



Successful construction with PERI



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Cover Photo: (Left-to-right) Asia Square Tower 2, Asia Square Tower 1 and Marina Bay Suites. All three buildings are constructed using PERI formwork systems.

Dear Customers and Readers,

Welcome to the latest issue of our PERI Scope. This issue is very special as it features a number of Singapore's new landmarks such as Asia Square Tower 2, d'Leedon and Skysuites @ Anson. It also showcases impressions of PERI Asia's participation at the first construction equipment exhibition in Singapore, the BuildTechAsia 2011, where we were delighted to welcome more than 400 interested construction professionals at our stand. The impressive display of exhibits which represent the latest in formwork and scaffolding technology has drawn the attention of fair visitors to our stand.

Today's architectural designs pose a challenge to both structural engineers and construction execution.

Successful construction has never been as difficult to achieve as it is now, demands in regards to Quality, Safety and Productivity have never been so high.

To satisfy the above requirements from vibrant cities, construction industries demand contractors to rely on competent partners and suppliers. Modern suppliers are expected to deliver in many aspects:

- innovative products
- quality assurance
- product documentation
- the supply of the requested quantity at the right time
- holistic project engineering solutions and drawings
- project administration
- site support
- training

PERI Asia is constantly striving to excel in every one of these duties to be your competent partner in order to give you the edge in this highly competitive market. Our staff is our biggest assets and undergoes frequent training to ensure top performance.

The outlook for the coming years is positive. BCA has projected construction demand for this year to be \$21b to \$27b and the average annual demand to be \$19b to \$27b for 2013 to 2014. We are looking forward to working with you on your next project and to a successful result.

Sincerely,
Bernd Kieslich
Managing Director Asia

Fast and safe construction of large slab areas with PERI systems

Workshop for HG Metal Manufacturing, Singapore



Construction of a 4-storey workshop for HG Metal Manufacturing Ltd. is currently being built at Jurong Port Road and is expected to be completed by May 2012.

The project uses the PD 8 Table System and ST 100 Stacking Towers for casting of the slabs with a total formwork area of more than 1,900 m².

For columns, the VARIO GT 24 Column Formwork System has been designed for standard columns and columns with single and double-sided corbels with more than 8 metres high.

PERI's CB 240 Climbing System and VARIO GT 24 Wall Formwork System were used for casting of the core walls of the building.

Workers preparing to move a PD 8 Table System with the lifting trolley.



Contractor
Erecon Construction Co. Pte. Ltd.
Field Service
PERI ASIA Pte. Ltd., Singapore

Lim Beng Huat, Project Manager:
"We have used PERI formwork systems for several of our projects and find them to be fast and non labour intensive. The technical support provided at the job site and off site is also good."



Successful presentation of products and services at first BuildTechAsia 2011 exhibition



During BuildTechAsia 2011, PERI presented more than 10 different formwork and scaffolding systems among its product range.

PERI participated in the inaugural BuildTechAsia 2011 exhibition that was held from 27 to 29 April 2011 at the Singapore Expo, Hall 3. The event was held in conjunction with the Singapore Construction and Productivity Week and was jointly organised by Sphere Exhibits Pte Ltd and the Building & Construction Authority (BCA).

The three day event saw the involvement of 120 exhibiting companies and other key industry associations. More than 4,200 trade visitors and delegates had also visited the show.

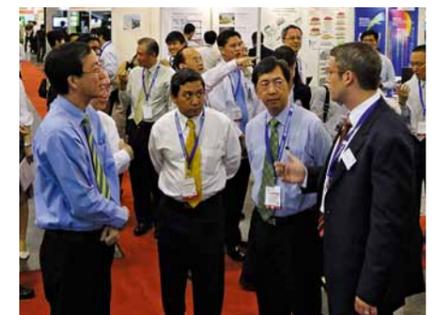
The booth was very well visited during the three exhibition days and considerable interest was shown in PERI products.



At the PERI stand, visitors were able to see more than 10 types of PERI products. Some of the latest products that were showcased include the PERI UP Rosett Flex, MAXIMO Panel Wall Formwork, UNO Monolithic Housing Formwork, LIWA Panel Formwork and VARIO QUATTRO Column.

