NOVOMESH® 850

PRODUCT DATA SHEET

NOVOMESH® 850 STEEL AND SYNTHETIC FIBER BLEND

Novomesh 850, formerly known as Novomesh e3,® secondary reinforcement system for concrete—a patented blend of cold drawn steel wire fiber and 100 percent virgin homopolymer polypropylene graded multifilament fiber containing no reprocessed olefin materials. Engineered and manufactured in an ISO 9001:2000 certified facility for use as concrete reinforcement at a minimum addition rate of one 24 lb/yd^3 (14.29 kg/m^3) degradable bag. UL Classified. Complies with National Building Codes, ASTM C 1116 Type III 4.1.3, Type I 4.1.1 and ASTM A 820.

ADVANTAGES

Requires no minimum amount of concrete cover • Is always positioned in compliance with codes • Safe and easier to use than traditional reinforcement • Greater cross-sectional area of steel than w2.9 x w2.9 (6x6) wire mesh • Saves time and hassle

FEATURES & BENEFITS

- Steel/synthetic system of secondary reinforcement used as an alternate to w2.9 x w2.9 (6x6) wire mesh and some #3 and #4 rebar configurations
- Inhibits formation of plastic shrinkage and plastic settlement cracks
- Provides impact, abrasion and shatter resistance
- Lowered water migration
- Provides higher levels of residual strength
- Provides improved durability
- Control of drying shrinkage and temperature cracking
- Good finishing characteristics
- Pumpable reinforcement

PRIMARY APPLICATIONS

Applicable to all types of concrete in the commercial market segment that demands the early age benefits of synthetic fibers and long-term performance of steel fibers. The commercial market segment can include stores, hotels, institutional, educational, health care, amusement, offices, churches and storage facilities.

- Slabs-on-ground
- Sidewalks
- Driveways
- Parking areas
- Overlays & toppings
- Composite metal decks

DO SPECIFY NOVOMESH 850 FIBERS:

- Reduced plastic shrinkage cracking
- Alternative to traditional reinforcement
- Improved impact, shatter and abrasion resistance
- Improved residual strength
- Reduced water migration and damage from freeze/thaw
- Improved durability

DO NOT SPECIFY NOVOMESH 850 FIBERS:

- Increasing joint spacing beyond ACI and PCA guidelines
- Decreasing thickness of slabs
- Replacing any moment or structural steel
- Decorative, exposed aggregate or architecturally sensitive concrete

CHEMICAL AND PHYSICAL PROPERTIES:

Polypropylene Component:	
Absorption	Nil
Specific Gravity	0.91
Fiber Length	Multi-Design Gradation
Electrical Conductivity	Low
Melt Point	324°F (162°C)

Steel Component:	
Tensile Strength	140-180 Kpsi (966-1242 MPa)
Fiber Length	1.5 in (38 mm)
Aspect Ratio	34
Deformation	Continuously deformed circular segment

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CONCRETE SYSTEMS

NOVOMESH® 850

PRODUCT USE

MIXING DESIGNS AND PROCEDURES: Novomesh® 850 reinforcing is a mechanical, not a chemical process. The addition of Novomesh 850 does not require additional water or other mix design changes at normal rates. Novomesh 850 degradable bags are added to the mixer after batching the other concrete materials. Mixing time of at least 5 minutes at mixing speed is required as specified in ASTM C 94. It is recommended that gloves and eye protection be used when handling or adding the package to concrete.

FINISHING: Novomesh 850 reinforced concrete can be finished with normal finishing techniques. Novomesh 850 is ideally suited for hand or vibratory screeds, laser guided screeds and all conventional finishing equipment.

APPLICATION RATE: The standard application rate for Novomesh 850 is one 24 lb degradable bag per cubic yard (14.29 kg/m^3) of concrete.

GUIDELINES

Novomesh 850 should not be used to replace structural, load-bearing reinforcement. Novomesh 850 fibers should not be used as a means of using thinner concrete sections than original design. Novomesh 850 should not be used to increase joint spacing past those dimensions suggested by PCA and ACI industry standard guidelines.

COMPATIBILITY

Novomesh 850 is compatible with all commonly used concrete admixtures and performance enhancing chemicals.

