

# PERI® *scope*

The Formwork  
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Successful construction with PERI

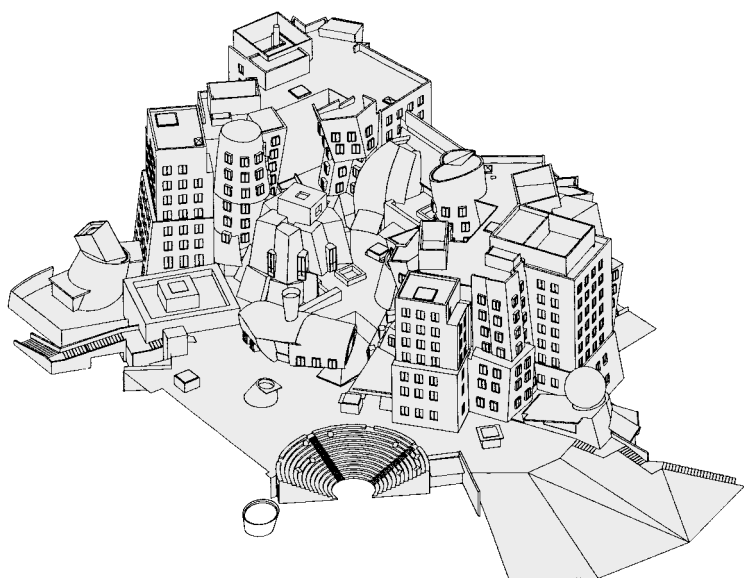


The Concert Hall was formed with 130,000 sqft (12,000 m<sup>2</sup>) of SKYDECK. The 20' (6.10 m) high slab was shored with the MULTIPROP 625. With this solution, there was no need to use two

or more props to achieve the heights required. The complicated wall designs were constructed effectively with the TRIO Wall Formwork system.

# PERI SKYDECK: Increasing Agility in Concrete Slab Forming

The Ray and Maria Stata Center, Boston, MA



Frank O. Gehry's creative architectural visions were translated into a reinforced masterpiece using PERI's know-how in formwork and engineering.

This unusually shaped facility is located at the MIT campus in Cambridge, MA. Designed by Frank O. Gehry, the building offered many challenges for the contractor. Some of these included a 42 x 52 ft (12.80 x 15.85 m) wall that was poured 9" (22.90 cm) from the adjacent building, beams ranging from 36" (0.91 m) wide and 142" (3.60 m) deep with a height of 40 ft (12.19 m) and slabs varying both in height and thickness.

For the walls, PERI TRIO was able to efficiently solve the various challenging requirements of this project. For example, large gangs could be moved at one time reducing the cycle times. This was made possible by the high rigidity of the elements and their simple coupling device – the BFD. Along with the KG 240 climbing brackets, TRIO fulfilled the expectations of this job even when

walls and columns had to be formed at an angle of 10°.

The various ceiling heights and slab thicknesses were completed with the PERI SKYDECK system and MULTIPROPS. The MULTIPROPS are aluminum post shores that allow continuous adjustment to suit any ceiling height. The patented Drophead system associated with SKYDECK reduces the amount of equipment required on site. It enables early stripping of the SKYDECK panels and main beams, while the props remain as reshores.

**The combination of these efficient PERI systems with the close cooperation between the jobsite and PERI's engineering team led to creative solutions that enabled this project to be completed in a timely and cost-effective way.**



Cantilevered slabs with continuous shoring using the MULTIPROP.



Colin Farragher, carpenter foreman; Mike Soares, carpenter foreman and Robert Adison, Local 40 Carpenter Steward (from left to right).

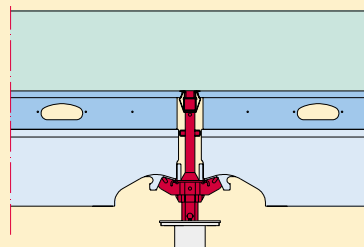
"PERI's SKYDECK system is easy to erect and requires little effort to level off. It is time effective in situations which require significant versatility, such as cantilevering for building decks which protrude beyond existing super-structures", stated Mike Soares.

