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emc engineering · marketing · consulting

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I About us

1. Company Profile

EMC Engineering · Marketing · Consulting GmbH, as a service company, provide comprehensive consulting in the area of high-intelligence, innovative technologies in the crane and special machine industries, especially in the field of mobile cranes.
We are addressing companies worldwide who want to modernise and optimise their range of products or their product and supply management.

Principles:

- Increasing the competitiveness of our customers by development and implementation of new technologies - based on an integral approach and a long-term partnership
- Development adapted to the national feasibilities
  market <--> finance <--> technology
- Enthusiasm and motivation to new thinking for effective implementation of innovations

In addition to the execution of purely development and construction related tasks at the highest technological level, the EMC GmbH also offer an innovative, integral consulting approach.

KEEP IT SIMPLE AND HIGHLY PROFESSIONAL !

Our aim is to develop technologies that suit both market and customers and that contribute to the further development of our customers towards being highly professional competitors in both their national and international environments.

2. Human Ressorces

Highly qualified service requires consultants that are not only excellently trained but also have profound practical experience. Our specialists at the EMC GmbH have decades of know-how in crane and special machine technology, knowledge that has been gathered in positions of responsibility in development, construction and management at leading crane manufacturers. The EMC GmbH consultants played a decisive role in the development of worldwide standards for modern mobile cranes.
The EMC GmbH also have a network of external specialists who can be brought in special projects.

II Range of Services

1. Consulting Tools

The technological and financial resources for setting up high-technology crane or special machine production are limited in many countries. Nonetheless, it is still necessary for the manufacturers in those countries to invest in the future of their production facilities and therefore in their long-term competitiveness. This is particularly valid in the area of globalisation and the uniting of regions and countries. Competitive pressure is increasing constantly. Imported products are increasing dependence on suppliers. Furthermore, these products do not always meet market requirements.

In addition to the execution of purely development and construction tasks at the highest technological level, the EMC GmbH offer an integral consulting approach that is innovative in crane and special machine technology:

KEEP IT SIMPLE AND HIGHLY PROFESSIONAL !

We develop technologies that are tailor-made for your company, your resources and your market and implement them together with you, as a partner, using our know-how.

II Range of Services

1. Consulting Tools	Project-Phases

Phase I — Analyses of current situation

- Definition of starting point
- Finding out the aims and wishes of the customer
- Creating a strengths and weaknesses profile

Phase II — Technology strategy

- Determination of the strategic operations in the fields of construction/production/supply/marketing – together with the customer, focussing in particular on the following:
  - strategic customer aims
  - market requirements
  - technical innovation requirements and necessities
  - the customer's financial capacities
  - technological strengths of the customer's divisions that are linked to production
  - the customer's existing personnel resources
  - the complexity of implementing the production process
- The final decision on preconditions for preparing the offer

If an order is placed in the fields of construction, production or supply management, consulting costs for phases I and II will be included.

Phase III — Specific offer

- The preparation of a detailed offer on the basis of the knowledge obtained in phases I and II.

Phase IV — Contract

- The contract will contain all the details of the order modules and cement the partnership cooperation.

Phase V — Implementation

- Execution of the individual engineering/marketing/consulting tasks as stipulated in the offer/contract.
- Continuous feedback and coordination with the customer
- Consultation on location if desired and agreed on

Phase VI — Concluding measures

- Submission of all necessary documentation
- Conclusion of the contract in the form of a final meeting on location

II Range of Services

2. Development / Construction

In accordance with our philosophy, we place particular value in the fields of development and construction on solutions that will give our customer a unique position in his market and, on account of the technological capabilities of the product developed, give him the opportunity to be successful in other markets.