PACKAGING

Novomesh 850 fibers are available in 24 lb (10.88 kg) degradable bags. Novomesh 850 fibers are packaged, shrink-wrapped and palletized for protection during shipping.

TECHNICAL SERVICES

Trained Propex Concrete Systems specialists are available worldwide to assist and advise in specifications and field service. Propex Concrete Systems representatives do not engage in the practice of engineering or supervision of projects and are available solely for service and support of our customers.

REFERENCES

- ASTM A 820 Standard Specification for Steel Fibers for Fiber-Reinforced Concrete.
- ASTM C 94 Standard Specification for Ready-Mixed Concrete Uniformity Requirements.
- ASTM C 1399 Average Residual Strength of Fiber Reinforced Concrete.
- ASTM C 1609/C 1609M Standard Test Method for Flexural Performance of Fiber-Reinforced Concrete (Using Beam With Third-Point Loading). Replaces ASTM C 1018.
- ASTM C 1116 Standard Specification for Fiber-Reinforced Concrete and Shotcrete.
- ASTM C 1550 Standard Test Method for Flexural Toughness of Fiber Reinforced Concrete (Using Centrally Loaded Round Panel).
- JCI-SF4 Method of Test for Flexural Strength and Flexural Toughness of Fiber Reinforced Concrete.
- ACI 304 Guide for Measuring, Mixing, Transporting and Placing Concrete.
- ACI 544-3R Guide for Specifying, Proportioning, Mixing, Placing and Finishing Steel Fiber Reinforced Concrete.
- UL® Approvals for use as an alternate or in addition to welded wire fabric used in floor-ceiling D700, D800 and D900 series designs.

SPECIFICATION CLAUSE

Novomesh 850 will be used for shrinkage and temperature protection of the concrete. Novomesh 850 is a blend of ASTM A 820 cold drawn steel wire fibers and graded multifilament polypropylene fibers of various lengths and thicknesses. Application rate shall be a minimum of one degradable 24 lb bag per cubic yard (14.29 kg/m^3) of concrete. At the request of the engineer, one and one-half bags or two bags (36 lbs and 48 lbs) per cubic yard may be utilized in heavier duty applications. Fiber manufacturer must document evidence of satisfactory performance history, compliance with applicable building codes, ASTM C 1116 Type III, 4.1.3, Type I 4.1.1 and ASTM A 820. Fibrous concrete reinforcement shall be manufactured by Propex Concrete Systems, 6025 Lee Highway, Suite 425, PO Box 22788, Chattanooga, TN, 37422, USA, tel: 423 892 8080, fax: 423 892 0157, web site: fibermesh.com.

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CS-515

07/06

ENGINEERING REPORT

Fiber Reinforced Concrete
in Composite Metal Deck Construction

Composite decks are designed as reinforced concrete slabs with steel decking acting as the positive reinforcement. Although a crack-free floor is always desirable, random cracks are to be expected in this type of floor system. Cracks develop for two reasons: either as a result of flexing of the metal deck or from the restraint of movement of the concrete. While the concrete shrinks, the steel frame does not. This restraint causes tensile stresses to develop in the concrete which ultimately leads to cracking. The normal method used to control cracks in the concrete over metal deck assemblies has been to use shrinkage and temperature reinforcement to distribute cracks uniformly and hold them tightly closed. Fibers as well as welded wire fabric are used for shrinkage and temperature reinforcement.

Long History in CMD

Since 1986, steel fiber has been used to reinforce millions of square feet of composite metal decks. Polypropylene fibers have been used as reinforcement in metal decks also. Quantities of steel fiber ranging from 20 to 40 pounds per cubic yard of concrete are common and exceed the minimum cross sectional area of steel specified by the Steel Deck Institute (SDI) Design Manual, Section 5.5. In 2003, the Steel Deck Institute revised their Design Manual and recognizes steel fibers as an alternative to welded wire fabric for shrinkage and temperature reinforcement.[1]

Continued on Page 2

STEEL DECK INSTITUTE ACCEPTANCE

The Steel Deck Institute Design manual (Publication Number 30-ANSI/SDI-C.10 Specification for Composite Steel Floor Deck1) permits steel fiber as an alternate means of providing temperature and shrinkage reinforcement for composite steel floor deck as stated in section 5.5:

"Cold-drawn steel fibers meeting the criteria of ASTM A820 at a minimum addition rate of 25 lb/y3 (14.8 kg/m3) and possessing an average residual strength of at least 80 psi (550 kPa) when tested according to ASTM C 1399, may be used as a suitable alternative to the welded wire fabric specified for temperature and shrinkage reinforcement."