TRIO Wall Formwork in conjunction with PERI's KG 240 climbing brackets met the requirements of forming the 10° sloped walls.

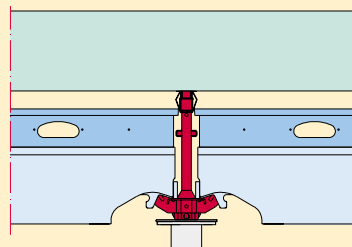


**Early stripping with SKYDECK:**

PERI's Drophead solution makes reshoring easy and minimizes the amount of materials. The SKYDECK panels and the main beams can be recycled to the next floor without dismantling the reshore.



**Erected**  
The panels and cover strips produce the soffit finish.



**Drophead lowered**  
The cover strip and dropheads remain in place while the panels and beams are stripped.

**Contractor:** S + F Concrete Contractors, Inc., Hudson, MA  
**Field Service:** PERI Boston

# 1 Million Sqft Parking Garage Completed with PERI's Expertise

Rental Car Parking Garage at BWI Airport, Linthicum, MD

Custom steel beam formwork was adapted to fit the patented SKYDECK system to produce an extremely quick stripping slab forming system.



This 1,080,000 sqft (100,332 m<sup>2</sup>) one level parking garage was built using PERI's slab, wall and reshoring systems. The 20'-0" (6.10 m) elevated slab with typical 60' x 60' (18.30 x 18.30 m) bays including 16" x 42" (0.40 x 1.06 m) PT beams were placed using a custom steel beam form and SKYDECK.

**This solution provided Facchina Construction with a system that could be stripped quickly and still produce a high quality finish. Utilizing this combination of systems allowed the client to quickly cycle equipment.**



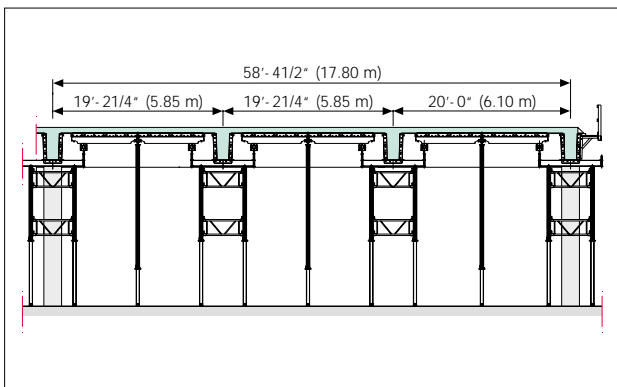
PERI's MULTIPROP system (MP 480's and frames MRK) was used to support the custom steel beam formwork. The high load capacity of the MULTIPROP Towers provided a stable forming solution even for deep beams.



Gerald Ours, Superintendent Facchina Construction, Harvey Evans, VP PERI USA and Greg Glorioso, PERI Sales Engineer (f. l. t. r.):

"PERI Formwork Systems has allowed us to take three months off a million sqft (92,900 m<sup>2</sup>) frame deck project with an already tight schedule", stated Gerald Ours.

**Contractor:** Facchina Construction Company Inc., La Plata, MD  
**Field Service:** PERI Baltimore



Architectural retaining walls were formed using the modular TRIO wall system. A high level of finish was achieved with this system.

# GT 24: The Carpenter Friendly Girder for cost-effective beam and table solutions

St. Luke's Hospital Parking Ramp, Cedar Rapids, IA

The St. Luke's Hospital Parking Ramp was completed by Kleiman Construction in order to accommodate the Nassif Heart Center parking facility. The ramp consisted of a 4 level post-tensioned slab with a short side radius of 96'-2" (29.3 m) and a long side radius of 224'-10" (68.5 m). The bays between the beams were "Pie-shaped", meaning a flexible and adaptable system would need to be supplied.

