

# PERI – The service provider

We offer more than just products



## Technical solution

Due to their in-depth understanding of the needs of our customers, our engineers are able to develop the best project-related solution. The services include general arrangement drawings, method statement, static calculations as well as assembly drawings.



## Logistics

PERI has the world's largest rental equipment pool and supplies its customers reliably, fast and with a high level of flexibility. "Just in time" deliveries and return deliveries – according to the particular construction schedule.



## On-site support

PERI Formwork instructors provide an extensive professional briefing on-site. They support the site management with this specific product knowledge and train the site team on the use of PERI products in order to achieve efficient and safe construction progress.

## Welcome to our Customer Training Centre

Our Training program includes both general product training and seminars with customized content. We support our customers with training on the latest formwork and scaffolding technologies, safe working processes and efficient construction methods.



The photographs in this brochure feature construction sites in progress. For this reason especially safety and anchor details cannot always be considered as conclusive or final. These are subject to the risk assessment carried out by the contractor.

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**PERI Formwork Malaysia Sdn. Bhd.**  
**Formwork Scaffolding Engineering**  
B-12-02, Level 12, Block B, PJ8,  
No. 23, Jalan Barat, 46050 Petaling Jaya,  
Selangor Darul Ehsan, Malaysia  
Phone +60 (0)3.7969 1088  
Fax +60 (0)3.7969 1020  
info@perimalaysia.com  
www.perimalaysia.com



# Scope



## **Site working conditions without interruptions**

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## **Detailed cycle planning with optimized system use**

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## Dear construction partners,

We are happy to present to you once more our yearly PERI scope, with a choice of exciting projects that we are proud of having contributed during the last year as your solution provider!

Again, the KVMRT has given us challenging tasks, and has given us the opportunity to introduce innovative technology solutions, such as for example our VARIOKIT tunnel formwork, which is provided as a cost efficient alternative to custom made formwork due to the fact of being entirely rentable. Also the local highrise construction is keeping developing at a strong pace, demanding for innovative, and more labour efficient alterna-

tives to conventional aluminium formwork. The shortage of qualified workers is repeatedly mentioned by our customers as the major challenge in the market for everyone. Related to the lacking qualification of the workforce are issues with productivity, safety and quality!

These mentioned issues, will not be solved by continuously importing millions of unqualified workers into Malaysia. The only real option for sustainable development is improving education and professional training.

Responding to this major market requirement, we have recently taken another important step ahead. We have opened our PERI Malaysia Training Center, which targets to

Train contractor and subcontractor site teams on the use of our products before they are using them on site, and therefore ensuring high productivity from the first day of use. Increase awareness and competencies on

modern technology and specifically safety, in order to prevent accidents. Increase the method engineering competencies of interested parties in the early phase of a project, in order to introduce more compliant work processes.

With our new training center we are contributing to the sustainable development of the Malaysian construction industry.

We will be happy to welcome you to our training center and invite you to subscribe to one of our training modules!

Sincerely,

Bernhard Steinle,  
Managing Director

## Saving time with SKYDECK

Stripe Hotel, Kuala Lumpur



One blow of the hammer releases the drophead; in the process, the formwork is lowered by 6 cm. Main beams and panels can then be struck.



Another YTL project, 20 Storey Boutique hotel is been built along Jalan Kamunting, Dang Wangi, Kuala Lumpur. Being one of our long time customer, YTL decided to purchase PERI

SKYDECK for their on-going development projects. SKYDECK the proven aluminium panelized slab formwork with very fast shuttering times. The systematic assembly

sequence and lightweight system components accelerate working operations. In addition, early striking with the drophead system reduces on site material requirements.

### Contractor

Syarikat Pembinaan Yeoh  
Tiong Lay Sdn Bhd

### Field Service

PERI Malaysia



**Mr. Tan Chee Been,  
Construction Manager:**  
"SKYDECK effectively addresses the issues of time, quality and cost. It is extremely versatile and can be adapted to accommodate just about any decking issue."



# All-round safety – increased efficiency

ibis Hotel, Kuala Lumpur



**Contractor**  
Goldstone Project  
Builders  
**Field Service**  
PERI Malaysia



## Mr. Jack Xiong, General Manager:

“The good construction result is proof that we selected the right formwork provider for this project. Together with PERI engineers, we were able to develop the right solutions and problem free construction work.”