Here, our principle is: **everything is possible – but not everything is necessary!**

special machines and special vehicles

Construction services for special machines and special vehicles

Full and detailed construction of vehicles and vehicle parts

- Steel construction (Light weight construction up to S 1100 QL)
- Steering (Mechanical-hydraulic and electronical-hydraulic)
- Drive trains (Mode of drive: mechanical, electronical and hydrostatic)
- Suspension (Mechanical- pneumatic and hydro-pneumatic)
- Wheel suspension (conventional and single wheel suspension for slow - and fast moving vehicles)

electrical engineering / electronics

Construction services in the fields of electrical engineering / electronics

- Preparation of electric schemes
- Preparation of cable harness plans
- Developing and programming of security systems (simple and redundant load moment indicator)
- Construction of the electrics in the vehicle
- Specification and selection of electrical and electronic parts
- Construction of control systems
- Programming of control systems
- Programming of human/machine interfaces
- Programming of diagnostic systems

hydraulics / vehicle pneumatics

Construction services in the fields of hydraulics / vehicle pneumatics

- Preparation of hydraulic plans
- Construction of hydraulic drive systems
- Preparation of hydrostatic drives for fast-moving street vehicles over 65 km/h
- Construction of hydraulic working systems
- Construction of pneumatic systems
- Preparation of controls for hydraulic systems
- Specification and selection of hydraulic and pneumatic components
- Support with calculations of brake systems

II Range of Services

2. Development / Construction

static calculations services

Services in the field of static calculations services

vehicle accessories for construction and lifting vehicles

Construction services ranging to complete solutions in the field of vehicle accessories for construction and lifting vehicles

- Construction and supply of attachments
- Electric, hydraulic and electronic installation on the construction machine
- Changing over the vehicle for the operation of the attachment

Support with inspections

Support with inspections

- Help in contacting state-approved and certified experts
- Help in compiling the necessary documents

KEEP IT SIMPLE AND HIGHLY PROFESSIONAL !

II Range of Services

3. Production Management

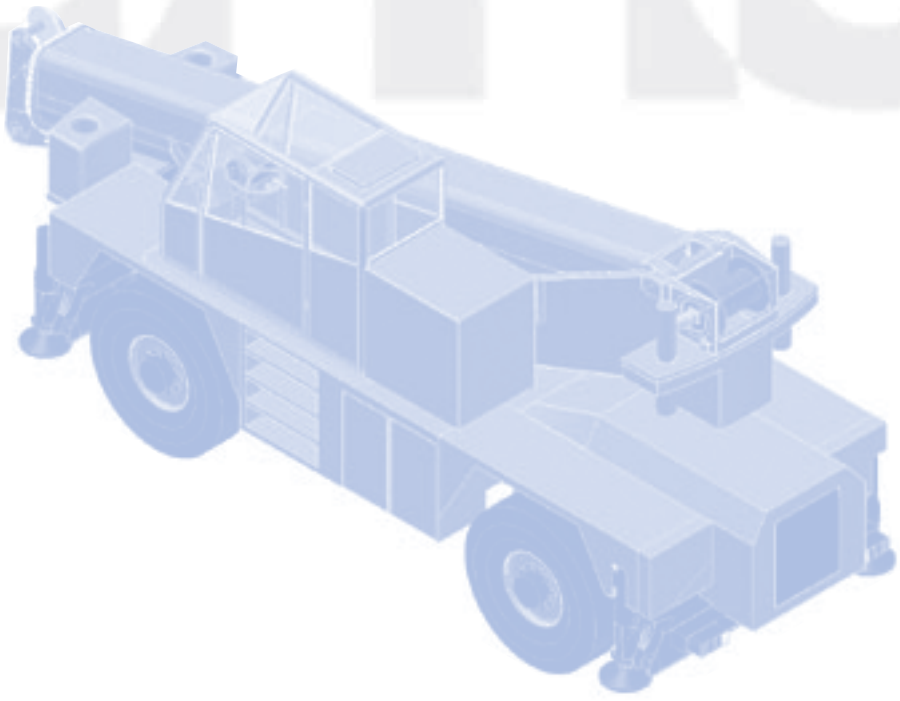
At the EMC GmbH, we offer our customers analysis of production processes and the technological state of production along with the strengths and weaknesses profile (see consulting tools) – because the success of a newly constructed product also depends crucially on whether it can be offered in mass production at a competitive price.

We offer comprehensive consulting, from detail adjustments in production to meet the special requirements of the new product to the complete reinstallation of production – and our aim is always to implement simple, highly effective and productive processes.

We offer the following:

- Organisation of assembly and manufacturing processes
- Consulting in the introduction of production planning systems
- Organisation of materials management (see also the supply management field of service)
- Organisation of material flow in production
- Consulting in documentation
- Consulting in parts lists processing
- Optimisation of customer service and spare parts managment

Efficient production management is required for the implementation of new technologies!