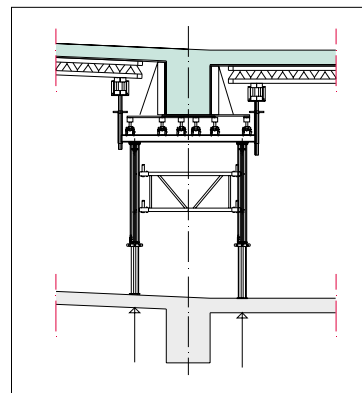
**The concept of the GT 24 is to provide contractors with a product that combines high loading capacities with the versatility associated with wood. The GT 24 can be used for both beam and table solutions. One can nail into the wooden girder at any location without altering the properties of the structure.**



The versatile and lightweight MULTIFLEX table system can easily be set in place with 2 men.

Leveling of this system is achieved by simply adjusting the spindle on the MULTIPROP.

**Contractor:**  
Kleiman Construction Inc.,  
Cedar Rapids, IA  
**Field Service:** PERI Indianapolis



The beam shoring consisted of 3 tables approximately 20' (6.10 m) long. A hinged headed allowed the tables to be stripped with the 29" (0.74 m) beam form sides left in place.

PERI provided this solution with 32,000 sqft (2,973 m<sup>2</sup>) of MULTIFLEX tables and 15 beam form tables approximately 62' (18.90 m) long. The GT 24 girder was used as the primary and secondary support beams for this system.

John Charnowski, Superintendent (pictured):  
"The MULTIFLEX system is light weight, versatile and easy to work with. The wooden GT 24 girder is much more carpenter friendly than aluminum or steel joists."



## Quick Response Time Benefits Client

Omaha Convention Center Arena, Omaha, NE

PERI received the order to deliver 38,000 sqft (3,530 m<sup>2</sup>) of equipment to the Omaha Convention Center with the expectation that it would arrive the next day. Accomplishing this incredible task, PERI was awarded the remaining phases of construction. PERI had excelled in supplying the kind of logistics support our clients expect.

**The Convention Center is the Midwest's ideal meeting venue. Housing a 17,500 seat arena, 194,000 sqft (18,023 m<sup>2</sup>) of exhibition space and a 30,000 sqft (2,787 m<sup>2</sup>) Grand Ballroom, this facility will accommodate a large selection of events.**

**General Contractor:**  
Kiewit Construction, Omaha, NE;  
**Shoring Subcontractor:**  
Shor Co., Omaha, NE  
**Field Service:** PERI Indianapolis



Designing the system as standard modular MULTIFLEX units, allowed PERI to solve complicated designs by simply joining the towers together in specific arrangements.

Don Grace, VP and Superintendent (Shor Co.):  
"The PERI MULTIFLEX system was very fast and easy to use, especially considering we were first time users. The system saved us a lot of labor."



A complicated design constructed easily using MULTIFLEX towers and Beam Walers.

Beam bottom units were prefabricated on the ground and spliced together. This allowed units of approximately 60 ft (18.3 m) in length to be flown onto preset towers.

## PERI Delivers Excellence in Engineering Support

Overture Center, Madison, WI

Steve Schuchardt, Carpenter Foreman:  
"This was our first job with PERI Formwork. The Engineering and technical support was excellent. We liked the TRIO system so well we purchased the material."



The Overture Center is a \$ 200 Million Dollar effort to create an arts district in the heart of Madison, WI.

The acoustical design of the Performance Hall consisted of large structural concrete walls with complex geometry extending approx. 118 ft (36 m). J. H. Findorff and Sons required a formwork system that could cycle laterally around the structure, easily adapting to offsets, corners and pilasters.

Cycling TRIO panels with KG was a success on this project.



**Using PERI TRIO and KG climbing system, the walls were cycled effectively in four 16' (4.88 m) lifts around the perimeter of the structure.**

The Overture Center is the major result of a civic gift by Businessperson Jerry Frautschi.

**General Contractor:**  
J. H. Findorff & Sons Ltd., Madison, WI  
**Field Service:** PERI Chicago

# Modular Tables

## Reduce Crane Time

Westin Midfield Terminal, Detroit, MI



In order to compensate travellers from the new Northwest Airlines terminal, a Westin Hotel was constructed. This would alleviate the hassle of accessing the terminal with the need of shuttle or rental car.

