there is a breakdown when the crane is erected it can be costly, as a breakdown at the top of the crane is expensive to fix.

“Take a hoist motor for instance. If it breaks when it’s in the workshop it’s easy to fix, but if it’s 80m up you need to bring in a big mobile crane to replace it.”

Phillips says: “The biggest issue you’ve got is that you’ve got to be working from a starting point that the crane has been looked after with preventative maintenance, not reactive maintenance. Things often don’t get looked at until they go wrong.”

“You also have to consider the structural aspects of a tower crane when remanufacturing, as over time the crane may have corroded,” says Watson. “It’s important that the crane is tested, perhaps with non-destructive testing to make sure it is fit for purpose.”

The cost of the work is a further issue. “Many tower crane companies opt to sell on or scrap their older machines as it is cheaper in the long-run,” says Watson.

Structural rebuilding

When you enter the realm of structural rebuilding, costs accelerate even further. SA French will only rebuild cranes less than 10 years old, as those older will require structural rebuilding and this is a massive expense, says van Breda.

“You can check the drive motor is ok, you can check the electrics are ok but things like the slew ring are different,” says Phillips. “They do wear out over time and replacing a slew ring can cost anywhere between GBP10,000 and GBP15,000.

“Then you’ve got the slew rack, which can wear out rapidly if the slew ring has worn down.”

Tomáš Vacek, of Czech crane rental firm JVS Cranes, adds the time needed to structurally rebuild a crane is another downside. “In the

Czech Republic, there are some companies rebuilding the old MB tower cranes, adding FM, replacing mechanical parts.

"But that is like rebuilding your old 1980 Mercedes. One must have too much spare time to do this."

Standards

Meeting the latest standards is another area that Watson draws attention to.

"There are issues with CE marking. It's a grey area as when does an old crane that has been remanufactured become a new crane? New cranes are covered by stricter rules than existed, say, 10 years ago.

"The remanufacturer has to meet these standards, and is responsible for CE marking. They can't fall back on the OEM, unless it is the OEM doing the remanufacturing.

"CE marking is quite an onerous task if done properly, and as a lot of manufacturers self-certify you don't know about problems until there is an accident and safety authorities have to get involved."

So does buying a rebuilt tower crane make good business sense in the current economic environment? As van Breda has said, the costs can be much less for the customer, with Crombe saying that, as far as Kranenbouw has experienced, there are no risks as they are supplying a high quality Liebherr product.

Phillips is not so sure. "There are some amazing discounts available from manufacturers at the moment as they have so much in stock," he says.

"So it doesn't make much financial sense to buy a young used crane. And with older models you are buying all the problems that come with them, if people haven't been looking after them properly."

Metal on Metal

The plating and galvanizing industries might be described as segments of the larger surface finishing or metal finishing industries, which also include processes from painting and lacquering to ceramic coatings.

Metal plating has a broader spectrum of purposes than galvanizing, including enhancement of electrical or bonding properties, helping to shape or form parts or just making it look nice.

Automotive and aerospace hardware, computer chips and circuit boards, decorative jewelry, door handles and shower heads, pretty much every industry that makes parts requires metal plating.

Galvanizing, by contrast, is aimed almost exclusively at protecting steel from the elements in outdoor applications. Galvanizing is not ‘surface finishing’, according to the American Galvanizers Association (although the National Association for Surface Finishing counts galvanizers among its membership). Galvanizing is really a corrosion protection industry, according to the AGA, although of course galvanized bridge girders certainly looks a lot nicer—as well as lasting longer—than un-galvanized steel.

Whatever you call it, it's all metal on metal, applied in coats of molten metal or metal ions as cranes and hoists raise and lower metal parts and pieces, moving them from one bath or 'kettle' or 'pot' to another in chemical environments that can be challenging.

“Typically the galvanizing industry is the most challenging one, the lifting equipment that works around and above the pickling tanks, the cleaning station of the material that eventually will be dipped into molten zinc for the galvanizing process,” says Bernd Forwick, overhead crane product manager for Demag Cranes & Components. The conditions are super hot, steaming with caustic fumes and boiling with corrosive splatter.

“Chemically, it's extremely aggressive,” he says. “They don't call them 'cleaning tanks' for nothing.”

Typically, material handling starts with receiving of the raw materials to be galvanized, which if large enough are handled by overhead cranes. The materials go through the cleaning process on the pickling line, where cranes and hoists dip the materials into molten zinc, and then lifted to a cooling station. The finished material is then moved to the shipping area.

Normal industrial cranes and hoists work fine on the receiving and shipping ends of the process, but in between they need to be tougher. One trend over the years in galvanizing has been a move toward faster process throughput by a transition from sulfuric to hydrochloric acid in the pickling process, Forwick says.

When major users started moving to hydrochloric acid in the early-to-mid 1990s, hydrochloric acid was the exception. Today, sulfuric acid is the exception, and sulfuric acid is equipment-friendly compared with hydrochloric, according to Forwick.