Design Considerations with Fiber Reinforced Concrete

There are a few common questions raised by design professionals when considering fibers for shrinkage and thermal reinforcement in composite metal decks. Full-scale testing was conducted at Virginia Polytechnic Institute evaluating the strength and performance of fiber reinforced concrete composite slabs under the supervision of Dr. W. Samuel Easterling. The evaluation program included full-scale testing to compare the performance of composite metal deck systems with concrete containing welded wire fabric against composite metal deck systems containing fiber reinforced concrete.

Do fibers affect the load carrying capacity of the composite deck?

Yes, in the same manner as welded wire fabric.

The Steel Deck Institute, in their Composite Deck Design Handbook (March 1997, page 4), states, "Experience has shown that at least 10% load capacity increase is experienced when compared to deck/slabs without the welded wire fabric. The minimum wire mesh is 0.00075 times the area (per foot of width of the concrete above the deck flutes."

The full-scale testing conducted at Virginia Polytechnic Institute under the supervision of Dr. W. Samuel Easterling, lead to the conclusion that "Given that all slabs failed in a similar manner and at similar loads, the use of Fiber Reinforced Concrete is an attractive alternative to WWF for temperature and shrinkage reinforcement in composite slabs under distributed load." [2]

Will using fiber reinforced concrete change the design of the composite deck due to strains and deflections?

No. Although full-scale testing at Virginia Polytechnic Institute indicates that the use of fiber reinforced concrete can result in smaller deflections and strains when compare to welded wire fabric, it is recommended to follow the design guidelines provided by the deck manufacturer.

Does the use of fiber reinforced concrete change the diaphragm capacity of the deck?

No. After extensive analysis of test results and calculations, Clarkson Pinkham of S.B. Barnes Associates, a well recognized Consulting Structural Engineering Firm concluded: "The diaphragm shear for concrete using Fibermesh Fiber Reinforcement shall be the same as the diaphragm shear using normal weight or lightweight concrete…" [3]

Can I use shear studs with fiber reinforced concrete?

Yes. A battery of shear-stud pushout tests conducted at Virginia Polytechnic Institute lead to the following conclusions: "Fiber reinforced concrete specimens with headed studs had similar results as tests done in previous research where WWF was used." 1-page 81 "There were no major differences in the performance of specimens reinforced with WWF and those with fiber reinforced concrete …. The performance of the fiber reinforced concrete once again proved to be equivalent to that of WWF." [2]

Can I use standoff screws with fiber reinforced concrete?

Yes. An extensive series of standoff screws pushout tests conducted at Virginia Polytechnic Institute lead to the following conclusions: "The use of fiber reinforced concrete in place of WWF produced no visible changes in the behavior of the Grade 8 standoff screws." [2]

Do fibers affect the negative moment region of the slab?

No. As with welded wire fabric the typical addition rate of fibers requires supplementary steel when continuity over the negative moment regions is required.

The Steel Deck Institute Design Manual (Copyright 1995) states (Section 5.1) "Most published live loads tables are based on simple span analysis of the composite system, that is, the slab is assumed to crack over each support ….The welded wire mesh, chosen for temperature reinforcement (section 5.5), does not usually supply enough area for continuity." …(Section 5.5) "Temperature and Shrinkage reinforcement, consisting of welded wire fabric or reinforcing bars, shall have a minimum area of 0.00075 times the area of the concrete above the deck (per foot or per meter of width), but shall not be less than the area provided by 6X6 W1.4XW1.4 [152x152-MW9xMW9] welded wire fabric …. Commentary: if welded wire mesh is used with a steel area given by the above formula, it will not be sufficient to be the total negative reinforcement; however the mesh has been shown that it does a good job of crack control especially if kept near the top of the slab (3/4 inc to 1 inc cover, 20 to 25 mm)."