The RCS climbing protection panel serves as anti-fall protection; thus work on the facade could be completed very quickly.

Jalan Yap Kwan Seng, Kuala Lumpur is set to host Downtown Kuala Lumpur's first ibis Hotel by French hotelier Accor Group: a 30 storey hotel expected to complete in 2017.

Mobile climbing units lifted the rail-guided RCS Climbing Protection Panel from storey to storey.



The hydraulic cylinder could be easily mounted on the climbing shoe between the wall and climbing rail.



Together with PERI specialists, the site management team developed a formwork concept that ideally matched the ambitious construction schedule and project requirements.

The two top floors under construction were completely enclosed with the help of the RCS Climbing Protection Panel. This enclosure served as protection against falling and reliably shielded the working area from the effects of the wind and weather.

Thanks to the mobile RCS climbing hydraulics, no crane was required for the rail-guided moving procedure. An integral part of the PERI climbing concept was the RCS MP Landing Platform which was used for moving and intermediates storage of formwork materials.



# Safe working conditions without interruptions

## Reliable support during all phases of the project

Equatorial Hotel, Kuala Lumpur



Hotel Equatorial Kuala Lumpur, one of the city's oldest landmarks was opened in 1973, ceased operations on April 1, 2012 to make for the redevelopment. The construction will take 36 months involves the construction works of the podium block, office and hotel towers. The board range of PERI products and optimized logistical operations through only one formwork partner simplified and accelerated the construction progress. The VARIO Wall Formwork System and CB 240 Climbing Formwork could be used extremely versatile for forming the core walls and

columns. SKYDECK Panel Slab Formwork ensured that the operations were carried out very efficiently.

At the later stage, the RCS Climbing Protection Panel will be used, not only to secure the construction site personnel against falling, the enclosed secure against falling, the enclosed working areas are also protected against extreme weather conditions. This, together with the increased feeling of safety, meant that work could be efficiently carried out at all heights in 10 days cycle.

PERI engineers combined rentable construction kit systems to create a customized formwork and scaffolding solution.

The columns could be safely and quickly shuttered in the protection of the RCS enclosure with VARIO.



**Contractor**  
IJM Construction  
Sdn Bhd  
**Field Service**  
PERI Malaysia

### Mr. Liew Yoon Han, Project Manager:

"Due to our positive experience with similar projects, we decided once again in favour of PERI. The customer support and the fast provided on-site solutions by their technical team have been highly appreciated and proven PERI's commitment to the job."





# Well ahead of schedule with PERI system application and support

Four Season Hotel, Kuala Lumpur



**Contractor**  
CRCC Malaysia BHD  
**Field Service**  
PERI Malaysia

**Mr. Ma Zhan Jiang,  
Project Manager:**

"PERI complied with our requests right from our very first meeting. The comprehensive support – planning, static, logistics through to the on-site service also had a very positive impact on the project."

The 1.5 million sq.ft. development consist of over 300,000 sq.ft. of luxury retail space, with more than 230 hotel rooms, as well as hotel service apartments and residences. This development is expected to be completed in 4 years and will be a new landmark located in Kuala Lumpur City Centre.

PERI Engineers combined PERI UP, ST 100 shoring and the RCS climbing protection panel to create an efficient formwork solution with a very high level of safety. The PERI UP shoring system was adapted to support the deep concrete beams with width of 3.50 m the height of 26 m of the birdcage. The PERI UP birdcage

scaffold enclosed the individual steel ribs on all sides and the height of the scaffold increased in step with the construction progress.

The shoring solutions were completed with the formwork systems which facilitated an optimized transfer of loads. Interface problems were kept to an absolute minimum, errors in the execution were avoided and productivity was maximized. The RCS climbing protection panel completely enclosed the building edges of the uppermost floors still under construction. This safeguarded personnel and passers-by alike and also ensured a higher operational performance.



