

The Delta Advantage

Design Topics for Precasters

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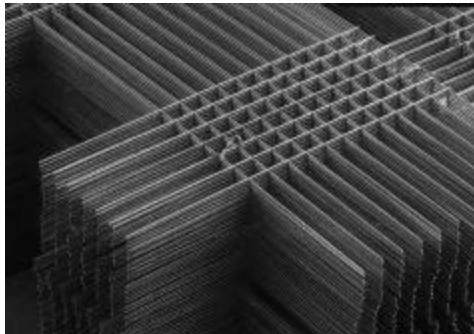
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Welded Wire Reinforcement

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Welded wire reinforcement (WWR), also known as welded wire fabric or wire mesh, is a method of concrete reinforcement composed of high yield strength cold-drawn or cold-rolled wires, electrically resistance welded into a square or rectangular grid pattern to form prefabricated reinforcement sheets. The sheets are manufactured using automated welding machines that can produce them in many widths and lengths while using different sizes of wires and wire spacing to meet the required steel areas of a concrete structure. The codes governing the manufacture of WWR are ASTM A185 or AASHTO M55 for smooth wire reinforcement sheets, and ASTM A497 or AASHTO M221 for deformed wire sheets. The codes governing the use of WWR are typically ACI-318 or the AASHTO design handbook.

WWR has been used for many years in production of concrete pipe, drop inlets, double-tees, architectural precast and other precast/prestressed structures. More recently, with advancements in technology, WWR is now able to be used for many more diverse products, such as box culverts, manhole boxes, utility vaults,



prestressed beams and sound wall panels. Such advancements have been facilitated by significantly improved automated welding machines. WWR sheets can now be produced using a batch-process method. This process reduces the changeover time between different sheet styles, thus enabling WWR manufacturers to produce smaller, custom orders more efficiently. In addition, some of the newer welding machines can weld sheets using wire sizes up to D31 (equivalent to a #5 bar), expanding WWR's ability to be used in more heavily reinforced products. Be aware, however, that each WWR manufacturer has different capabilities and should be consulted before submitting a project for approval with WWR or before an order is placed.

WWR can benefit precast concrete producers by reducing the time required to place reinforcement into forms, increasing productivity within the plant. Using WWR reduces the number of bars that need to be tied to form a reinforcement cage. WWR also reduces the inspection time of a reinforcement cage since the individual wires are pre-welded at a fixed spacing. In addition, the resulting reinforcement cage is more rigid and can typically be placed into forms with less trouble than hand-tied rebar cages. By reducing the labor time to tie and place a reinforcement cage, more concrete pours can be made earlier in the day allowing employees to do other tasks.

Another benefit of WWR can be a direct material savings for projects. WWR can be specified up to 80 ksi as allowed by ASTM and ACI-

318. This is 25% stronger than traditional 60 ksi rebar and this increased strength can be used in many cases to reduce to total amount of steel required for a structure. However, this typically needs to be approved by the engineer of record before ordering the WWR and making the substitution, as not all design methods or governing codes will accept the higher yield strength material.

The biggest drawback for the use of WWR has traditionally been the time it takes to receive material once it's been ordered. Unfortunately, the construction market is seasonal and can cause lead times to be as long as 3-4 weeks, occasionally more, to receive material in the peak season. However, WWR manufacturers are aware of this problem and are typically willing to help concrete producers stay supplied with material. Some manufacturers will inventory material specific to a precaster's production requirements in their storage yards, or it can be kept on-site at the precaster's location. This will allow material to always be in stock, ready for delivery without unnecessary delay. For project specific reinforcement, especially larger projects, drawings can be submitted with both traditional rebar design as well as the WWR alternative. The project can then be started with rebar and can be completed with WWR as soon as it is available, taking advantage of WWR's benefits for as much project as possible. Although WWR may not be suitable for all products or applications, it can be a valuable product to produce a high-quality product in less time.

Total Quality Management Training

In May of this year the entire staff of Delta Engineers reaffirmed their commitment to Total Quality Management by attending a full day seminar held at our corporate offices. This training, an extension of our original program developed in 1990 with assistance from Corning, Inc - a world-renowned leader in Quality performance, emphasized an awareness of our four Quality Principles and their importance to our ongoing drive for continuous improvement in all that we do.

Delta Principles of Total Quality

- Meet The Requirements
- Error-Free Work
- Manage By Prevention
- Measure By The Cost Of Quality



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