“Sulfuric acid is still aggressive, but not nearly as bad as the hydrochloric acid that's pretty standard today in the cleaning tanks,” he says. “It requires that you choose certain materials and avoid other materials because they just don't work.”

Demag cranes used in this environment are designed for this environment, from epoxy paint on steel structures to special execution of the control panels and wiring materials. Materials that just don't stand up in hydrochloric acid, such as nylon, have to be eliminated from the component list. Another trend in pickling line areas of the process is toward more automation of the dipping operation, with cranes positioned automatically by production programmes.

“One of the main reasons for that is to get people out of the environment, which is nasty and got nastier by using hydrochloric acid,” Forwick says.

Demag is one of the brands most commonly used by galvanizers, and that seems to be a long tradition, Forwick says. “It seems that a lot of proprietors of galvanizing companies were German immigrants, and when Demag started to market their hoists and cranes in Canada and the US, customers were basically sure that they would get the same kind of equipment they'd had in the home country,” he suggests. “Whatever Demag sold them at that time worked, because they kept coming back to us for generations. In the long run, it’s become really a market position for us.”

Lifting equipment that works in galvanizing can also be used in other hot and caustic industries, “but it just so happens that galvanizing is the most widespread industry that provides these environmental challenges,” Forwick says.

Yale Lift-Tech is another company often mentioned by galvanizers as a supplier of cranes and hoists, thanks at least in part to specialty features of the company’s products aimed at the industry’s requirements, according to customer service manager Brett McCleary.

“The hoists typically have to go fast as they take it from one tank to another,” he says. “You're also doing a lot of start and stop, with the operator trying to plug something carefully into the tank so as not to make a splash.”

Yale Lift-Tech hoist advantages come from features such as mechanical load brakes, variable frequency and electronics enclosed to prevent deterioration, and hard, heat treated gearing, McCleary says.

While a hoist needs a slower speed when dipping a part into molten zinc, production speed requires it to move more quickly once it's out of the bath, lifting and trolleying to the next bath. The David Round Company custom-built a variable-speed, 1 US ton wire rope hoist specifically for a galvanizing plant that can work at up to 50ft per minute but still has the variable-speed feathering capability for the dip.

Standard air hoist speeds are more in the range of 20, or even 10ft per minute, and one major crane/hoist manufacturer, for example,

bought the variable speed from David Round Company because its products did not fit the bill, says Matthew Downing, David Round director of sales and marketing. While this unit, which features two-part epoxy coating and gearing enclosed against the elements in oil-bath lubrication, has a 1 US ton lift capacity, the company's units do go up to 30 US tons, Downing says.

Yale's Cable King wire rope electric hoists have lifting capacities varying from 3 to 7.5 or even 10 US tons, although the majority of galvanising kit falls in the 5 US ton range, says McCleary.

Demag equipment used in galvanizing is mostly in the range of 10 US tons or less, according to Forwick, “though we have built 25 to 30 US ton equipment for galvanizing large units, like sections of high-tension transmission towers.”

Texas Galvanizing Inc., Hurst, Texas, uses Demag and Yale hoists, 3 and 5 US ton hoists in one of its locations, and US 10 ton hoists at its large plant, with monorails over the 'kettle' area and bridge cranes over the other process tanks. In the larger plant, the 10 US ton hoists work over a zinc kettle 55 feet long, 7.5 feet deep and tapering from 5.5 to 7 feet wide, says vice president Jim Mason.

“With two of those hoists, we can just about lift a truckload of steel through the plant,” he says. “Twenty years ago, a 42ft kettle was one of larger kettles, but now it's more typical.”

Texas Galvanizing treats products such as light poles, signal poles, high school and stadium bleachers, boat docks and boat trailers, bridge railing and retaining wall steel, but things like wind turbines and towers are too large for the facility.

A major tower galvanizer is Sabre Galvanizing, a hot-dip galvanizer in Alvarado, Texas, which boasts “North America's largest operating kettle,” a galvanizing tank 65ft long, 9ft wide and 11ft deep containing 2.6 million pounds of molten zinc. With 20 US ton lifting capacity, says Carroll Baynard, vice president and general manager, the facility's cranes can handle even the largest structures.

Sabre Galvanizing is a division of Sabre Industries Inc., which manufactures products including towers for power delivery, telecommunications, sports and high-mast lighting. The galvanizing operation started September 2008 and got full production underway at the start of 2009. It was built to serve the company's products but is now doing about 35% of its work for non-Sabre customers.

“Highway customers are probably our most busy customers right now,” Baynard says. “In December, we had the biggest month since we opened, and all indications are it will stay pretty strong for the first

quarter at least. We're actually getting ready to expand our building, and we're starting a third shift."

Infrastructure like highways and power are a strong point for the galvanizing industry right now. "The utility industry is also driving pretty much of our industry currently, particularly alternative energy," says Philip Rahrig, executive director for the American Galvanizers Association, "from windmills and solar arrays to the grid and infrastructure. So there are a lot of galvanized poles going in."