# Successful initial applications of system formwork

Aspen Residence, Penang

**Contractor**  
Rimbaco Sdn. Bhd.  
**Field Service**  
PERI Malaysia



**Eng. William Low, Project Manager:**  
“For the team it was the first time using system formwork. Compared to the use of conventional formwork we were able to save around 50% of working time. Especially the straightforward application is to be emphasised. The whole team quickly understood the system and worked with little training.”



Always being a conventional contractor, Rimbaco relies on PERI for their first system formwork for this 26 storeys residential and commercial building in Penang. DUO was first introduced for the shear wall of the upper storeys as the construction team has started working on

the first 13 storeys with timber and boards. Due to its low weight, all work will be carried out by hand. In addition, the formwork system is very simple and thus easy to handle. The good quality of the system components guarantees a high reusability and at the

As the panels are very light they can be installed manually. The construction team works efficiently and without having to wait for the crane.



same time provides good wall surface results.

Furthermore, the reduced cleaning effort results in time savings: as the concrete does not stick to the formlining, it can be easily and quickly cleaned after every use.

## Fast shuttering and striking

1Malaysia Civil Servants' Housing Programme (PPA1M), Putrajaya

Located at Precinct 5, Putrajaya, a total of 100,000 houses will be built under 1Malaysia Civil Servants' Housing Programme (PPA1M) nationwide. The first phase of the PPA1M programme involving the construction of 10,366 houses was launched in April 2015. Mitrajaya first time using the new innovative system DUO for this housing project. DUO was chosen to enhance the efficiency, flexibility, speed and cost saving. With the integration of the DUO for the walls and columns. PERI TK Table and PERI UP for the slabs, can be safely



shuttered from the installation level. The panels are hooked in from below and pushed upwards by means

of the shuttering aid. As the panel size determines the position of the slab props, measuring is not necessary.

**Contractor**  
Pembinaan Mitrajaya Sdn Bhd  
**Field Service**  
PERI Malaysia



**Mr. Ng Kong Huei, Project Director:**  
“DUO system rationalises the processes on the construction site and we were able to reduce the execution time as well as staff requirement. DUO can be cleaned easily because the concrete hardly sticks to the formlining. We are satisfied with the concrete surface results too.”

## DUO Formwork

Lightweight, universal and easy



DUO is the innovative system formwork featuring a very low weight and extremely simple handling. It is not only the material used that is innovative, but rather the entire concept. It allows for efficient formwork of walls, columns and slabs using a minimum number of different system components.

DUO Panels can be used for vertical and horizontal applications. Besides the investment and logistics costs, this also minimises the expenditure for the training of staff. Simple operations, low weights and uniform system components allow for a very high productivity on the construction

site. Working with almost no tools additionally reduces the risk of injury and prevents noise.

The special highlight of DUO: easy replacement of formlining guarantees quick maintenance – without requiring any special tools or skills.



### Universally applicable

Flexible forming of walls, columns and slabs using only one system



### Ergonomic in all respects

Low weights, crane-free handling and intuitive application



### Easy replacement of formlining

Quick maintenance with just a few screws – without requiring special skills



With DUO, the slab can be safely shuttered from the installation level. The panels are hooked in from below and pushed upwards in from below and pushed upwards by means of the shuttering aid. As the panel size determines the position of the slab props, measuring is not necessary.







# Performing systems from one source

Suruhanjaya Pencegahan Rasuah Malaysia (SPRM), Precinct 7, Putrajaya



**Contractor**  
Pembinaan Mitrajaya  
Sdn Bhd  
**Field Service**  
PERI Malaysia

**Mr. Leslie Lim, Project Director:**  
“The expertise of PERI’s engineering staff was invaluable to our project. Their unique and innovative formwork designs served a variety of applications, including a challenging shoring design utilizing the PERI UP system. PERI’s solution allowed us to execute our project in a safe, productive and timely fashion.”