PERI sales engineers were on hand to explain and demonstrate the various products on displayed. Goodie bags were given to all visitors at the booth and some even had the opportunity to taste Bavarian beer and sausages to experience the warmth of German hospitality.

The flexible PERI UP Rosett Flex Scaffolding offers various application possibilities. Demonstrations were conducted at the PERI booth.



VIPs visited the PERI booth (left-to-right): Mr Tan Tee How, Permanent Secretary (National Development), Mr Lee Chuan Seng, Deputy Chairman, BCA Board of Directors, Mr Tan Tian Chong, Director, Technology Development Division and Construction Productivity Centre, BCA, Dr John Keung, CEO BCA and Mr Bernd Kieslich, MD of PERI Asia Pte. Ltd.

The GRIDFLEX Aluminium Grid Slab Formwork attracted the interests of many visitors.





A future prestigious iconic landmark designed by Zaha Hadid is climbing with PERI systems

d'Leedon Condominium, Singapore

The new development comprises 7 towers of 1,703 apartments and 12 villas on a large land site of 838,488 square feet.

PERI RCS Rail Climbing System and ACS Self Climbing System minimise the use of cranes for formworking operations.

With the PERI RCS Rail Climbing Safety Screen, site personnel are secure against falling at all times and protected against strong winds when working at great heights.



Fast and cost-effective formwork and scaffolding products combined with best technical solutions

Warehouse for Yang Kee Logistics, Singapore

A 10-storey warehouse and an ancillary eight-storey office block are currently being built at Jurong Pier Road. The development is owned by Yang Kee Logistics Pte. Ltd. and is the second phase of its plan to build a chemicals logistics hub.

Contractor
HPC Builders Pte. Ltd.
Field Service
PERI ASIA Pte. Ltd.,
Singapore



Zhu Jianxin,
Site Manager:

"I will recommend the use of PERI formwork systems as they are fast and cost-effective. They have also provided good technical solutions and on site support to us to resolve any problems we may encounter."

For the large-scale columns, very good concrete surface results have been achieved.

Yang Kee Logistics provides a wide range of logistics services, including warehousing and inventory management, distribution and freight.

For slabs of the warehouse, the cost-effective PD 8 Table System was used to cover large slab areas.

For columns, VARIO GT 24 Column Formwork System was used. PERI's design engineer was able to incorporate the SKS Single Sided Climbing System with the VARIO GT 24 Column to cast 3-sided columns that were located next to an existing building.



With the VARIO GT 24 Column Formwork System, square or rectangular cross-sections up to 80 x 120 cm can be concreted – the formwork is continually adjustable.



Alex Chua,
Site Agent:

"PERI have provided us with good products and custom-tailored solutions to meet the requirements of this project. Their professional services have also helped us to resolve problems encountered at the job site. Consequently, we were able to achieve the desired productivity with much less resources."

Contractor
Woh Hup (Private) Ltd.
Field Service
PERI ASIA Pte. Ltd.,
Singapore

The d'Leedon is a residential development comprising of seven blocks of 36-storey apartments (1,703 units) and 12 units of double storey semi-detached houses located at the Farrer Road area. It is designed by world renowned architect, Zaha Hadid Architects.

For core walls of the residential blocks, the VARIO GT 24 Girder Wall Formwork System is used together with the RCS Rail Climbing System and ACS Self Climbing System to achieve maximum efficiency. Through the use of hydraulics, the crane-independent RCS and ACS systems allow the wall formwork and platform to climb together in one single operation. The RCS Rail Climbing Safety Screen is also being installed

to allow for safe working at the slab edge at height. The screen can provide protection up to two and a half floors or more if required. In order to suit the design of the buildings, a single rail RCS Rail Climbing System has been specially fabricated for the casting of slanting columns and to provide safe working access at the corners of the apartment buildings.