II Range of Services

4. Supply Management

Our multidimensional consulting approach includes, in addition to purely construction and development tasks and product management, the increasingly important field of supply management.

On account of our many years of experience, we have worldwide contacts to suppliers, especially in the field of crane and special machine technology. Our negotiating positions are first-class, which means we can offer our customers benefits in many areas.

Optimising this field, which is decisive for smooth production processes – means that we usually, together with our customers, can discover considerable potential for saving on costs.

We see two “supply dimensions” in the framework of our consulting:

Purchase of parts	Cost reduction potential	Internal production of parts
- Checking the suppliers, considering alternatives - Checking contracts with suppliers - Checking the possibility of internal production - Optimising logistics - Optimising storage		- Checking the alternative of purchasing - Optimising part production - Checking the possibility of national/international part distribution

More efficiency in supply management will set free financial resources to invest in new technologies!

III Projects / References

Projects overview

AT Cranes page 10 - 13

- Development of compact cranes with hoisting capacities of 35, 40, 70 and 80 tonnes
- Modernisation of a compact crane with a hoisting capacity of 40 tonnes
- Development of a compact crane with a hoisting capacity of 35 tonnes
- Development of a telescoping boom system (self-patented one-cylinder system)

RT Cranes page 14 - 15

- Development of an RT crane with a hoisting capacity of 60 tonnes
- Development of an RT crane with a hoisting capacity of 100 tonnes

Truck mounted cranes page 16

- Development of a truck mounted crane with a hoisting capacity of 60 tonnes on standard 4-axle trucks

Harbour cranes page 17 - 18

- Layout and dimensioning of the entire hydraulic drive technology and controls for harbour cranes
- Development and design of portals for harbour cranes

Aerial work platforms page 19

- Development of an aerial work platform with a lifting height of 58 m on standard 3-axle trucks

Other projects/references page 20 - 22

- Development of special accessories for compact cranes
- Supply management for machine park
- Programming of electronic control systems
- Feasibility analysis and FMEA for a aerial work platform for a standard AT crane

III Projects / References

AT Cranes	Development of Mobile cranes 35, 40, 70 and 80 tonnes

Aim of the project

The development of extremely manoeuvrable, compact mobile cranes that are to be a revolution in crane technology. Extraordinary solutions were expected, especially regarding the travelling drive and range of accessories.

Project Description

The development of a mobile crane to set a new worldwide trend is a task that could hardly be more complex or demanding.
The cranes, starting with the 35-tonner, are the first mobile cranes worldwide with fast-running hydrostatic drive. Additionally, a comprehensive range of accessories was developped, even including special components for the fire service.
The entire range of services offered by the EMC GmbH – from construction/development and production and supply management to marketing – was used here.

Product/Customer benefits

1. Extremely manoeuvrable, optimum off-road capability, even when burdened on wheel base
2. Fast at place of use
   Serial-produced vehicles that can reach constant speeds of over 80 km/h with a hydrostatic single-wheel drive – and that very economically
3. Precise, easy operation even under the most difficult conditions
4. Unique, particularly short boom, that stands out due to its high rigidity and load capacity.
   For example, the boom in the 40-tonner is 5.50m long and has seven telescope segments.
   The telecopic system allows the infinitely variable retraction and extension of the boom up to 30m.
5. The many different uses – including via attachments such as elescopic stacker, aerial scaffold, working platform, luffing jib – permit to fulfil a wider range of jobs with the crane and therefore better productivity for the customer.
6. Well-considered technology in all areas
   The cranes are trendsetting in many areas, from the engine in the superstructure, which serves as a counterweight, to the removable upper part in the driver's cabin to master even the lowest headroom.

Follow-up projects

As a consequence of this work and the years of experience connected with it, the EMC GmbH were entrusted with consulting in further complex technological problems very soon afterwards.

For additional pictures take a look on www.emc-engineering.de

III Projects / References

AT Cranes	Modernisation of a 40t Mobile crane

Aim of the project

Modernisation and overhaul of the electronic, electrical and hydraulic system of a 40t mobile crane manufactured under licence with the aim of adapting the product to the special market conditions and customer requirements.