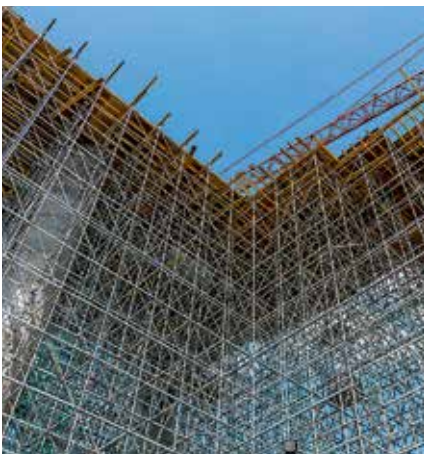
The Malaysia Government is investing in the extension of the Malaysian Anti Corruption Agency in Putrajaya. 3 office towers are built with a distinctive architecture, based on traditional local housing concepts founded on piles. The 3 highrise with 25 to 30 levels start in a height of 20 m - 40 m above the ground, founded on top of a series of inclined mega columns.

The building is situated on a hill in the centre of the Government City of Putrajaya and is expected to be completed by the end of 2016. In close cooperation with the engineers from the contractor MITRAJAYA, PERI designed especially for the high shoring a very flexible and safe solution with the PERI UP volumn shoring. A steady grid pattern of 150 cm x 150 cm x 150 cm makes assembly easy to manage.

The flexibility of the PERI UP system allows to modify the grid pattern to 100 cm of 50 cm ledgers to get around the columns and keep the system stable and rigid.

The slanting mega columns can easily be climbed thanks to the RCS rail guided system, which allows safe climbing even on the “face down” side of the columns. A bracing system made of custom made connecting parts and ST 100 has been designed in close cooperation with the structural engineers from ARUP in order to stabilize the slanting columns during construction.

Finally, above the 180 cm thick transfer floor slab, the typical floors have been realized in a very economical way using PD 8 and TK table form.





# Detailed cycle planning with optimized system use

## You can rely on PERI

RGT2 LNG Tank, Pengerang, Johor



**Contractor**  
Samsung C&T  
Corporation  
**Field Service**  
PERI Malaysia

### Mr. Alex Seo, Civil Manager:

"We are satisfied with PERI formwork not only the material but also their continuous technical support at site. PERI system are versatile and easy to handle during assembly, jumping and rectifying."

With a package of solutions consisting of formwork, scaffolding, logistical and technical services provided throughout the project, PERI engineers effectively supported Samsung C&T Corporation for the construction of the LNG tank with capacity of 5 million tons per annum and two 200,000 m<sup>3</sup> LNG

storage tanks. Construction is expected to be completed by April, 2018. The re-gasification terminal (known as RGT-2) is part of Malaysia's development plan to secure stable natural gas supply for the nearby Refinery and Petrochemical Integrated Development (RAPID), Pengerang Co-generation Plant (PCP) and also to the Peninsular Gas Utilization (PGU) Grid. The main focus was to coordinate the wide range of formwork configurations, with a tight schedule and high material requirements in particular. In addition to the planning of formwork and scaffolding solution for the complex geometries and high loads, strict compliance of the construction schedule and staying within the planned budget for the imposing LNG Project were the major challenges. The right choice of the tie system is crucial, particularly for structures with special requirements, such as LNG



Tanks where water proof concrete is necessary. The SK sealing cones prove to be an advantage for closing the required tie positions. The cones could be fixed with minimum effort and are permanently watertight.

The outer tank diameter is 89.40 m and the overall pouring height is 4.50 m when completed. To withstand the pressure from within, the standard wall thickness and the buttress is about twice as thick. The result with a height of 4.50 m for each casting, the main contractor manages to finish the entire wall casting in only 8 sequences.

## SK tie cone system

### Lightweight, universal and easy

The SK sealing cones prove to be an advantage of waterproof concrete through to radiation protection.

It has long life span, replaceable plastic tubes and moreover, it can be simply unscrewed for ease of striking.

It is used as a stable spacer with tube for walls thicker than 60-cm-tie rod recoverable.



The excellent finishes resulting from the use of the PERI SK Tie System suited the high demanding off-form requirement.



- waterproof
- gas impermeable
- fire-resistant
- soundproof
- suitable for strong-rooms and architectural concrete



# Tunnel know-how for a cost-effective system solution

Tun Razak Exchange Station, Kuala Lumpur



TRX is an iconic 70-acre development in the heart of Kuala Lumpur that is set to become a dedicated international financial and economic hub, promoting Malaysia as a new global economic growth nucleus. Strategically located at the southern gateway to Kuala Lumpur's city centre, TRX is flanked by main arterial roads, with its excellent accessibility and connectivity via an integrated underground Mass Rapid Transit (MRT) interchange station as well as direct connectivity to key roads and major highways such as the SMART Tunnel, MRR2, Jalan Tun Razak, Jalan Bukit Bintang, and Jalan Sultan Ismail, as well as connections to the planned KL-Singapore HSR in Bandar Malaysia via the MRT Line 2.