Fast and safe climbing solutions help to realise fast building progress

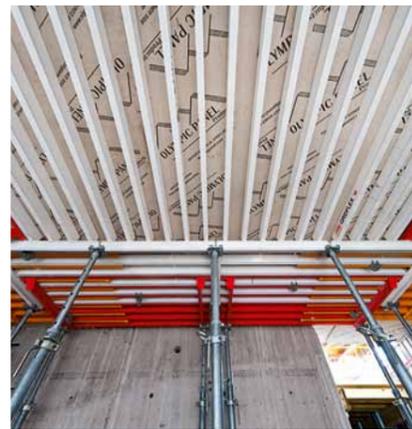
Skysuites @ Anson, Singapore



The mobile self-climbing equipment can be retrofitted at any time.



The RCS Rail Climbing Safety Screen provides perimeter safety.

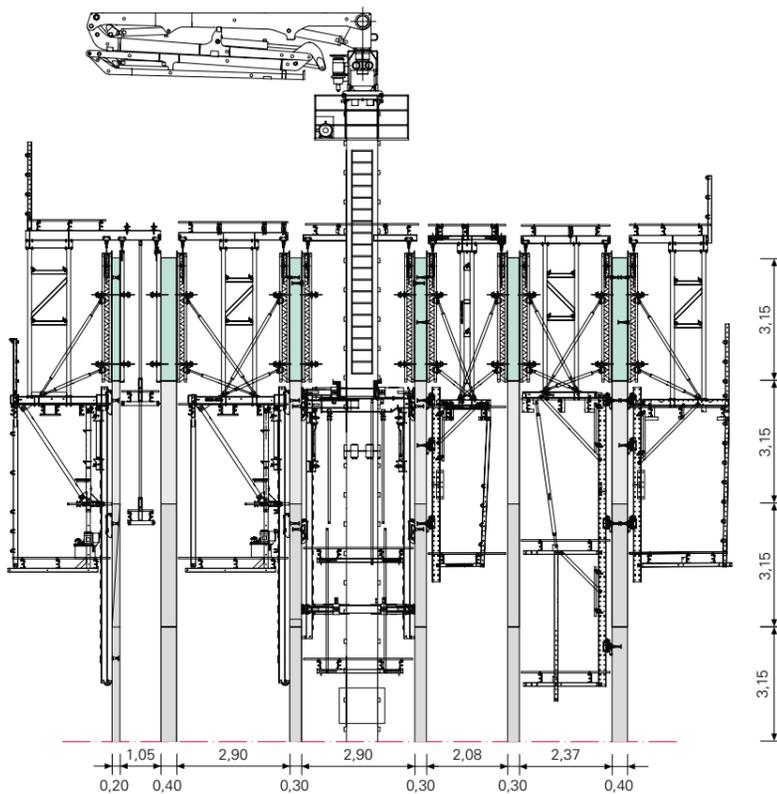


PERI GRIDFLEX is the flexible slab formwork system complete with accessible girder grids and very short shuttering times. The panel grid system allows safe access for laying the free choice of formlining.

The cross-section shows the formwork solution for core walls – which climbs together with the concrete placing boom.

Contractor
Woh Hup (Private) Limited
Field Service
PERI ASIA Pte. Ltd., Singapore

Skysuites @ Anson (left) apartment building rising gradually next to the nearly completed Altez condominium – which is also being constructed with PERI formwork systems.



Cao Baochun, Site Manager:
"PERI have provided us with very safe and highly efficient formwork systems. In particular, they have given us a good solution for the high void area with the ACS. With the professional support from PERI, I believe we are able to achieve our target."

At 71-storey high, Skysuites @ Anson is set to be one of the tallest residential building in Singapore. The development will have 360 units and is situated in Singapore's CBD at 8 Enggor Street.

Skysuites @ Anson will share the same building height of 250 m as Altez condominium, which was featured in the 2011 issue of PERI Scope, another project by the same contractor using similar PERI formwork systems which is located just next to it. To achieve their target of 6 to 7 day cycle per floor for typical floors, the contractor adopted

With the ACS Self Climbing System and the RCS Rail Climbing System for both the internal and external core walls, a 6 to 7 day cycle per floor can be reached for the typical floors.

PERI's proposal by using the ACS Self Climbing System and RCS Rail Climbing System for core walls. In addition, the RCS Rail Climbing Safety Screen is being used to provide perimeter safety. A special transfer truss was designed for it at the sky terraces and loft units area to allow for anchor installation in the absence of slabs.