While performing the full-scale testing at Virginia Tech, it was of interest to evaluate the cracking in the negative moment regions. The conclusions were:

- "The mid-span deflections for all four slabs at a typical design load of 70 psf [3.35 kPa] are in the range of 0.015 in. to 0.03 in. [0.38 mm to 0.76 mm] These deflections are very small compare to the maximum allowed for serviceability, which is approximately 0.30 in. [7.6 mm]" [2]
- "It is important to note that at a typical design load of 70 psf [3.35 kPa] none of the specimens showed considerable crack widths." [2]
- "At equivalent load, fiber reinforced concrete slabs had a smaller opening of the crack over the concrete surface along the interior support." [2]

Novomesh® 850 - The Fiber Reinforcement Solution for Composite Metal Deck Construction

Performance that rises above the rest:

Novomesh 850, formerly Novomesh e3®, is an engineered blend of steel and polypropylene fibers - a combination that offers unmatched reinforcement performance throughout the entire lifespan of the concrete. Its synthetic fibers work to reduce the formation of plastic shrinkage and settlement cracks, allowing the concrete to develop to its optimum long-term integrity. The steel fibers work to reduce drying and restrained shrinkage cracking that may occur over time, resulting in redistribution of stresses to a crack-free area of the concrete and tighter held cracks providing years of exceptional toughness.

Provides 100% Positive Placement

Novomesh 850 steel/synthetic fiber blend provides uniform, multi-directional concrete reinforcement that is always positioned correctly, eliminating any concern of proper placement. There is no minimum amount of concrete cover required. The uniform fiber distribution creates stronger, more durable concrete composites for unparalleled monolithic performance.

SDI Cross-sectional Area of Steel Requirements

The quantity of secondary and temperature reinforcement is usually specified in cross sectional area of steel.4 Chart 1 demonstrates that Novomesh 850 at 1.5 bag addition rate per cubic yard will exceed SDI's specifications for cross-sectional area of steel, regardless of the concrete depth. For concrete thicker than 2 ¾", Novomesh 850 at 1-bag addition rate per cubic yard will exceed SDI's specification for cross-sectional area of steel.

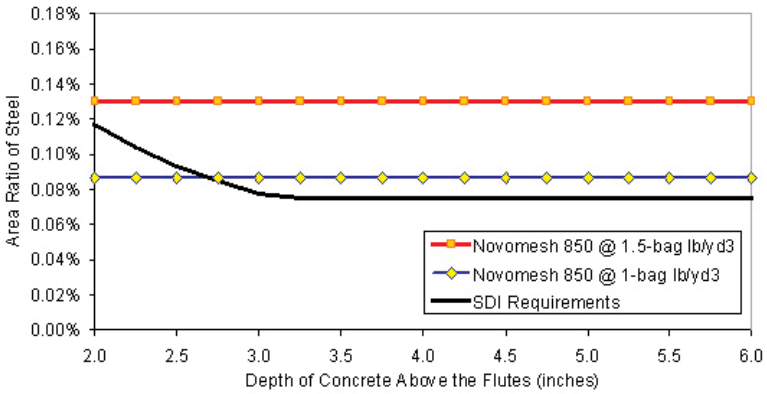

Chart 1: Novomesh 850 Addition Rate Selection Chart

It should be recognized that area of steel is not the suggested method determine the recommended dosage of steel fibers since the performance of the fiber is not taken into consideration. It is recommended to determine fiber loading based upon the desired toughness (resistance to crack extension) performance.

SDI Average Residual Strength Requirements

Novomesh 850 at 1 and 1.5 bag addition rates per cubic yard exceeds the specified average residual strength (ARS) of at least 80 psi (550 kPa) when tested according to ASTM C 1399. See Chart 2 for Novomesh 850 ARS performance data.