PERI engineers developed a customized formwork carriage solution for

WCT, one of our regular customer using components taken from the VARIOKIT Construction Kit and supplied formwork and scaffolding from one source.

TRX infrastructure project runs underground with a depth of 14.00 m, the double-tube tunnel with a rectangular cross-section was realized using cut-and-cover construction method.

With this customized project solution, the construction crew maintained a 3 week cycle. PD 8 elements were connected to form large-size units which could be moved very quickly to the next place of use each time. This saved valuable crane time and also allowed moving operations to take place in the area even when no crane was available.



**Contractor**  
WCT Construction  
Sdn Bhd  
**Field Service**  
PERI Malaysia

**Encik Mohamad Hafez bin Abdul Malek, Project Manager:**

"For such projects, the choice of the right formwork system is a very important decision. After very careful consideration, we decided in favour of PERI due to the high level of safety, easy handling and fast cycle sequences. As expected, the PERI team has provided us with very professional support."





## Climbing System

### RCS and ACS Climbing Formwork

**PERI ACS self-climbing variants** for facades, building cores, shaft structures and inclined bridge pylons make the construction of high concrete structures extremely economical, fast and safe. The efficient sequence of operations from floor to floor facilitate allow a very high level of productivity and exceptionally short cycle times.

#### Crane-independent

Shuttering, striking and hydraulic climbing in a very fast work rhythm

#### Weather-independent

Comfortably-designed platforms, also protected against wind and weather if required

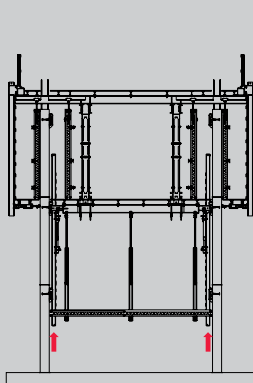
#### Load-independent

Working platforms can accommodate high loads, e.g. arising from material storage or placing boom mast

### Installation and climbing sequence

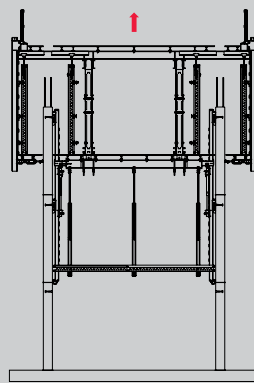
#### Climbing Phase

Presentation with external working platforms on advancing core



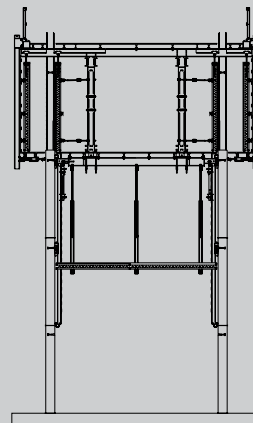
#### 1<sup>st</sup> Step

Strike, Attach climbing shoe, Climb rail, Remove trailing climbing shoes and anchors



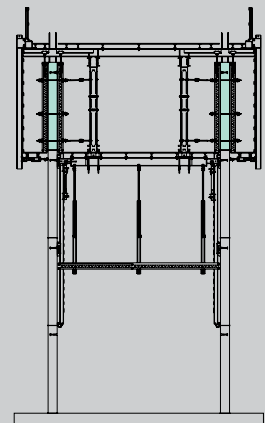
#### 2<sup>nd</sup> Step

Climb climbing scaffold, Position climbing scaffold on climbing shoe



#### 3<sup>rd</sup> Step

Place internal formwork, Clean formwork, Reinforce, Install leading anchor Shutter



#### 4<sup>th</sup> Step

Close formwork, Concrete





# Systematic adaptation for completely safe working conditions

KVMRT UDG Cochrane Station, Kuala Lumpur

**Contractor**  
IDE-Totalap Joint Venture  
**Field Service**  
PERI Malaysia



Suspended scaffolding for installation of M&E & ceiling and wall cladding.