Project Description

On the basis of a detailed analysis, the EMC GmbH received the order to re-equip a 40t mobile crane for which the customer had obtained a production licence so that it would better be able to fulfil the requirements of the market and the customer.
The crane was equipped with highly complex electronics that meant considerably more effort, especially in terms of service and the training of the production personnel. Further, massive problems on the part of the supplier were building up, which went as far as cessation of the supply of individual components. This increasingly hindered the production of the crane, finally bringing it to a standstill.
The EMC GmbH took the following measures to ensure that the customer could continue production and the crane could meet market requirements considerably better:

- creation of new control electronics programs with appropriate adjustments for the new hardware
- incorporation of new electrical and electronic components into the existing vehicle electrics
- overhaul and simplification of the electrical and hydraulic systems

Product/Customer benefits

1. The production of the crane could be restarted in a very short time with the help of the new components.
2. Costs were saved by the use of more efficient and less complicated technology
   - with electronic component parts,
   - with cables and hoses by saving on superfluous connections,
   - by increasing the motivation of the employees in the manufacturing and service divisions by simplified technology and solving the supply problems

Follow-up projects

Due to the positive experiences with this project, talks are currently taking place regarding technological improvements to the 70- and 80-tonners that are also being produced by the customer under licence.

III Projects / References

AT Cranes	Development of a Mobile crane 35 t.

Aim of the project
Construction for a mobile crane that fulfils the special requirements of the customer and the market in terms of:

- existing production,
- infrastructure,
- legal conditions and
- financial resources.

Achieving top performance with easy, financially viable means

Furthermore, the customer‘s construction division should be trained in order to bring it up to the international technological standard of development in crane technology

Project Description:
On the basis of a detailed analysis, the EMC GmbH received the order to construct a 35 t. mobile crane with modern technology that would be competitive worldwide and to monitor the development right through to the final inspection, which would be conducted according to national law.
Intensive consultation on location in order to professionalise the construction personnel in the form of a specially organised institution was also agreed on.
The EMC GmbH constructed a new crane in agreement with the customer. The latter‘s policy is to reduce the complexity of regular imported cranes - especially in terms of the electronics - and concentrate on the technological necessities.
This not only means considerably faster mass production times but also customer service being able to make themselves more independent from „external specialists“.
A competitive advantage that is noticeable in the price.

Product/customer benefits
1. No expensive purchased parts because many new components can be directly manufactured by the customer.
2. The use of components available due to their already being in the customer‘s product range simplifies the integration of the new crane into the production.
3. The new single-wheel suspension not only reduces weight, increases ground clearance and improves off-road capability, but it is also lower in cost than the traditional rigid axle.
4. More performance at the same total weight compared to traditional cranes:
   At 2.5m radius: 35t; at 3m radius: 32t
   Full on-road capability (10 t/axle)
5. The construction enables easy expansion by additional components.
6. Customer service can be carried out on location almost independently.
7. Lower in cost than imported cranes and higher performance at the same time.

Follow-up projects
Further development of the product range on the basis of the 35t mobile crane

For additional pictures take a look on www.emc-engineering.de

III Projects / References

AT Cranes	Development of a telescoping system (self-patented one-cylinder system)

Aim of the project

Development of an innovative, new telescoping system for modern, state-of-the-art telescopic booms of every size, taking the worldwide valid patent rights into consideration.

Project Description

The task of developing a new telescopic boom system always poses a special challenge to constructors. Our customer – a renowned, worldwide manufacturer of mobile cranes and other products – makes one very particular demand on EMC: it has to be a one-cylinder system with which the boom is extended – and which must not violate the worldwide patents of leading manufacturers: in other words, a real, patentable innovation!

In connection with the first step of this project, EMC was commissioned – in cooperation with the customer – to conduct detailed patent research in order to lay the foundations for the following development and design.

After a clear requirement profile had been defined, an innovative, new one-cylinder system that could be patented worldwide without any limitation and indeed had already been patented in some regions was designed.

