PERI Automatic Climbing System (ACS)

The Automatic Climbing System (ACS) is a hydraulically operated self-climbing formwork system used for the construction of tall concrete structures such as building core walls and bridge pylons. Tall concrete structures have historically been formed with crane lifted formwork often referred to as “jump” forms. These systems require a worker to ride the formwork as it is raised to its next position in order to insert reties through the previously cast lift to secure the form. This procedure requires extensive crane time and is too slow, unsafe and unproductive for tall structures where the concrete walls are typically on the critical path.

The Automatic Climbing System is the latest development in climbing formwork technology by PERI GmbH. PERI is the world’s largest manufacturer and distributor of concrete formwork and shoring equipment with wholly owned subsidiary companies in over 40 countries. PERI introduced its first crane lifted formwork scaffold in 1972 which provided a safe working platform with the formwork panels mounted on retractable carriages. This innovation allowed for the simultaneous lifting of the formwork and work platform without the need for the workers to ride the forms as they are lifted. PERI introduced its first self-climbing formwork system in 1978 for use in the construction of bridge pylons. Numerous improvements have led to the current generation of the Automatic Climbing System which is the state of the art in self-climbing formwork technology.

The ACS has been used successfully on over 75 projects around the world including the Petronas Towers in Kuala Lumpur, the Second Severn Bridge in the UK, the Trump World Tower in New York and the Park Tower in Chicago. The Automatic Climbing System is a dramatic improvement over conventional jump formwork in terms of productivity and safety. An ACS climbing unit is raised without the use of a crane and is connected to the structure at all times during the climbing process. The system can be climbed during all weather conditions as it is designed to resist wind speeds of 200 km/hour (120 mph) and can safely be operated at wind speeds of 100 km/hour (60 mph). The platforms allow for safe and efficient work and can be designed to carry high loads for the storage of equipment and reinforcing steel. Even the placing boom for the concrete pump can be climbed with the formwork by the ACS.

Three standard configurations of the Automatic Climbing System are available: ACS-R (Regular), ACS-P (Platform) and ACS-G (Gallows). An ACS unit consists of two or more ACS-R or ACS-G brackets, an ACS-P platform or a combination thereof. Each unit is an independent system that requires only electrical power to operate the hydraulic pump.

The ACS-R is used on the exterior of a core wall (Petronas Tower - Malaysia, First National Center - Omaha), for the facade of a structural concrete building (Trump World Tower - New York, Park Tower, Chicago) or for bridge pylons (Second Severn Crossing - United Kingdom). A significant advantage of the ACS-R format is that there are no over wall obstructions thus permitting the reinforcing steel to be pre-tied on the ground and lifted into place in mats. The ACS-P configuration is utilized for the interior cells of a core wall (First National Center - Omaha) or for raising both the interior and exterior formwork for a building core together. ACS-P provides large work area for the storage of equipment and material. In the ACS-G arrangement the formwork is suspended above the surrounding structural slab which allows the core or shear walls to be poured monolithically with the slab (World Trump Tower New York, Park Tower - Chicago). This means of construction permits very short floor to floor construction cycles (2 days for the World Trump Tower and 3 days for the Park Tower).

The climbing sequence begins by stripping the formwork from the previously cast lift using the carriages on the brackets or platform. The leading climbing shoes are then bolted to the anchors in the previous lift. The hydraulic climbing mechanism then raises the climbing rails located at each bracket or platform beam to the leading climbing shoes where they engage and lock automatically. The climbing mechanism is switched from climbing the rails to climbing the unit. The ACS unit then climbs on the rails at the speed of 0.50 m (1'-8") per minute. After the unit has reached the leading climbing shoe, it is secured with a locking bar and the hydraulic system is disengaged. With the unit in its new location, the rebar is installed from the work platform and the formwork is positioned using the carriages. The formwork is now ready for concrete placement to complete the construction cycle.

