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Jacobs Field—The New Cleveland Indians Ballpark—Cleveland, Ohio Welded Wire Reinforcing Saves 15% Over Conventional Strength Reinforcement

Open minds, working closely, and sound engineering decisions are just some of the highlighted superlatives that describe the construction team assembled to complete the most unique ballpark ever built. Value engineering of the reinforcing design using high strength welded wire reinforcement (WWR) played a big role in saving money and helped construction stay ahead of schedule.

On April 4, 1994, Jacobs Field, the new Cleveland Indians Ballpark, officially opened. Completed near the end of 1993, it took less than 2 years to build. On that opening day, the umpire's shout of "Play ball" was warmly received, just like the new facility. Immediately after contracts were awarded in January 1992, the construction team began the work that the Gateway Development Corporation had planned. Those that played a key role on the reinforced concrete portions of the project are: **Huber, Hunt & Nichols**, the construction manager; **HOK**, Architect; **Donley's Inc.**, the prime contractor; **Osborn Engineering**, the structural engineers; **Sidley Precast**, the prime precast concrete contractor; **Whitacre Engineering**, the steel reinforcing fabricator and **Engineered Wire**

Products, the welded wire reinforcing producer. All firms worked together providing their individual expertise on the variety of engineered products and systems to obtain efficiency while maintaining quality. One of those systems was the utilization of high strength welded wire reinforcement for all paving, slabs-on-grade, supported corridor slabs and beam shear cages.

The Engineer's Role

Gary Thayer, the project manager of the structural design team for Osborn Engineering, Cleveland, Ohio, recognized there would be a definite savings in placing sheets of structural welded wire reinforcement. He was also aware that a distinct savings would be realized if high strength (75,000 psi yield strength) wire was specified. In Gary's words, "The real shining star for welded wire reinforcement is in the use of cages for shear reinforcing in beams. You get the steel where it belongs—and it provides accurate concrete cover." He believes that the closely spaced wires provide better distribution of stresses and reinforces for better crack control.

**From the Prime Contractors
Vantage Point**

Donley's Inc. of Cleveland was a strong proponent of structural welded wire reinforcement and offered many voluntary alternates utilizing WWR for the flatwork and beam reinforcement. Kevin Wright, Chief Estimator, said "Even though a premium was paid for the beam shear cages, we knew that bent sheets of welded wire reinforcement could be placed faster, therefore, an overall savings was achieved." "Considering forming turnover time and by placing sheets of high strength WWR, over \$125,000 was saved." Jim Nystrand, Donley's senior project manager at the site, likes working with welded wire reinforcing—"It provides the exact area of reinforcing required and is easily placed."



Bent cages of WWR for shear reinforcement in the poured, in-place concrete girders are easily handled by two workers.

From the Reinforcing Fabricator

Keith LePage, President for Whitacre Engineering of Canton, Ohio said "Approximately 15% of the material costs were saved over conventional strength reinforcing steel by utilizing high strength welded wire reinforcement in the slabs-on-grade and the supported slabs." Bob Long, Chief Engineer for Whitacre advised, "With welded wire you can maintain accurate

cover which provides quality concrete systems. When estimating sheets of reinforcing, time and dollars are saved by being able to take off areas of reinforcing more quickly, then adding splices and coming up with an accurate takeoff."

About the Ballpark

The \$169 million park seats 42,400 and has asymmetrical dimensions that give it an old fashioned feel, including a 19 foot high fence in left field and a 410 foot deep recess where the left and center field fences converge. The lighting system is unique, with vertical light towers that extend high above the stands. Hitters like the way the stands come so close to the field, leaving little room for fouls to be caught. The ballpark used 55,000 cubic yards of concrete and incorporated over 7,500 precast pieces.



Workers ensure the proper WWR cover as they work with the pumped concrete.

More About Welded Wire Reinforcement

Almost 1,000,000 square feet (340 tons) of welded wire reinforcement for slabs, paving, and beam stirrup cages was utilized. Another approximately 150 tons of WWR reinforcement was provided in the precast units used for the double seat risers, stairs and wall sections. All WWR was furnished in sheet form. Sheets varied in size from 5 to 8 feet in width and up to 25 foot lengths. Both deformed and plain wire was used — sizes ranged from W1.4 (1/8" in diameter) up to a D8 (5/16 " in diameter).



As the sunlight is replaced by the uniquely-lit Indians Stadium, you can see Cleveland's restored historical Terminal Tower and in between, the silhouette of the Cavaliers' new arena almost ready for the new season. Two major projects built in this downtown setting add to the renewed vitality for the city of Cleveland.

Large wire spacings (12 x 12 and greater) are being specified more today, allowing wider support spacings enabling easier placement by stepping through and in between wires.

To give some insight on the styles and quantities of welded wire reinforcement used and the applications, this summary is provided:

6 x 6-W4 x W4 (GR 65) and
4 x 4-W2.9 x W2.9 (GR 65) 224,800 s.f. - slabs-on-grade
6 x 6-D8 x D8 (GR 75) 150,300 s.f. - paving
12 x 12-D7.5 x D7.5 (GR 72.5) 465,600 s.f. corridor supported slabs (metal deck type)
Varies x 4-D3 x D6.4 (GR 75) 120,000 s.f. - beam cages
6 x 6-W1.4 x W1.4 and
4 x 4-W1.4 x W1.4 (GR 65) 10,000 s.f. - equipment pads and metal deck slabs.
12 x 6-W1.4 x W4 (GR 65) 453,800 s.f. - precast units for seating
4 x 4-W4 x W4 (GR 65) 112,000 s.f. - stairs and wall panels

Benefits of Using High Strength Welded Wire Reinforcement

It is to owner's advantage to have their construction teams consider the inherent high strength characteristic of coldworked welded wire reinforcement. ACI 318 allows the use of high strength reinforcement for flexure, shear and temperature/shrinkage purposes when tests for extension show that the specified yield strength (up to 80 ksi) is developed at 0.35% strain.



Here concrete blocks support the bottom layer of WWR and continuous wire chairs support the top layer.



High strength WWR shear reinforcement allows excellent control of concrete cover and is very cost effective.



Precast concrete tiers for seating are reinforced with sheets of welded wire reinforcing.



More cost effectiveness and easier placing can be achieved with step-through styles of WWR (12x12 and larger).

The project credits and key people who worked on the ballpark are:

Developer GATEWAY DEVELOPMENT CORP.
of Greater Cleveland
MARK HORTON, 216/2411994

Engineer OSBORN ENGINEERING, Cleveland, OH
216/861-2020
GARY THAYER, Project Manager

Architect HOK SPORTS FACILITY GROUP
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JIM NYSTRAND, Senior Project Manager

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BOB DECKER, Project Manager

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Call your local welded wire reinforcement producer for more input. (See the WRI web site for WWR producer members.)