Our services included:

- Development and design of the operating mechanism, locking and fastening mechanisms etc.
- Design of the telescoping cylinder
- Incorporating the mechanics into the boom profile prescribed by the customer
- Working out the programme procedure for the controls
- Detailed technical coordination of and instruction of those responsible for the project at the company at location and at EMC
- Support and supervision of the tests and inspection on location

Product/customer benefits

1. Increase in competitiveness due to the availability of an independent, patent-protected and functioning one-cylinder telescopic system
2. System can be used for different boom sizes
3. Increased performance of the different types of crane possible because of the weight saved in the boom system
4. Know-how transfer for different divisions

Follow-up projects

Further cooperation in other fields of activity in the company is currently being discussed.

III Projects / References

RT Cranes	Development of a RT crane with a hoisting capacity of 60 tonnes

Aim of the project

Development of a product family of rough-terrain cranes that set new standards in performance, function, design and handling in the clients' markets and are intended to lead to a strong position on the world market.

Project Description

Our customer – a renowned Asian manufacturer of construction machines active on the global market – approached a European engineering office for the first time with this major project of a new generation of rough-terrain cranes in order to achieve a new development in a high technical level.
After a detailed functional specification document had been drawn up in a first step, EMC was comissioned to draw up a concept for a series of RT cranes.
This was implemented in an initial project in the form of a new 60-tonne RT crane.
Here, we were responsible for the entire development and construction of the crane.
Our services included:

- The entire development and design of the boom in addition to the telescoping system and folding jib, the 2-axle lower structure, the upper structure and the cabin
- Design of the entire electrics and hydraulics
- Planning and programming of the entire controls
- Structural analysis and documentation to European standards
- Translating the crane manual into English
- Support regarding acceptability in terms of European standards
- Clarification of all technical questions on location and at EMC

Product/customer benefits

1. Considerable increase in competitiveness, especially in markets with high technological development
2. Basic work done for the development of a high-performance product family in the significant rough-terrain cranes segment – especially for markets with considerable potential for investment in infrastructure
3. Product benefits that will penetrate markets successfully:
   - low weight,
   - high performance in terms of payload,
   - less than 4 m in height in transport position,
   - high payload even in "pick & carry" mode,
   - high payload with folding jib,
   - boom can be extended when loaded,
   - very good manoeuvrability
4. Intensive know-how transfer for different divisions

Follow-up projects

The first cooperation was successful in every way. Numerous talks on location helped build up a trusting relationship. Communication with those involved is goal and implementation orientated.
Further models have been and will be developed by EMC.

For additional pictures take a look on www.emc-engineering.de

III Projects / References

RT Cranes	Development of an RT crane with a hoisting capacity of 100 tonnes

Project aim

Using the development of the 60-tonne RT crane, the 100-tonne rough-terrain crane should also fulfil, even surpass, the market requirements in its hoisting class.

Project description

Our customer – a renowned Asian manufacturer of construction machines active on the global market – approached a European engineering office for the first time with this major project of a new generation of rough-terrain cranes in order to achieve a new development at a high technical level.
After a detailed functional specification document had been drawn up in a first step, EMC was commissioned to draw up a concept for a series of RT cranes.
This was implemented in an initial project in the form of a new 60-tonne RT crane and continued consistently to create the 100-tonner.
The 100-tonner was also completely developed and constructed by EMC.
Our services included:

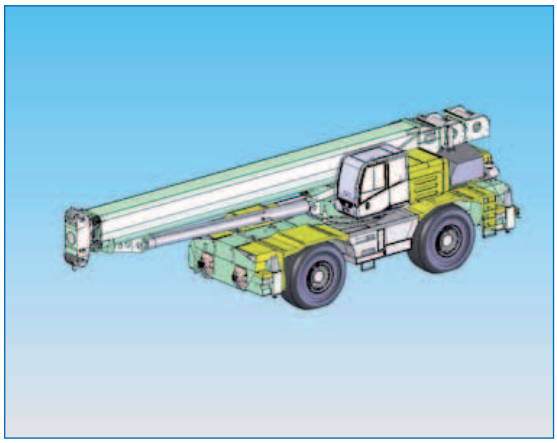
- The entire development and design of the boom in addition to the telescoping system and folding jib, the 2-axle lower structure and the upper structure (the cabin developed by EMC was carried over from the 60-tonner)
- Design of the entire electrics and hydraulics
- Planning and programming of the entire controls
- Structural analysis and documentation to European standards
- Translating the crane manual into English
- Support regarding acceptability in terms of European standards
- Clarification of all technical questions on location and at EMC