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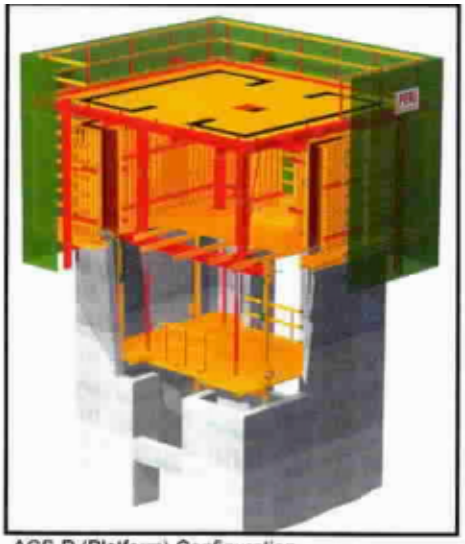
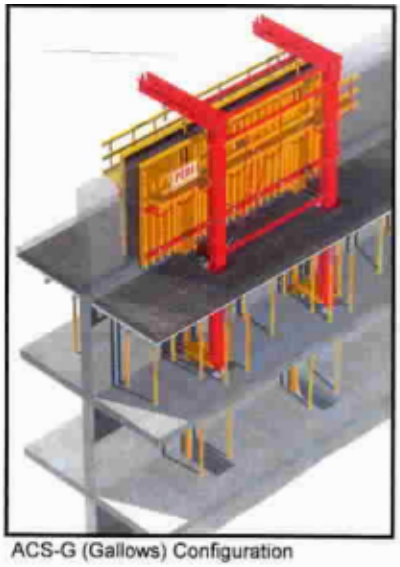
PERI Automatic Climbing System (ACS)

ACS-R (Regular) Configuration

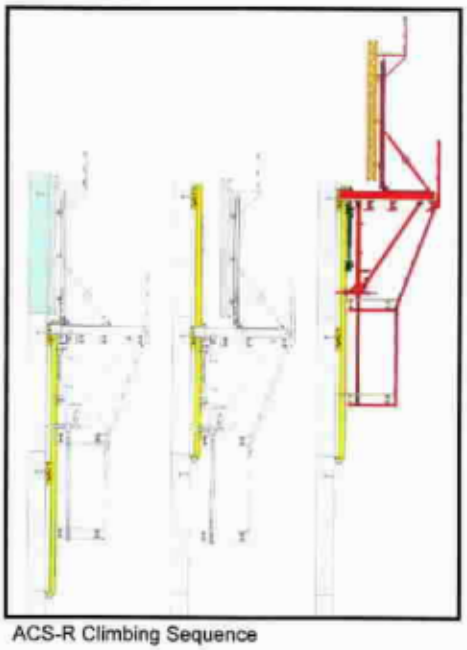


ACS-P (Platform) Configuration



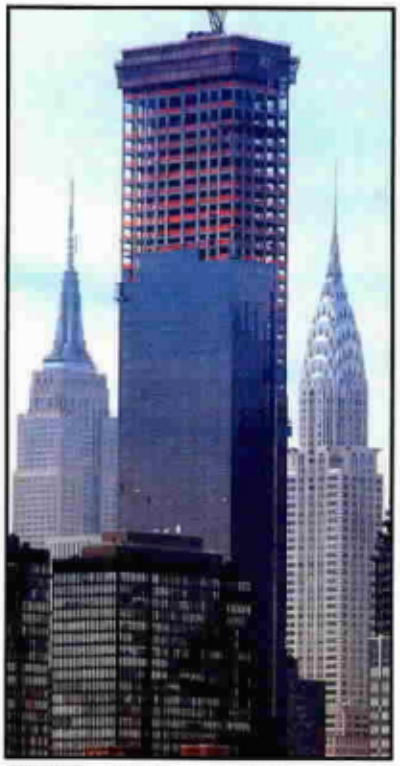
ACS-G (Gallows) Configuration

Second Severn Bridge - United Kingdom



ACS-R Climbing Sequence

First National Center - Omaha



World Trump Tower - New York

Petronas Towers - Kaula Lumpur, Malaysia

Park Tower - Chicago