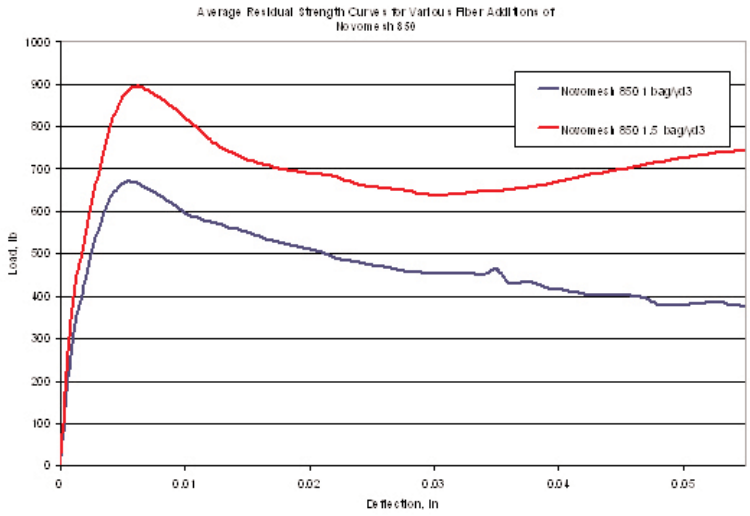

Chart 2:Residual Strength of Novomesh 850 at Various Addition Rates

Novomesh 850 1 bag/yd^3 ARS = 86 psi (0.59 MPa)
Novomesh 850 1.5 bag/yd^{3}ARS = 148 psi (1.0 MPa)

UL® Fire Ratings

Novomesh 850 has been approved for use as an alternative or in addition to welded wire fabric used in Floor-Ceiling D700, D800 and D900 Series Designs. Fibers may also be used in Floor-Ceiling Designs G256 and G514. Fibers added to concrete mix a rate of one 24 lb bag of fiber for each cubic yard of concrete. Per UL report CBXQ.R14701

References:

1. Publication Number 30-ANSI/SDI-C.10 Specification for Composite Steel Floor Deck.
2. Easterling, W.S. and Roberts-Wollman, C., "Strength and Performance of Fiber-Reinforced Concrete", Structural Engineering and Materials Research Report, Virginia Polytechnic Institute, November 2001, pp. 18, 33, 34, 77, 80, 81.
3. S.B. Barnes Associates Report Number 88-5, Allowable Loads on Systems of Steel Deck and Concrete Using Fibermesh Fiber Reinforcement, June 21, 1988.
4. Parviz Soroushian, Cha-Don Lee, Distribution and Orientation of Fibers in Steel Fiber Reinforced Concrete, ACI Materials Journal, Sept-Oct 1990.
5. ASTM A 820 Standard Specification for Steel Fibers for Fiber Reinforced Concrete.
6. ASTM C 1399 Standard Test Method for Determining Average Residual Strength of Fiber Reinforced Concrete.

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ER-CMD

ENGINEERING REPORT No. 12

Strength and Performance of Fiber Reinforced Concrete Composite Decks

OVERVIEW – The following report is a summation of Strength and Performance of Fiber Reinforced Concrete Composite Slabs, an engineering study performed at Virginia Polytechnic Institute and State University (Virginia Tech) under the supervision of W. Samuel Easterling, Ph.D., P.E., and Carin Roberts-Wollmann, Ph.D., P.E.

The evaluation program included full-scale testing to compare the performance of composite metal deck systems with concrete containing welded wire fabric against composite metal deck systems containing fiber-reinforced concrete.

PURPOSE OF THE REPORT – According to the Steel Deck Institute's Composite Deck Design Handbook (1997), composite metal decks (CMDs) benefit from welded wire fabric reinforcement. "Experience has shown that at least a 10 percent load capacity increase is experienced when compared to deck/slabs without the welded wire fabric. The minimum wire mesh is 0.00075 times the area (per foot of width) of the concrete above the deck flutes." Since fiber reinforcement such as Novomesh® 850, formerly Novomesh e3®, has proven to provide benefits equal to or better than welded wire fabric in numerous applications, this report compares testing data of CMDs fortified with WWF against CMDs reinforced with fibers to determine the benefits and performance of each.

NOTE: Novomesh 850 added at one bag (24 lb/yd^3, 14.2 kg/m^3) and two bag (48 lb/yd^3, 28.5 kg/m^3) quantities provides equivalent toughness performance to that of Novocon® steel fibers evaluated in the Virginia Tech test program in quantities of 25 lb/yd^3 and 50 lb/yd^3 (14.8 and 29.7 kg/m^3).