The project consisted of eight post tensioned and three typical slabs.

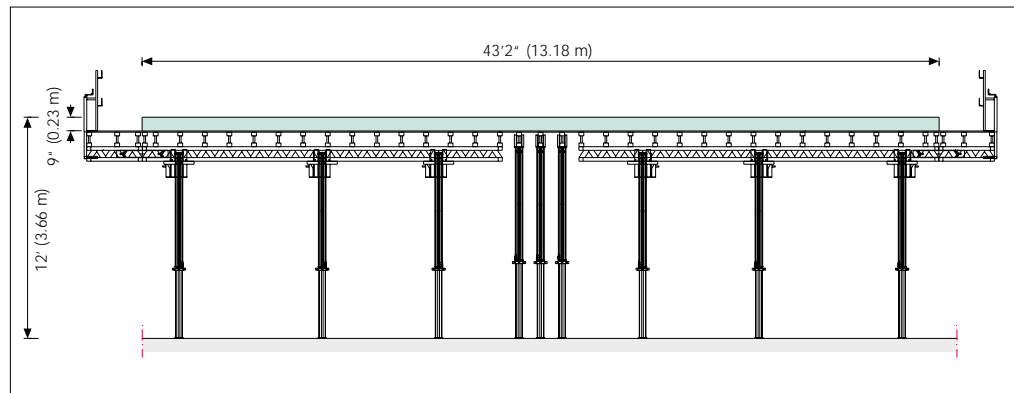
The slabs ranged from 18,000 sqft (1,762 m<sup>2</sup>) to 42,000 sqft (3,902 m<sup>2</sup>). Therefore PERI supplied a carefully laid out combination of slab forming systems including: SKYDECK, UNIPORTAL and MULTIFLEX. The combination of these systems proved to be efficient and quick in providing a superior finish.

**With an overall size of 300 sqft (27.9 m<sup>2</sup>), the UNIPORTAL tables were much larger than conventional shoring tables thereby cutting down crane time. Using the MULTIPROP as single props or in combination with MRK Frames as towers, allowed the client to set and strip with ease and accuracy – independent of the varying slab heights.**



Using UNIPORTAL tables allowed them to move 300 sqft (27.9 m<sup>2</sup>) in extremely short periods of time.

Moving the UNIPORTAL tables with handrails and walkways already attached ensures safe working environment.



The guest level slabs opened in the center to a large atrium.

**Contractor:** Walbridge Aldinger / Devon Industrial Group, Detroit, MI  
**Field Service:** PERI Indianapolis



With the slab measuring 43 ft (13.10 m) in width, it only required two tables to span the entire length. So with each pick, 50 % of the slab was stripped.

Stable and high load capacity make the MULTIPROP and MRK frame an optimal solution.

Ed Schultz, Site Superintendent:  
 "We have used many different systems but the solutions provided by PERI for this job were by far the quickest and most versatile."

# Custom Steel Formwork Produces Exceptional Architectural Concrete

The Grand Plaza, Chicago, IL

With a footprint of 1.7 million sqft (158,000 m<sup>2</sup>), the twin tower apartment high rise in Chicago's booming River North neighborhood will occupy an entire city block. The project features a 57 story tower on the east end and a 37 story on the west end including 80,000 sqft (7,432 m<sup>2</sup>) of parking space. With retail units and a full scale grocery store on the ground floor, a 1,000 unit parking structure and 764 apartment units, the Grand Plaza is an impressive mixed-use development.

In order to successfully complete such a project on time, formwork design was given a high level of importance. Working with PERI, McHugh relied on the experience and expertise of the formwork and scaffolding specialists.

PERI's goal was to provide a complete procedural concept through a concise construction plan containing formwork systems that were ideally suited to each specific task.

Slab forming made quick and easy: Using an efficient erection grid with SKYDECK panels, only minimum filler areas were required.