Benefits for product and customers

1. Considerable increase in competitiveness, especially in markets with high technological development
2. Basic work done for the development of a high-performance product family in the significant rough-terrain cranes segment – especially for markets with considerable potential for investment in infrastructure
3. Product benefits that will penetrate markets successfully:
   - low weight,
   - high performance in terms of payload,
   - less than 4 m in height in transport position,
   - high payload even in “pick & carry” mode,
   - high payload with folding jib,
   - boom can be extended when loaded,
   - very good manoeuvrability
4. Intensive know-how transfer for different divisions

Follow-up projects

The cooperation was – as with the first project, the 60-tonne RT crane - successful in every way.
Numerous talks on location strengthened the trusting relationship further.
There are plans to develop further models.
Furthermore, there are also considerations regarding cooperation in other product areas of the company.



For additional pictures take a look on www.emc-engineering.de

III Projects / References

Truck mounted cranes	Development of a truck mounted crane with a hoisting capacity of 60 tonnes on standard 4-axle trucks

Project aim

Development of a high-performance telescopic crane for worldwide use, on an all-terrain 4-axle standard truck with a hoisting capacity of 60 tonnes at a radius of 3m.

Project description

Our customer – a renowned international European manufacturer of lifting vehicles – commissioned EMC with the complete development of a telescopic crane, built on an all-terrain standard truck chassis.

In addition to optimising the performance – at the axle load prescribed by the truck – another part of the specifications was the lowest possible complexity of design in order to simplify production and maintenance.

Our services included:

- The development and design of the steel construction for booms that can be extended more than 40m and the two-part folding jib
- Design of the upper structure, in addition to the dimensioning of the slewing gear and construction of the outriggers
- Design of the intermediate frame for fastening to the truck chassis
- Dimensioning of the hydraulics for the entire system
- Dimensioning of many crane components (e.g. cylinders)
- Dimensioning and design of various counterweight options
- Structural analysis and documentation to European standards
- Clarification of all technical questions on location and at EMC

Product and customer benefits

1. Expansion of the construction crane range to include a very high-performance machine that will set standards on the world market and advantages over AT cranes of the same performance category, especially in big countries with long travel distances to work locations (considerably lower costs per km)
2. Competitive advantages of the 4-axle construction crane with a hoisting capacity of 60 tonnes at a radius of 3m:
   - Low weight of the crane construction combined with a high hoisting capacity allows it to be assembled on a 4-axle truck (instead of a 5-axle one)
   - high performance for the entire range of payloads,
   - compact dimensions (less than 4m in height and 12m in length in transport position),
   - high payload with extended folding jib
   - boom can be extended when loaded,
3. Intensive know-how transfer for different divisions

Follow-up projects

During the cooperation on this project, EMC was also charged with further tasks.

For additional pictures take a look on www.emc-engineering.de

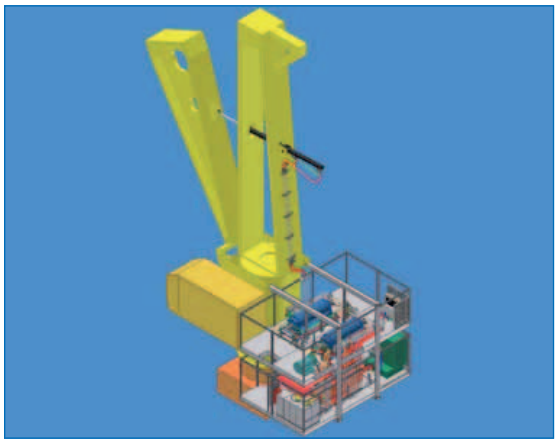
III Projects / References

Harbour cranes	Layout and dimensioning of the entire hydraulic drive technology and controls for harbour cranes

Project aim
Development of an alternative drive technology to the electrical drive of harbour cranes as part of a research project commissioned by the client

Project description
Our customer – a renowned international European manufacturer of harbour cranes – commissioned EMC with the development of an alternative to the previously used electrical drive format of its harbour cranes.
The first step was to compare the new hydraulic drive technology with the electrical drive technology as part of a cost-benefit analysis – on the basis of initial dimensioning. On account of the positive results, EMC was then commissioned to design the hydraulic alternative for a harbour crane model and to dimension it completely, including controls. Finally, the entire pipework and tubing was constructed in 3D.