For slabs, the GRIDFLEX Aluminium Grid Slab Formwork is being used with the PERI UP Rosett Flex for fast and safe casting of concrete slabs.

The building is expected to be completed in Nov 2015.



Skysuites @ Anson will offer modern high-rise living with 71 floors of exquisite apartments.



Ahead of the schedule – thanks to PERI products and competent technical support

Asia Square Tower 2, Singapore



Tower 2 will feature 46 floors with the hotel occupying the 32nd to 46th floors.



With the PERI RCS Rail Climbing Safety Screen, the slab edges on the upper floors are completely enclosed.



ST 100 is a very efficient shoring system which can be assembled quickly. All ST 100 system components are simply slotted together without any bolts or pins.



Different PERI systems and solutions are used for forming the slabs. Slab tables with steel walers supported by the MULTIPROP System ...



... as well as shoring solutions based on the PERI UP Rosett Flex scaffolding system.

Contractor
Hyundai Engineering & Construction Co., Ltd.
Field Service
PERI ASIA Pte. Ltd., Singapore

Asia Square Tower 2 is the second building to be built as part of the twin-tower Asia Square Towers development. It is located at the Marina Bay area and will accommodate retail shops, offices and a Westin hotel (Starwood

Hotel group) when completed. Similar to Asia Square Tower 1, the project uses a variety of PERI formwork systems to ensure speed and safety in the construction process.

For slabs, the ST 100 Stacking Tower is being used for the transfer floors up to a height of 21.6 m (from 1st to 6th floor) and 8.3 m (from 32nd to 34th floors). In addition, more than 5,000 m² of formwork area of PERI MULTIPROP system,



Kim Ju-Han, Senior Construction Manager:
“Even for such a big scale project, the use of the ACS and RCS climbing systems has made a 4-day per floor cycle possible. When combined with the other PERI formwork systems and their impeccable technical support, we were able to be ahead of our schedule by three to four months.”

PD 8 Table System and PERI UP tables are being used to cast the typical floor slabs.

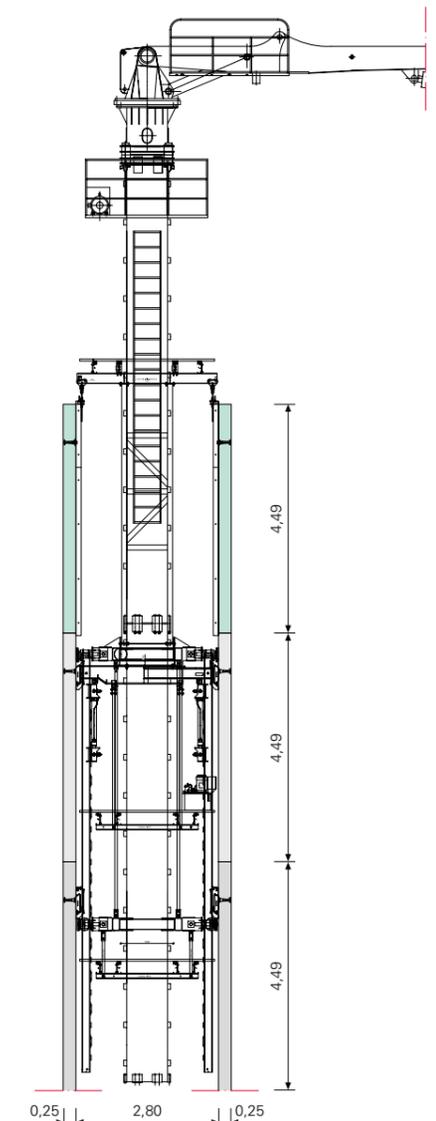
For construction of the hotel (from 32nd to 46th floor), the GRIDFLEX Aluminium Grid Slab Formwork will be used for the slabs and TRIO Panel Wall Formwork will be used for the shear walls.

To meet the target of 5 days per floor cycle for the core walls, the crane-independent RCS Rail Climbing System and the ACS Self Climbing System were used for the internal and external platforms respectively. For perimeter safety, the RCS Rail Climbing Safety Screen has been adopted to prevent workers from falling off the edge of the building. For greater efficiency, the concrete placing boom has been incorporated into the core wall systems. As a result, there is no need for additional openings in the slab.

