

Engineering Solutions Systems

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Integrated Construction Services



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Bridges Engineering

Erection of precast beams & prefabricated steel girders

Sinking of pile caps under water

Tailor made platforms

Widening, repair, maintenance,
bearing & expansion joint replacement

Strengthening & temporary supporting for bridges
subjected to over designed loads

Heavy lifting

Lifting of water tanks

Truss lifting & skidding

Lifting, moving & skidding of abnormal
loads and heavy equipment

Lifting of roof slabs & Steel space frames

Conical roof & dome lifting

Slip-form

AICS Slip-form technique

► Engineering Solutions Systems – Bridges Engineering

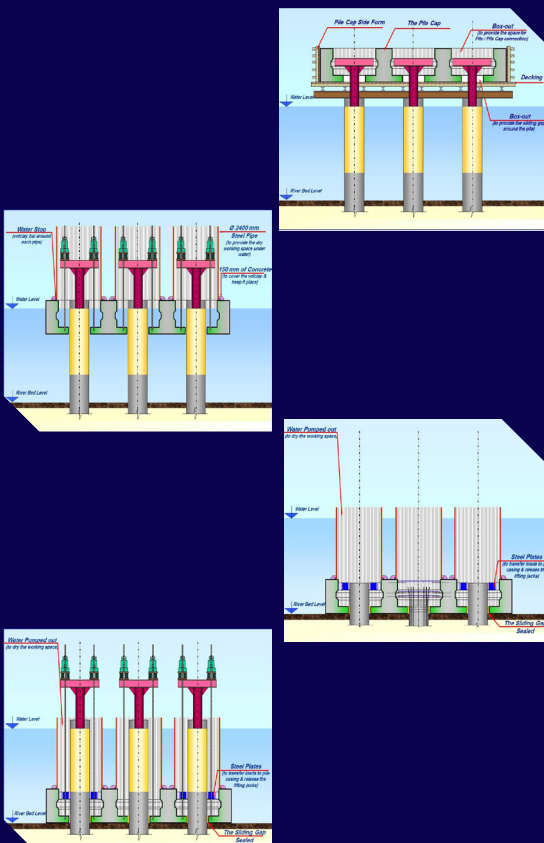
► Erection of precast beams & prefabricated steel girders

- AICS is concerned with the construction of bridges structures having decks formed wholly or partly from precast concrete elements where it is impossible or uneconomic to erect these precast elements by means of conventional cranes.
- The requirements of special equipment for the erection of all types of precast bridge decks vary considerably but the same fundamental design philosophy is necessary to achieve an efficient and economical solution in each case.
- AICS tailor-made system is the best solution if it is not practical or economic to erect the precast elements by conventional cranes.



► Sinking of pile caps under water

- Many techniques are used in practice to construct underwater foundations, including caissons and piled foundations. The main challenge of underwater construction is cutting off water seepage so as to always provide dry working conditions.
- Water seepage can be eliminated by continually pressurizing inside caissons and dewatering the intercepted space of sheet-pile cofferdams. Although these methods alleviate water seepage, they have negative aspects, including unhygienic working conditions and elevated costs. This Photo presents a method to partly construct the submerged pile caps above water, sink to place, and complete work in totally dry working conditions. This method adapts the heavy lift technology to lower the pile cap to the underwater permanent position. This method of construction is Easier, Faster and Cheaper.



► Tailor made platform

- This technique is used for cast in situ bridge decks or for cross heads where it is impossible to erect any false work from the ground due to the extreme height or working offshore.
- The steel platform is designed and erected by AICS staff, then it is transported over the water on pontoons.
- The steel platform is lifted up using AICS jacking system and steel rods to the bottom of the bridge deck. After concrete pouring & curing the platform is lowered and moved on shore in the same way.
- The same concept is used for cast in situ cross heads with extreme heights where the steel platform is erected on the ground, then lifted up using AICS jacking system and steel rods. After concrete pouring and curing the platform is lowered in the same way.



► Widening ,repair, maintenance , bearing & expansion joint replacement

- Rehabilitation and maintenance of reinforced concrete bridges has become an important issue during the last years. More than 40% of the bridges in Egypt were built in the fifties and sixties, and most of these are in urgent need of rehabilitation and 20% of bridges are in critical need of repair.



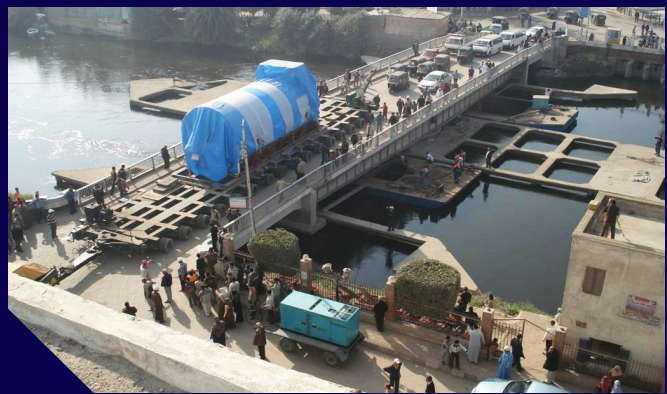
- AICShas a long experience and skills in this filed.
- Exchangeof the expansion joints is one of the most common applications in the field of ridgesmaintenance and rehabilitation.

- Bearing replacement is also one of the applications of bridges maintenance and rehabilitation.
- The girders are lifted up slightly using AICS jacks , then the bearing are replaced and then the girders are lowered to their original level.