Product and customer benefits
1. A clear opportunity to make an evaluation of the alternative drive technology with a view to costs and performance as compared to the drive technology used by the client
2. The opportunity to offer an alternative corresponding to the varying requirements of our client's customers



For additional pictures take a look on www.emc-engineering.de

III Projects / References

Harbour cranes	Development and design of portals for harbour cranes

Project description
Development and steel construction of modular-designed, stationary and mobile portals for harbour cranes of different payloads

Product and customer benefits
Our customer – a renowned international European manufacturer of lifting vehicles – commissioned EMC with the development of a new generation of portals for its harbour crane portfolio.
EMC developed a modular system of portals with different widths (up to 11m) and heights (up to 12 m) for assembling harbour cranes weighing up to 200 tonnes and with a payload of up to180 tonnes.
The portals were designed in such a way that they can be used in a stationary position, on rails and on crawler chassis.
In addition to the steelwork´s design, EMC also conducted the structural analysis and drew up all the necessary documents.

Product and customer benefits
1. Considerable increase in the scope of uses of harbour cranes because of the competitive range of portals
2. Optimum adaptability of the constructed portal versions to special requirements of harbour operatives (our client's customers), although the 'standard versions' already cover a multitude of uses
3. Competitive pricing due to weight-optimised steel construction

Follow-up projects
During the cooperation on this project, EMC was also charged with further tasks.

For additional pictures take a look on www.emc-engineering.de

III Projects / References

Aerial work platforms	Development of an aerial work platform with lifting height of 58 m on standard 3-axle trucks

Project aim

Development of a market-leading aerial work platform built on a standard 3-axle truck chassis, based on a boom system new to these market

Project description

Our customer – a renowned international European manufacturer of aerial work platforms – commissioned EMC with the development of a maximum-performance aerial work platform with view to work height built on a standard truck chassis with a maximum of 3 axles.
In order to achieve the features expected of this new machine, it was necessary to go in a new direction in terms of the design of the main telescopic boom for the aerial work platforms industry.
In order to do this, the depth of experience in the mobile crane industry of those responsible at EMC was brought in and a new shape of boom and a telescoping system were developed and designed. Furthermore, the upper structure/rotating platform and outriggers were developed and constructed to optimum weight.
EMC also supported the customer in all technical questions regarding hydraulics and electrics, and conducted the necessary structural analysis and drew up the documentation to European standards.

Product and customer benefits

1. A market-leading aerial work platform on a standard 3-axle truck chassis
2. Know-how transfer in regard to the development and further development of new telescopic boom designs
3. Competitive advantages of the 3-axle aerial work platform:
   - Low weight of the main boom and the upper structure/rotating platform and outrigger allows it to be assembled on a 3-axle truck (instead of a 4-axle one) at a work height of 58m
   - outstanding working range over a 360-degree radius at a reach of up to 40m
   - compact dimensions (less than 4m in height and 12m in length in transport position),
4. Know-how transfer for different divisions

For additional pictures take a look on www.emc-engineering.de

III Projects / References

Other projects/references	Development of special accessories for compact cranes

Aim of the project

The development of powerful special accessories to increase the areas of use of different types ofmobile cranes.

Project description

While a new generation of mobile cranes (compact cranes) was being developed, a demand was observed for providing tailor-made special accessories for these cranes that would differ greatly fromthe ranges of accessories the competition had to offer and display, in part at least, exceptional power. Lifting work platforms/scaffolding were constructed that could transport up to 3000kg + two operating personnel, therefore having a load capacity many times higher than that of traditional workplatforms/scaffolding. The control system developed for the machines allows radio remote control ofboth crane and work platform using the whole range of functions. The construction, thought through to the last detail, enables the work platform to be simply „foldedup“ so that it can be taken away by the crane itself. Extensions to the crane can be made by thedriver without any help and in a short space of time. The features of the crane are not inhibited by theaccessories. Provisions were made for expansion by a knuckle-boom crane, mounted directly on the lifting workscaffolding and supporting assembly work at a height of up to 46 m.