The building has been slated to open on 1 July 2014.



Asia Square Tower, located along Marina View at Marina Bay in Singapore, is a twin-tower mixed-use development. Tower 1 was completed in late 2011, Tower 2 is currently under construction.



The concrete placing boom has been incorporated into the climbing solution for the core wall systems and ensures maximum efficiency in the formworking process.



Safe and time-saving concreting of slabs in great heights

8 Storey Factory, Singapore



A new 8-storey factory is currently being built in the western industrial area of Singapore at Sunview Way.

Each floor of the factory is being divided into three sections, with each section covering an area of about 3,500 m² (50 m x 70 m). For fast and cost-effective casting of slabs, the PD 8 Table System was chosen for this application. The typical tables have a height of 11 metres and were designed to provide optimal coverage with the largest table measuring 3.6 m (W) x 5.5 m (L).

(Left) A PD 8 Table System being crane-lifted onto the next level. (Below) A few workers moving a PD 8 Table System with the help of lifting trolleys.

For columns, the VARIO GT 24 Column Formwork System was used. The column formwork come in two sizes, 1,100 mm x 1,100 mm x 10.5 m (H) and 1,100 mm x 900 mm x 10.5 m (H).

PERI's CB 240 Climbing System was used for casting the core walls of the building with a height of 5.4 m.



Flexibility and easy handling of formwork and shoring systems saves time and manpower

Woodlands 11 Factory, Singapore

Woodlands 11 is a 10-storey ramp-up multi-user light industrial factory located at Woodlands Close.

For fast and cost-effective construction of large slab areas, the PD 8 Table System and the MULTIPROP System are chosen for this task. The largest PD 8 tables measure 6.0 m x 2.9 m and 4.47 m x 3.9 m with typical height at 3.8 m. The total formwork area for the PD 8 table is 6,400 m².

The contractor was able to construct an area of 1,700 m² in a 15 to 17 days cycle. They have advised that they

could even go faster if the job site is not located near to residential buildings. For core walls, the CB 240 Climbing System and VARIO GT 24 Wall Formwork System are used. As for columns, the VARIO GT 24 Column Formwork System is being used for casting various column sizes of the buildings.

The safe and easy to assemble PERI UP Stair Tower 75 offers full headroom and provided quick access to workers at the job site.

The expected date of completion of the factory is 7 December 2012.



Contractor
Yee Hong Pte. Ltd.
Field Service
PERI ASIA Pte. Ltd.,
Singapore

Wee Moong Eng, Project Director:
"We have not encountered any shortcoming in PERI's formwork systems for this project. The formwork systems provided by PERI have been flexible and easy to handle. As a result, we have been able to save time and manpower."

MULTIPROP post shores are made of aluminium which means they are of very light weight.

View of the PD 8 Slab Tables during positioning ...

... and after concreting the slabs.



Contractor
MA Builders Pte. Ltd.
Field Service
PERI ASIA Pte. Ltd.,
Singapore

Tan Eng Hwee, Project Manager:
"The use of the PD 8 Table System for this project is at least 50% faster as compared to conventional formwork. Furthermore, for tables of such height (11 m) it will not be as safe to use conventional and more materials will be needed. PERI have provided us with the right formwork systems – fast and reliable."





The crane-independent ACS Self Climbing System and RCS Rail Climbing System are being used for casting of the core walls.



Contractor
Thian Sung Construction Pte. Ltd.
Field Service
PERI ASIA Pte. Ltd.,
Singapore

Khoo Wang Yang, Site Manager:
"The unique design of the Le Nouvel Ardmore has posed many challenges in the construction process. But PERI have been able to support us with solutions and formwork systems that are fast, safe and efficient."



Uniquely designed condominium development – formed with safe and reliable system equipment

Le Nouvel Ardmore, Singapore

Le Nouvel Ardmore is a luxurious condominium development designed by globally renowned architect and winner of the Pritzker Architecture Prize, Jean Nouvel. This 33-storey condominium has only 43 exclusive residences and is situated on 1A Ardmore Park.

