For construction engineers and managers: when Biax comes 'off the truck'

The following paper was written by a construction engineer especially for construction engineers and managers from the point of view of when a Biax pod 'comes off the truck.'

Upfront
The Biax Foundation-Forming System is made up of 'pods,' which are 30" x 30" x various heights plastic forms that, when connected together with clips provided with the pods and reinforced with either rebar or post-tensioned cables and concrete monolithically placed, form a Biax 'slab.'

A Biax slab is designed with constructability in mind. It provides both simple engineering solutions and ease of construction when building on problematic soils such as expansive, collapsible, liquefiable or rocky soils. This paper briefly focuses on the benefits of the Biax Foundation-Forming System from receipt of the shipment of the pods at the building site through their use in construction of concrete foundations.

Receipt and Storage of Shipment
Biax pods are compactly packaged for shipment on sturdy pallets, much like plastic drink cups are stacked for packaging and shipment. They are wrapped in plastic sheeting, strapped securely to the pallets and labeled. They are then shipped in either enclosed dry vans or flatbed trucks directly to the jobsite or storage location. When the truck arrives, pallets are removed by fork lift and stored as desired.

Since Biax pods are made from polypropylene plastic, they are water resistant and can be stored outside in most weather conditions. They are not affected by rain and sun like some other void systems. The clips used to connect the pods together are also made of the same plastic and shipped similarly with the pods on separate pallets in cardboard boxes.

Site Excavation
No excavation for in-ground beams is required with the Biax system. The only soil work needed is to prepare a flat site, along with any flat areas at different levels from the main foundation—e.g., step-down garage slabs. Off-haul of soils is no more than would be normally done during site preparation for a uniform thickness concrete slab on grade.

Installation of Biax Pods
After the formwork is installed, the pods can be easily laid out within the footprint as specified in the engineered plans. If plastic sheeting is specified and used (50% of installations use it, 50% do not), it is first laid on the finish-grade to provide a clean surface for installing the pods and to provide a moisture resistant barrier for the underside of the foundation. The Biax pods are easily removed from the shipping pallets and put into

position as shown on the plans. From there, the pods can be quickly interconnected with the clips provided in the shipment. These clips accurately position the pods in place and provide secure support for the steel reinforcement specified (either rebar or P/T).

Each pod measures 30” x 30” and forms a relatively large void space, as compared to other plastic void form systems that require multiple boxes to be joined together to form one large void space. In addition, fewer clips are required to be installed with the Biax system. This saves significant time during installation and makes installation very simple.

Installation of Reinforcing Steel
Biax slabs can be designed to use either rebar or post-tensioning cables for reinforcing. Because there are no in-ground beams between pods, installation of the steel is done quickly from a flat site with no excavations. In addition, the chosen rebar or post-tensioning cables are easily and quickly laid out and snapped into position with the clips. The clips are also designed to retain the reinforcing steel once it is placed into the clips, in order to avoid having the steel lift out during the concrete pour. Note that the clips automatically and quickly provide the correct horizontal and vertical positioning for the steel reinforcement.

All-Weather Construction
The make-up of the Biax pods (polypropylene plastic) allows for installation of both the pods and the steel reinforcement to be done in inclement weather.

Concrete Volume Estimating
The amount of concrete required can be accurately determined when using the Biax Foundation-Forming System. As there are no in-ground beams of varying width and depth caused by inaccurate excavation, the volume of concrete is simply the volume of the rectangular prism defined by the formwork minus the total volume of all the pods. It is a simple and accurate calculation, and is in stark contrast to the significant swings in overages with other slabs.

Pouring Concrete
Because of the strong clips used to interconnect the pods, movement during the pour is negligible. The Biax pods are very strong and can support construction workers walking on them during the pour and finishing of the concrete.

Summary
From a construction engineering and construction management perspective, the Biax Foundation-Forming System:

- is easy to handle
- is quickly and easily installed
- provides accurate and secure positioning of steel reinforcement
- provides a very accurate calculation of concrete volume
- can be installed during inclement weather
- can be walked on during construction

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This paper is presented for informational purposes to developers, engineers and contractors by Biax USA, providers of the Biax Foundation-Forming System in the United States and Mexico. A Biax slab is a 4th generation, on-grade, waffle slab designed and engineered specifically for expansive, compressible, liquefiable or rocky soils. It delivers superior performance and significant hard-dollar cost savings – especially when compared to in-ground ribbed and/or uniform thickness foundations.

For more information on Biax foundations go to www.biaxusa.com or call Tom Richards at 925.683.2739.