The California Department of Transportation is a huge consumer of galvanized products, says Lance Rosenkranz, vice president of operations at L A Galvanizing, Huntington Park, California. L A Galvanizing uses 5 US ton Yale Lift-Tech hoists in its galvanizing line, along with 2 US ton Ingersoll-Rand air hoists in its pickling line.

"Air hoists work better in the cleaning stage environment because of the acid fumes in that portion of the plant," Rosenkranz says.

Infrastructure helps, and in general more and more steel is being galvanized every year, say some industry insiders. Activity is also geographical, says Larry Hettleman, president of The Southern Galvanizing Company, Baltimore, Maryland.

"We're in Maryland, near the centre of federal government, so we do see federal spending but very little private financing or construction. It seems like there are a lot of public jobs right now, and very few private."

Still, say some galvanizers, the industry is not exactly thriving. Nor is the plating industry, a smaller and more specialized industry than galvanizing and one with less impetus from the infrastructure boost.

"Our industry is way down, but that has a lot to do with the economy," says Tim Walker, president of Mesa West International, a plating equipment and supply company in Corona, California.

"It's not for infrastructure. Most customers are doing electronic components, circuit boards. Some people are doing plating like door handles, shower heads, rims on cars; that type of finishing is what our industry is all about."

"We're seeing an up-tick now in a lot of businesses because our equipment is capital equipment and it takes sometimes six months to construct the equipment," says Tony Guglielmo, vice president of Technic Equipment Division, Pawtucket, Rhode Island, which produces cranes and hoists designed specifically as parts of integrated plating systems.

Demand for plating of products like electrical panels for homes has been off for many years, but now that's a big market for companies like General Electric, one of Technic's biggest customers, and Siemens,

Guglielmo says. And with manufacturing facilities in Singapore, China and Malaysia, as well as Europe, Technic is quoting more systems in China, Guglielmo says. “We're starting to see our customers here that are going to China asking us to bid.”

Plating, or more properly, electroplating (although the category also includes 'electroless' plating), coats parts through electrolysis, usually smaller parts than those typical in 'hot dip' galvanizing.

Plating lines have to be more versatile than in galvanizing, which is a process between iron and steel and zinc, while plating applications choose from a huge menu of materials including brass, cadmium, chromium, copper nickel, zinc.

The work can be plated in barrels, racks or baskets, from 50lbs to 4,000lbs depending on the application, says Guglielmo. "With chip capacitors, you could have half a million pieces in a cup, or it could be 500lbs of nuts and bolts in a barrel."

Lifting requirements in the plating industry tend to be lighter than those in galvanizing, ranging from hundreds of pounds to a couple of tons, but typically averaging around 1 ton.

While, ACCO Material Handling Solutions hoists for galvanizing, for example, range from 1 to 10 US tons, most common being the 5 US ton electric wire rope hoist, Mesa West International's Aries hoist transporter is a 'sidearm' hoist with lift capacity of 750lbs. The company's overhead hoist system, for heavier loads and larger tanks, can lift up to 1 US ton.

The plating industry is unique in the kinds of cranes and hoists it uses, including not just overhead hoists but the ‘side-arm’ hoists cantilevered from a frame above one side of the process line, and ‘rim-runner’: hoists, which ride along an integral frame that line the tank edges.

Hoist speeds can be slower than in galvanizing because parts may be dipped in and sit for longer times. The plating industry is also different in using a variety of chemistries for a variety of processes, which helps make this industry one dominated not by the big crane and hoist manufacturers but by specialty companies such as Technic, says Guglielmo.

“In a lot of cases, the crane manufacturers don't have the chemical background to be able to specify the equipment,” he says.

“We in the plating industry suspend our work from a flight bar, and that work can be a barrel, a rack loaded with parts or a single part, and that plating bar is transported by the hoist from station to station, directing the drag-out into the appropriate rinse tanks and wastewater streams so it can be waste treated. So it's not simply specifying a hoist

to lift a particular load, but designing a system for a particular application."

Special exhaust systems, automatic drip trays, controlled in some cases by complex multi-tasking algorithms so they can run a wide variety of parts—plating hoists and cranes are very specific to the industry versus conventional programmable cranes, says Neil Baker, president of Baker Technology Associates Inc., a plating systems company in Santa Monica, California.

"More today than before, hoists themselves are directly integrated into the physical conditions under which they're operating," he says. "Using a conventional, even intelligent overhead programmable crane, with rare exceptions won't work."

The programming in many cases on plating hoists is "multiple process programming," says Guglielmo, to serve just-in-time needs. Where previously hoists were controlled by pre-programmed processes, he says "now the customer is able to choose a menu on the fly as work comes to the line."

Companies that sell hoists and cranes for plating are really selling a whole room full of equipment, says David Drake, vice president of International Plating Technology, New Britain, Connecticut, which along with programmable hoists designs and manufactures everything from plating and anodising systems and to plating tanks and barrels, aqueous cleaning equipment, loaders and material handling systems, plating wastewater treatment systems and other pieces of the process.

"Hoists and controls are just another package we put together," he says. "We need to precisely fit the work into tanks in an automatic mode, and it's closer to a robot than to a conventional crane or hoist."