Due to the unique and interesting design of the building, PERI's design engineers need to cater to the floor-by-floor changing layout through the use of several formwork systems.

For core walls, the crane-independent ACS Self Climbing System and RCS Rail Climbing System are being used. The ACS has also been designed for use with the spider placing boom. For flat slabs, the GRIDFLEX Aluminium Grid Slab Formwork provided much speed and flexibility when concreting slabs of the building. On the other hand, the PERI UP Rosett Flex is being used for the perimeter beam.

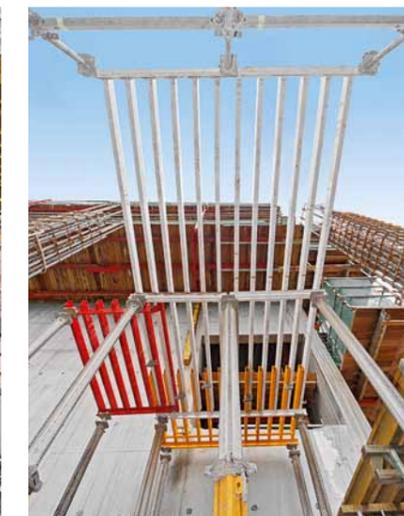
The building has a total of eight void areas between the 7th and 32nd floor. For these areas, the ST 100 Stacking Tower is being used to complete the job with height of the towers ranging from 8 m to 25 m.

The building is expected to be completed by December 2014.



GRIDFLEX Aluminium Grid Slab Formwork is the flexible slab formwork system complete with accessible girder grids. It fits best to PEP slab props...

... as well as to MULTIPROP props with higher load-bearing capacities for greater heights.



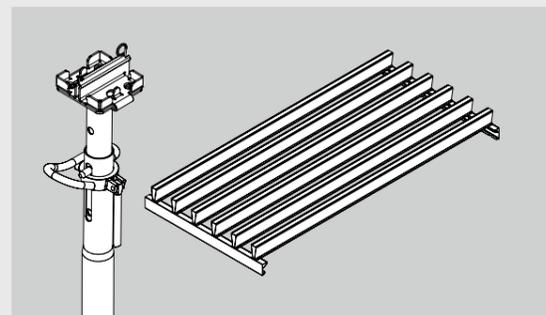
GRIDFLEX Aluminium Grid Slab Formwork

Fast – Safe – Flexible

The GRIDFLEX is an innovative and award winning product that can maximize cost-effectiveness and increase the levels of working safety concurrently. Applications on job sites have shown that for the same slab area, it is capable of achieving a productivity of 26 m² to 53 m²/day with half the manpower as compared to 5 m² to 6 m²/day using conventional formwork.



GRIDFLEX – A type tested and award winning product
Rated Band 2 by BCA Singapore under the Constructability Points for System Formwork.



Only 2 system components
are required for placing the girder grid in a standard field: the Prophead GFH (with prop) and the GRID-FLEX GFP Panel (Standard Element GFP 200 x 100).



Fast
The standard field is formed using only three system parts: elements, plywood and prop. The easy to handle parts and an element weight of 10 kg/m² simplify the forming process.



Safe
The girder grid design of the GRIDFLEX automatically forms an accessible working area which provides a high level of safety when laying the plywood sheets.



Flexible
The telescopic function provides a flexible two-dimensional adaptability in both transverse and longitudinal directions with the elements.



Short shuttering times due to lightweight components and pre-determined assembly sequence

Multi Storey Car Park at Simei, Singapore



Contractor
Logistics Construction Pte. Ltd.
Field Service
PERI ASIA Pte. Ltd., Singapore

Kenneth Paw, Project Manager:
"The GRIDFLEX is an efficient and flexible system that can reduce construction time significantly. It is light weight and easy to handle and has almost zero wastage."

A multi storey car park at Simei was upgraded with the addition of two more decks by using the PERI GRIDFLEX Aluminium Grid Slab Formwork.

The contractor wanted a fast slab formwork system that could expedite their construction sequence with minimal inconveniences. The GRIDFLEX was their ideal choice as it is light weight and has only three system components.