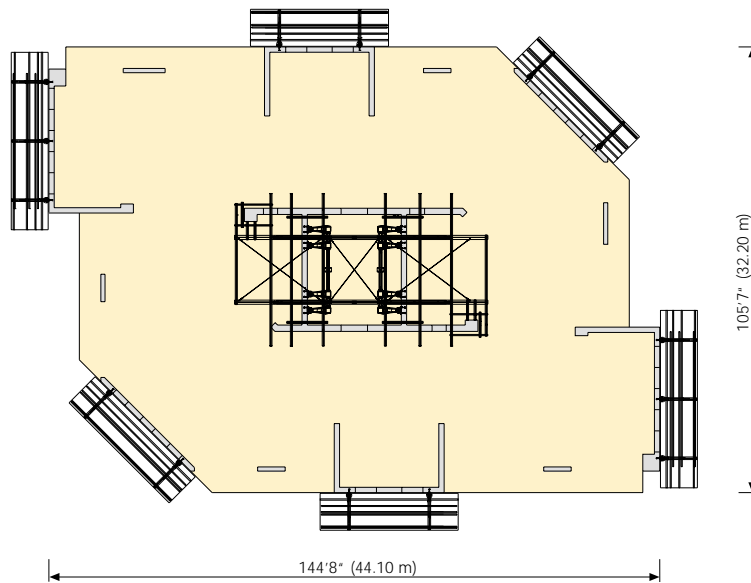
Jim Payne, Superintendent; Bob Siegel, Project Engineer and Joe Payne, Superintendent (from left to right): "PERI's systems including SKYDECK and ACS are a great addition to the Construction Industry. When dealing with deck and wall systems, our company is looking for a light weight, productive, reliable and easy to dismantle system. I feel that PERI's product line meets our needs!"

PERI's Formwork and shoring solutions were utilized exclusively throughout the project. SKYDECK was rapidly set and cycled through the garage as well as the towers.

**Contractor:** James McHugh Construction Company, Chicago, IL  
**Field Service:** PERI Chicago and PERI Germany, Weissenhorn

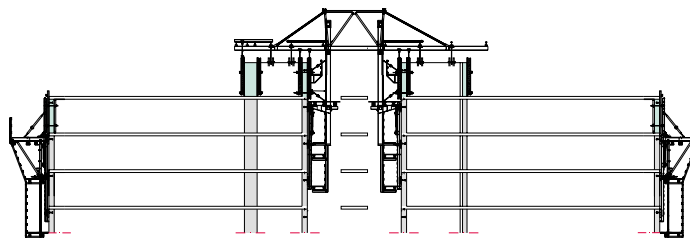


The crane independent ACS was used to cycle the custom steel formwork on the exterior walls to produce an architectural finish. A high level of importance was placed on the quality of finish required on this project. This was achieved through the various PERI products supplied.



The towers will be topped with illuminated penthouses and masts for architectural interest.

For the core of the East tower, PERI supplied a special construction on the base of the Automatic Climbing System ACS including eight climbing platforms. With this solution McHugh was able to concrete both the overhanged shear walls and the corewalls in just one pour.



After completion in spring 2003, the East and West towers of Chicago's largest residential project will reach heights of up to 640' (195 m) and 377' (115 m).



Integrating ACS, SKYDECK and VARIO provided a safe working environment.

# Tablized Slab and Beam System Saved Time and Money

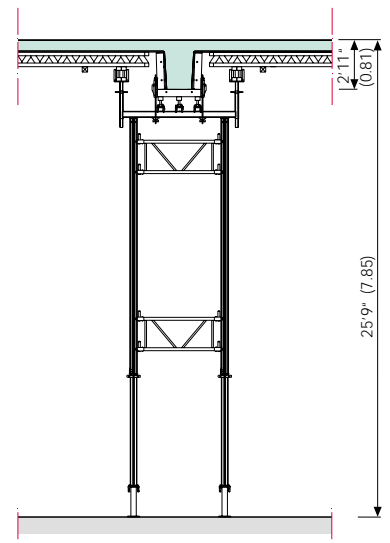
Philadelphia Eagles Football Stadium, Philadelphia, PA

Madison Construction is the concrete contractor responsible for placing nearly 60,000 yd<sup>3</sup> (45,876 m<sup>3</sup>) of concrete required for this project. The main concourse level consisted of 360,000 sqft (33,444 m<sup>2</sup>) of slab and beam 24 ft (7.32 m) above ground level.