For the M&E and architecture finish works the contractor chose to use PERI UP scaffolding due to its safety, versatility and fast installation. As the space below the working area was fully occupied by escalators, the PERI UP scaffold was suspended from the ceiling at a height of 15 m to provide access for installation of cladding on ceiling and walls. The top platform was suspended 2 m below the slab structure with an area of 8 m x 21 m and there were 5 platform levels below.



PERI has provided a complete solution starting with design, calculation, method statement for installation, logistics and an instructor on site to ensure that the installation ran smoothly. The metal decking with

anti-slip surface is providing an excellent working area with live load capacity of up to 200 kg/m<sup>2</sup> on each level. For the access from one level to another, PERI has supplied a hatch 75 x 100 with a ladder. The opening



**Mr. Raymond Tan, Senior Engineer:**

"With PERI UP system scaffold, construction can be optimally executed in a safer manner, shorter time frame and lesser cost. The partnership and the support has been absolutely phenomenal, the productivity and efficiency has all been met and our targets are on track."

of the hatch is closed automatically which provides the working space across the whole area of the platform. Horizontal ledgers UH plus are also used as a railing and the yellow toe board to prevent any falling object.

## Mobile working platform reduces time and material cost

KVMRT Semantan North Portal, Kuala Lumpur

Semantan North Portal is the interfacing point between the underground and elevated tract, located next to Jalan Duta, Kuala Lumpur. This portal will have its Portal Building to house M&E related equipment, as well as a 132 kV TNB substation, a suction and pump room and a permanent access road.

Nanyang Tunnel Engineering has chosen 9.30 m high

PERI UP working platform for installation of the water proofing membrane. The ground levels were not equal and part of the scaffolding was placed on the concrete cantilevered beam. The whole scaffolding was anchored using wall ties to ensure stability. To provide an access to all levels, PERI has supplied a stair tower which was connected to the scaffolding itself.





# Safely to the top with optimally adapted climbing technology

KL Eco City Parcel B, Kuala Lumpur



KL Eco City is an integrated urban city development located in Bangsar right across Mid Valley City. It is the first mixed commercial and residential development designed for Gold Certification under Malaysia Green Building Index (CGBI). Due to the confined conditions on the construction site, crane time for the formworking operations was to be minimized; in addition, unobstructed and safe

pedestrian access for the entire construction period had to be guaranteed. The complex building floor plan with curvatures, offsets and different angled walls presented further challenges during the planning and execution.

An efficient working environment was guaranteed by the use of the RCS climbing protection panel on the building's outer edges.

This enclosure provided safe working levels and could be adapted to the constantly changing layout of the slabs.

PERI designed a special anchor solution that could vary the inclinations of the protection panels and allowed the hydraulic climbing procedure to take place without any modifications. Laterally, sliding scaffold elements secured the variable balcony cantilevers.



**Mr. Yap Wei Tong, Asst General Manager – Project:**  
“This KL Eco City itself is a real technical challenge whilst the site surroundings also provide severe restrictions. The PERI climbing formwork solution, based on the RCS system, fully meets our requirements-both in terms of safety as well as use.”

**Contractor**  
Grand Dynamic Builders Sdn Bhd  
**Field Service**  
PERI Malaysia





## The VARIOKIT Engineering Construction Kit

### Heavy-Duty Trusses and Heavy-Duty Shoring Towers for high loads



With VARIOKIT core and system components, heavy-duty shoring towers and wide-span lattice girders can be systematically assembled. Also for other construction tasks where high loads are to be transferred, VARIOKIT is the optimal system. Providing the overall solution from one source ensures optimized processes during the course of the project. Through the connection possibilities for the PERI UP Modular Scaffold, secure access to all working areas as well as the required working surfaces is easily integrated.

#### **Countless possibilities**

Bridge, tunnel and civil engineering solutions with core and functional system components

#### **Fast assembly**

with bolted connections and pre-assembled tower segments up to 10 m

#### **Cost-effective solution**

as all system components are available in the PERI rental parks

#### **High degree of safety**

Integrable solutions for working platforms and access means with the PERI UP modular scaffold