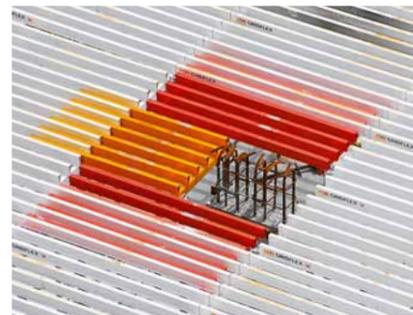
The standard element of the GRIDFLEX is used jointly with the PERI UP Rosett

Flex at the perimeter area and with the PEP Prop at the main deck area. The required slab thickness was 300 mm and the total formwork area used was 1,800 m².

Besides the GRIDFLEX, PERI MULTIPROP was used for back propping and GT 24 and VT 20K girders were used with the PERI UP Rosett Flex for casting of the ramp of the new car park decks.



The GRIDFLEX elements are hooked in from below and swivelled upwards – means the erection of the formwork is very safe. After this, the PEP prop can be positioned.



With the GRIDFLEX, simple labour-saving filler areas can be realized for any building shape. The telescopic function provides a flexible two-dimensional adaptability.



Yellow powder-coated MULTIPROP props offer a high load-bearing capacity. According to type calculations, the permissible load-bearing capacity is up to 90 kN (DIN EN 12812).

PERI sponsors BCA's Skilled Builders Competition

It was a privilege for PERI to be one of the sponsors for the Skilled Builders Competition – System Formwork Installation category, jointly organized by the Building & Construction Authority (BCA) and the Singapore Contractors Association Limited (SCAL).

The Skilled Builders Competition for System Formwork Installation was held from 25 to 26 April 2011 at the BCA Academy. It was part of the Singapore Construction Productivity Week which aimed to raise awareness of productivity improvement at the workers' level through the adoption of technology and best practices.

Over the two days, a total of 10 teams consisting of four men in each team participated in the System Formwork Installation category. They were tested on their ability to comprehend drawings,



plan their time and to use the provided tools to install the system formwork allocated to them within a specific timeframe.

The system formwork sponsored by PERI at the competition included:

- GRIDFLEX Aluminium Grid Slab Formwork
- PERI UP Rosett Flex
- PEP Ergo Prop
- TRIO Panel Wall Formwork
- GT 24 formwork girders

This year, PERI will once again sponsor the competition which will be held at the Marina Bay Sands from 15 to 16 May 2012. The organisers are targeting to increase the total number of participating teams from 10 to 12 and the competition area and standard will also be increased.

All participants will be awarded with a Certificate of Participation. The top two teams will also be awarded with cash prizes and a trophy.



PERI Product Range



Wall Formwork
 Panel Formwork
 Girder Formwork
 Circular Formwork
 Facade Formwork
 Brace Frame



Climbing Systems
 Climbing Scaffold
 Self-Climbing System
 Climbing Protection Panel
 Platform Systems



Column Formwork
 Square
 Rectangular
 Circular



Scaffold, Stairways, Working Platforms
 Facade Scaffold
 Working Platform
 Weather Protection Roof
 Stairway Access



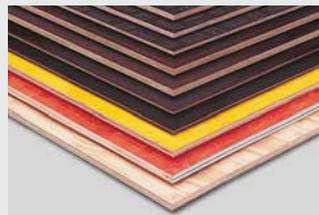
Slab Formwork
 Panel Formwork
 Beam Grid Formwork
 Girder Formwork
 Slab Table
 Beam Formwork



Bridge and Tunnel Formwork
 Cantilevered Parapet Carriage
 Cantilevered Parapet Platform
 Engineer's Construction Kit



Shoring Systems
 Steel Slab Props
 Aluminium Slab Props
 Tower Systems
 Heavy-Duty Props



Accessories
 Plywood
 Formwork Girders
 Stopend Systems
 Pallets
 Transportation Containers

PERI Services



Engineering and Software
 Efficient formwork planning and design through use of PERI CAD software.



Site Supervision
 Provided to ensure efficient use of systems.



Rental Service
 Large rental fleet with cleaning and repair services.



Training
 Seminars and customised courses to support our customers.

The illustration featured in this brochure are photographs taken at a particular time on a construction site. This is why the safety details shown cannot be considered as final.

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