PERI combined the easy to assemble MULTIPROP system with MULTIFLEX and TRIO panels for an efficient solution. For this site 26 ft (7.92 m) long by 22 ft (6.71 m) high towers (including beam soffit and side) were used. This complete system prevented expensive wooden solutions on site. The advantage of the MULTIPROP towers was that they could easily be moved from one pour to the next in complete units using the PERI Trolley.



100 % of standard material for slabs and beams cut actual production costs: the beam tables had been supported with MULTIPROPS 625 and MP bases.



Incorporating the MULTIFLEX slab system with TRIO allowed the client to quickly reconfigure the ganged formwork from one pour to another.

Combining both MULTIFLEX and TRIO saved countless man hours that would otherwise have been required to cycle the formwork.



Harry Duke, Superintendent:  
"Tabling the slab and beam formwork for the main concourse level was the only way we could bring this job in on time and under budget."

57,000 sqft (5,295 m<sup>2</sup>) of MULTIFLEX slab system and 17,000 sqft (1,580 m<sup>2</sup>) of TRIO wall system were supported with MULTIPROPS connected by MRK frames.

# PERI's Large Range of Product Allows Client to Achieve Schedule

## Torpharm Expansion II, Toronto, ON

The Torpharm Expansion project was scheduled for completion 11 months after starting. In order to achieve this milestone, Hardrock Forming Ltd. used a large range of PERI formwork. The demanding schedule required a forming system that would satisfy all of the client's needs regarding cost

and efficiency. PERI was able to supply these solutions, whereby conventional forming systems would have failed.

Approximately 24,000 sqft (2,230 m<sup>2</sup>) of TRIO wall panels and 48,000 sqft (4,460 m<sup>2</sup>) of the light-weight and easy to erect

SKYDECK Slab Forming System was used for the expansion of the Pharmaceutical facility. Other product ranges included UNIPORTAL tables, KG climbing brackets and TRIO column panels. With such a broad range of equipment, PERI provided the client with over 1,000 hours of

engineering to ensure a maximum production rate of concrete placement could be achieved.



Michael Chartrand, Superintendent:  
"The use of PERI equipment eliminates the massive waste of conventional wood material and saves labour."

Hardrock used several of PERI's forming systems including SKYDECK, UNIPORTAL tables, HD 200, high MULTIFLEX shoring, TRIO columns, KG platforms and TRIO wall panels.



The PERI UP stair tower provides safe and easy access.



Staging area used to construct MULTIPROP towers making erection efficient and simple.



The HD 200 props are used for their high load capacity in this relatively confined workspace. Loads were transferred from the slab to the steel beams and then to the HD 200.

Site support along with logistics were especially important when using multiple systems.

**Contractor:** Hardrock Forming Ltd.,  
Concord, ON  
**Field Service:** PERI Toronto

# SKYDECK and MULTIFLEX: Flexible and Quick Slab Forming Systems

Niagara Falls Casino / Gateway Project, Niagara Falls, Ontario



One of Canada's largest construction sites would definitely describe the Niagara Falls Casino located in Ontario. This 8 hectare site is being constructed by MCH (Main Parking Garage) and Premili Group (Hotel, Casino and VIP Parking). This facility will

house a 470,000 sqft (43,663 m<sup>2</sup>) Casino, with a 368 room Hyatt Hotel including a 1,500 seat auditorium and parking capacity of over 3,000 cars. In order to have this facility built as per the schedule, PERI provided two slab form systems. The SKYDECK

system and the MULTIFLEX system were chosen for both flexibility and speed. The SKYDECK slab system incorporates a light aluminum panel, main beam and post. This enables easy handling and quick set up and dismantlement. The MULTIFLEX table

system incorporates both flexibility (associated with the wooden GT 24 girder) and high load capacity (associated with the aluminum MULTIPROP) producing a quick and stable slab forming system.