► Strengthening & temporary supporting for bridges subjected to over designed loads

- AICS provides a complete “Project Logistics Management” services to clients under a single package. These services include the strengthening of bridges at the cargo's way to the site.
- On arrival of the cargo in bridges, AICS arranges the customs clearance, transport to site and complete installation of the required mega shoring and strengthening system. The service also includes the initial bridge surveys, arranging of local Road & bridge Permits, if required. AICS designs and builds temporary Supports to carry the loads of heavy and abnormal cargoes.



- AICS has the knowledge, experience and resources to assure delivery of clients Project Cargoes safely, economically and in the proper time.



► Engineering Solutions Systems – Heavy Lifting

► Lifting of water tanks

- There are specialized operations in civil engineering or industrial plants that are related with the displacement of large and heavy structures. Such solution is called heavy lifting.
- AICS provides various solutions for heavy lifting applications in civil engineering.
- Lifting of bowls of elevated water tanks is one of the famous applications that AICS is specialized in.
- The bowl is poured on the ground and then lifted to its location using AICS jacking system and steel rods to pull up the bowl weight.



► Truss lifting and skidding



- Lifting of steel trusses is one of the applications that AICS heavy lifting system provides.
- The steel trusses are assembled on the ground, then using AICS jacking system and steel rods, the trusses are lifted up to their final location.
- The locations of the lifting equipment and the points of lifting are chosen checked by AICS technical office that provides the suitable solutions for such special types of structures.



► Lifting , moving and skidding of abnormal loads and heavy equipment

- AICS tower system can be used in combination with jacking system to lift abnormal loads and heavy equipment.
- This system has several configurations and is adjustable in length, height and width to match the dimensions for each specific job. It is commonly applied in the energy sector.



► Lifting of roof slabs & Steel space frames

- One of the economical solutions for typical floor slabs and for high level slabs where the slabs are poured on the ground and lifted one after the other using AICS jacking system and steel rods.



- First the columns are poured and then the jacking system is erected at the top of the columns, then the slabs are poured on the ground, lifted to its location and a cast in-situ part is poured to join the columns and the slab together.

► Conical roofs and dome lifting

- Conical roofs and domes are usually high level slabs where the traditional systems of slab shoring is not the practical solution.
- AICS heavy lifting solution saves the cost of slabs shoring , minimizes the slab deflection due to displacement of the shoring system and



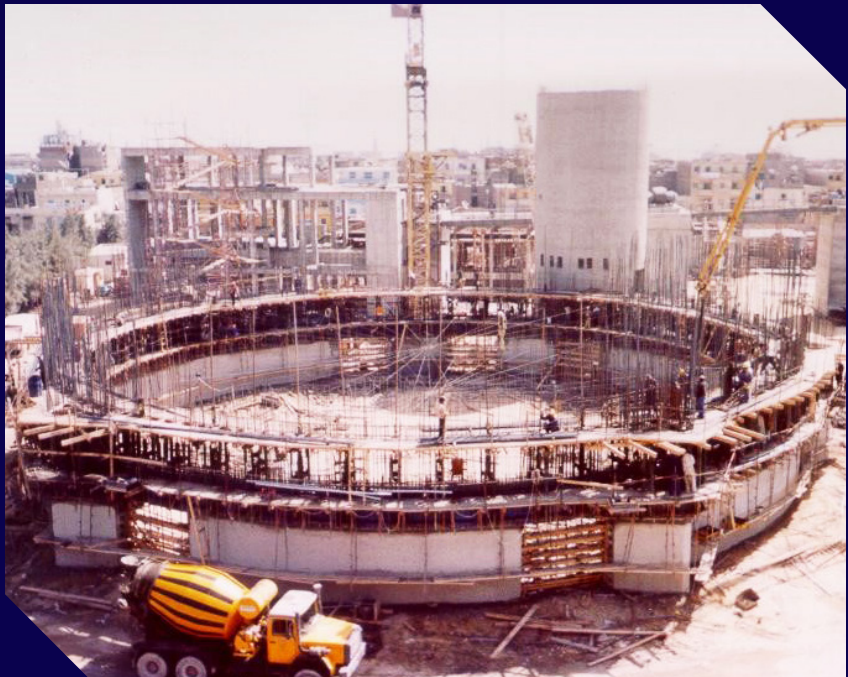
saves the time of erection and dismantling for the shoring system.

- AICS jacking system and steel rods are used to lift the conical roofs and domes from the ground up to their locations.

► Engineering Solutions Systems – Slip-form

► AICS Slip-form technique

- Slip forming is an economical, rapid and accurate form of construction that can be used to build concrete, reinforced concrete, or pre-stressed concrete structures. Although slip forming is not suitable for all types of structures, it can be used to construct a wide variety of structures such as silos, chimneys, building cores, bridge piers, and water towers.



Modern slip forming equipment has become so advanced that economics, not technology, dictates its use. Generally, slip forming is only economical on large structures (30 m or taller).

- Slip forming consists of constructing a wall-shaped form approximately 1.0 to 1.2 meters high at the base of what is soon to be the structure. The form, however, is not fixed to the ground as it is with traditional forming techniques but is suspended from climbing tubes (also called tie-rods). These climbing tubes are either suspended from a crane to provide support from above or, if the structure is too tall, the tubes are embedded in the already-cast concrete to provide support from below. The form is then filled with

fresh concrete. Once the concrete has started to harden, the form is slowly raised by lifting devices. From that point on, the form is continuously raised and fresh concrete is continuously poured into the void created at the top of the form. As the form is raised, it can be adjusted to vary the taper of the structure and the thickness of the wall as needed. The rate at which the form is raised is between 5 and 30 cm/hour. This around the clock operation results in a construction rate between 1.2 and 7.2 m/day, which cannot be attained by any other construction method. The slip form can be stopped if absolutely necessary, but it is not recommended.

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