Product and customer benefits

1. A considerable increase in the number of possible uses and therefore the capacity of the mobilecranes.
2. More work hours for crane hirers since the mobile cranes, along with the special accessories, havebeen able to do work that the competition have had to refuse (special use).
3. Very economical work since only one person is required to assemble and operate the crane and the accessories.

Follow-up projects

Further special accessories have been developed (heavy-lift fork with a lifting power up to 5000 kg) onthe basis of the development and construction work for the lifting work platforms/ scaffolding.
In addition to the luffing jib typical of the industry, a special mounting jib with unusually high lifting power and a very low dead height was developed for assembly work right up to the roof.

For additional pictures take a look on www.emc-engineering.de

III Projects / References

Other projects/references	Supply management for machine park

Project aim
Support for the supply of machines from the most varied of manufacturing areas of mobile crane production, from supplier search and evaluation to negotiation of offers/contracts.

Project description
On the basis of material requirements and manufacturing planning the different categories of machines (forming, separating and joining systems) and the necessary power of the individual machines were determined. After market research was conducted, manufacturers were selected by means of a catalogue ofcriteria. Their offers were evaluated and recommendations per machine category made using a pointssystem. Additionally, the different production techniques were explained in this talks with suppliers andevaluated using a cost-benefit analysis.
The negotiation phase was monitored by EMC and the implementation of the machines in production supervised.

Product and customer benefits
1. Detailed overview of the supplier situation in the individual areas.
2. Integration of the existing machine park and the know-how of the manufacturing personnel of thecustomer when choosing suppliers taken into account.
3. Exact testing of the technical power of the machines in the shortest possible time.
4. Determination of the manufacturing processes.
5. Optimisation of investment costs, since our recommendation was focused on the minimum necessary with the option of investing in extra machine accessories.

Follow-up projects
Discussions are currently being held about total planning for the manufacture of further components.

Other projects/references	Programming of electronic control systems

Project aim
Development of an electronic control that massively simplifies the vehicle electrics and contains allvehicle functions, including the safety functions.

Project description
The complex and inflexible vehicle electrics were converted to a decentralized CAN bus system whose components are readily available and which could be expanded easily. A powerful human/ machineinterface was integrated to improve operability.

Product and customer benefits
1. The complex electrics were massively simplified, especially in the area of the electrical components that were liable to be disrupted. This led to saved costs on account of the greatly reducedexpense involved in cabling and with special components.
2. Greater flexibility and power of the vehicle by means of modern digital controlling technology.
3. Realisation of functions that were not possible in other commercially available products.
4. Control of a hydrostatic travel drive with more than 23 axles.
5. Redundant, self-checking safety installations (LMB).
6. Precise diagnosis system for displaying the state of the vehicle.
7. Possible remote diagnosis of the vehicle.
8. User-friendly operation and improved clarity of vehicle meters for the driver.

III Projects / References

Other projects/references	Feasibility analysis and FMEA for a aerial work platform for a standard crane

Project aim
A feasibility study to aid in deciding on developing aerial work platforms/scaffolding for mobile cranes as special accessories

Project description
Our customer – one of the world's leading manufacturers of lifting vehicles of all kinds – commissioned EMC to carry out a detailed feasibility study to facilitate a decision on developing aerial work platforms-/scaffolding for mobile cranes as special accessories.
The study covered the following areas:

- What requirements does the specific standard (EN 280) for work platforms make of a crane manufacturer with regard to the technically required changes to mobile cranes, using the examination of a standard crane made by the manufacturer as an example?
- What concrete technical changes must be made to the standard mobile crane in order to fulfil the standard for work platforms?
- What must be observed with constructive adaptations with regard to potential dangers (danger analysis) and error sources (failure modes and effects analysis, FMEA)?

Product and customer benefits

1. Creation of a well-founded basis for clients to decide whether the project, 'aerial work platforms/ scaffolding for mobile cranes', should be pursued further
2. A detailed, compressed examination of the specific requirements for a standard that is not usually relevant for a crane manufacturer

IV Contact

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