The Niagara Falls Casino Gateway Project will have a 470,000 sqft (43.663 m<sup>2</sup>) gaming floor.



Large MULTIFLEX tables flown easily and safely.

MULTIPROP 625s are used with MULTIFLEX tables. Stripping of tables can be easily performed with the PERI Trolley.



Don McKnight, Project Manager:  
 "The SKYDECK System is very manageable and saves crane time. It is proven to be light weight and very labour efficient."



A well designed erection grid allowed the client to form complicated column capitals using SKYDECK.

**Project Management:**

PCL Constructors Canada Inc.,  
 Toronto, ON

**Contractors:** Premrili Group, Toronto, ON (VIP Parking, Hotel, Casino) and MCH Inc., London, ON (Main Parking Garage)

**Field Service:** PERI Toronto

Large MULTIFLEX tables can be erected from the ground with minimal effort.

The patented main beam design allows a crew of two men to easily erect the SKYDECK system.

# Reduced Crew Size In a Market with Labour Shortage

Classico Condominiums, Vancouver, BC

The Classico Condominium project consisted of a 38 story residential structure. The project itself posed several obstacles including various beam depths ranging from 8" to 52" (0.20 to 1.32 m) deep. These problems were overcome by using the SKYDECK system for the parking levels and MULTIFLEX for areas with deep slabs. Through a combination of both systems, Quorum was able to achieve increased productivity.



**Contractor:** Quorum Construction Inc., Vancouver, BC  
**Field Service:** PERI Calgary

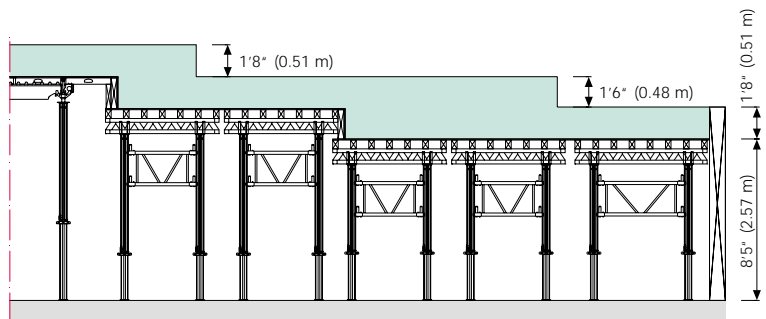


Quorum was able to save approximately 3 - 4 weeks off of the original schedule using the SKYDECK system.

John Smart, Superintendent:  
 "PERI has been the most impressive forming system we have ever used. They have provided us with excellent solutions to our forming requirement."

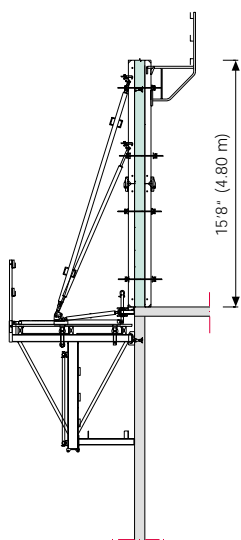


The advantages of the PERI solution were the speed of use, reduced crew size and employing less skilled labourers.



# Close Working Relationship with Engineering, Sales and Operations

East Side Village Loft, Calgary, AB



This 8 level residential condominium building required the slab to be poured at a height over 15' - 8" (4.8 m). This was performed using the patented UNIPORTAL table with MULTIPROPS and MRK Frames. The shear walls were constructed using TRIO panels and flown into place with the KG 240 wall brackets. Elite was able to achieve multiple pours using this system.

The KG system allowed Elite to form 15' - 8" (4.8 m) shear walls safely.

First time users of the KG 240 system felt safe and comfortable using this system.



The flexibility of the UNIPORTAL table allowed for quick setup times with minimal labour.

**Contractor:** Elite Formwork Inc., Calgary, AB  
**Field Service:** PERI Calgary



Steve Jensen, General Manager:  
 "PERI formwork has provided solutions to many of our unique forming situations. A close relationship with engineering, sales and operations has resulted in many successful projects. We look forward to continue success and support with PERI in the future."

# Architectural Pattern from SKYDECK Accentuates Look of Lecture Hall

Seneca College, Toronto, ON



The SKYDECK C-Hook ensures a safe mode of transportation for the tabilized system.

The pre-approved pattern from the SKYDECK system would accentuate the look of the lecture hall, according to the architect.



The construction of Seneca College proved to be a schedule driven project. In order to achieve an efficient sequence of construction work with a "lean" crew, the patented SKYDECK system was chosen.

**SKYDECK's logical erection sequence (props - main beam - panels) speeds up shoring. The use of its drophead system allowed for quick and easy stripping even at floor heights of 16 ft (4.88 m).**

With an amount of 20,000 ft (1.858 m<sup>2</sup>) of SKYDECK and MULTIPROP 480's the site had an efficient system at command that reduced labour cost on this project.



Vince Alberico, Superintendent:  
"It was the first time that we used SKYDECK. The learning curve was very quick with our crew, which meant fewer headaches and no lost time."

Edge tables completed with Handrail Holders and Handrail Posts SGP out of the SKYDECK product range were used to provide a safe working condition.

**General Contractor:**  
Vanbots Construction, Markham, ON  
**Contractor:** Hardrock / Structform JV, Toronto, ON  
**Field Service:** PERI Toronto

# PERI UP Rosett: The Versatile and Flexible Scaffolding System

Roy Thomson Hall, Toronto, ON



The PERI UP scaffolding system was used on the upper balconies to access the bulk-heads.



The Roy Thomson Hall enhancement project in Toronto, Ontario had only 22 weeks for the scheduled construction. This meant that an extremely quick scaffolding system would have to be

used. The PERI UP Rosett system was the product of choice. This system allows the user to easily erect large towers with minimal labour, yet ensuring strict safety regulations are

followed. For the reshoring of the main canopy, PERI provided the patented MULTIPROP and MRK frames for extra load capacity.

The speed of erection was crucial in awarding the tender to PERI.

**Contractor:** Ellis Don Corporation, Mississauga, ON  
**Field Service:** PERI Toronto

# Architectural Concrete Solution

## VARIO GT 24 Wall Forming System

**NEW**

Concrete surfaces remaining visible are a preferred means of design for present-day architecture.

PERI provides the right formwork solutions for all architectural concrete requirements possible – from the standard formwork for normal projects to specially designed custom and semi-custom systems for special projects.

**NEW:**

With the new VARIO Coupling VKS and the Alignment Clamp VRS, clean and accurate panel joints can now be constructed in order to fulfill a special architectural concrete finish on walls – quickly and easily.

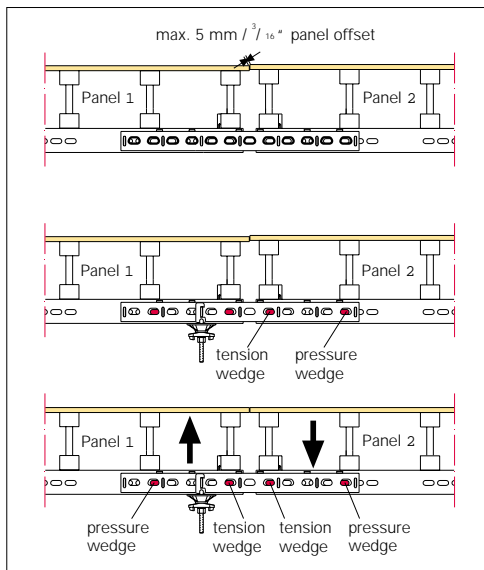


Perfect architectural concrete with horizontal and vertical pattern.

The VKS can be used to eliminate an offset of up to 5 mm / 3/16", while still serving as a standard panel coupling device.



To get further information, please contact your PERI Sales Engineer!



High quality finish with VKS: Minimized offset between panels.



The illustrations in this brochure are photographs of real site situations. Safety or formwork anchor details are therefore not to be taken as a definitive guide to the way the equipment is to be used.

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