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CONCRETE SYSTEMS

Strength and Performance of Fiber Reinforced Concrete Composite Decks

Composite Slabs Under Distributed Loads

Three 24' x 6' (7.3 m x 1.8 m) composite decks were constructed. The three slabs contained the following secondary reinforcement and mix design:

Type of Reinforcement

- 6 x 6-W2.1 x W2.1 (152 x 152 – MW13 x MW13)
- Novocon® steel fibers at 25 lb/yd^3 (14.8 kg/m^3)
- Novocon steel fibers at 50 lb/yd^3 (29.7 kg/m^3)

Concrete Mix Design

230 lb. of Portland Cement Type-I
230 lb. of slag cement
1690 lb. of #57 coarse aggregate
1480 lb. of C-33 sand
200 lb. of water
3 oz. of air-entraining agent
24 oz. of mid-range plasticizer

Fabrication of the Test Slabs

The 20-guage (0.358"; 0.91mm) steel deck came from the same production lot. The rib height was 2" (51mm), and the slab thickness was 4.5" (114 mm). All specimens were constructed in the same manner, using concrete with the same 3,000-psi (20.7 N/mm^2) mix design. The concrete was consolidated with an internal vibrator and all slabs were cured for a minimum of 28 days before testing. Each test specimen contained two 10' (3.0 m) test spans, one on each end of the deck. The intermediate 4' (1.2 m) section was not tested.

Test Procedure

All spans were tested sequentially. A distributed load was applied to each test zone by an airbag placed above the slab. A load frame was located above the airbag, which in turn, was anchored to the reaction floor as shown in Figure 1. The span was given an initial preload of 30 psf (1.4 kN/m^2) of air pressure to allow the structure to settle. The deck was then unloaded, and all gauges were zeroed. The span was loaded in 30 psf (1.4 kN/m^2) increments until the first visible crack appeared. After the first crack appeared, the load increment was reduced to 10 psf (0.5 kN/m^2). The deck was loaded to failure.

Excerpts from Distributed Load Test Results

"The minimum applied load observed from all specimens was 305 psf (14.7 kN/m^2), which is considerably higher than a typical design load (about 70 psf [3.4 kN/m^2] for office buildings)." (See Figure 2)

"The mid-span deflections for all ellipsis slabs at a typical design load of 70 psf (3.4 kN/m^2) are in the range of 0.015" to 0.03" (0.38 mm to 0.76 mm) These deflections are very small compared to the maximum allowed for serviceability, which is approximately 0.30" (7.6 mm)." – pg. 18

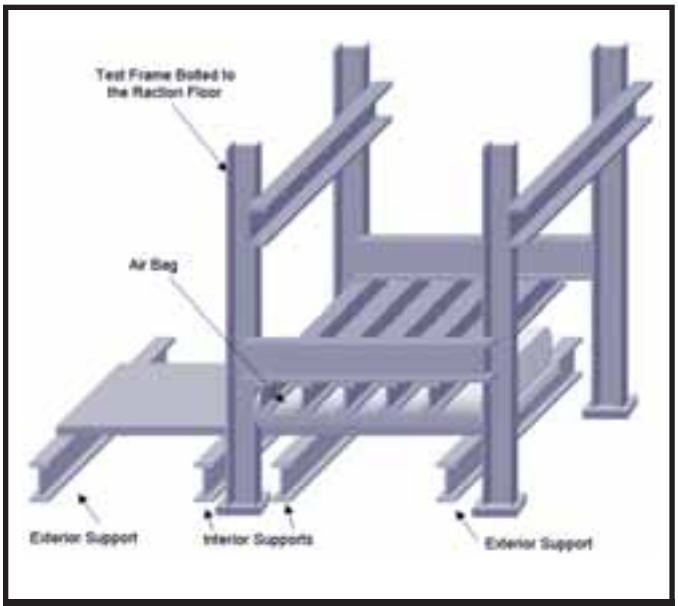

Figure 1. Load frame for Distributed Load

	1 1/2" Novocon®		WWF
	25.0 lb/yd^3 14.8 kg/m^3	50.0 lb/yd^3 29.7 kg/m^3	
First End	305 lb/ft^2 14.7 kN/m^2	417 lb/ft^2 20.1 kN/m^2	367 lb/ft^2 17.7 kN/m^2
Second End	387 lb/ft^2 18.7 kN/m^2	489 lb/ft^2 23.6 kN/m^2	337 lb/ft^2 16.3 kN/m^2
Average	346 lb/ft^2 16.7 kN/m^2	453 lb/ft^2 21.9 kN/m^2	352 lb/ft^2 17.0 kN/m^2

Figure 2. Maximum load of composite metal decks

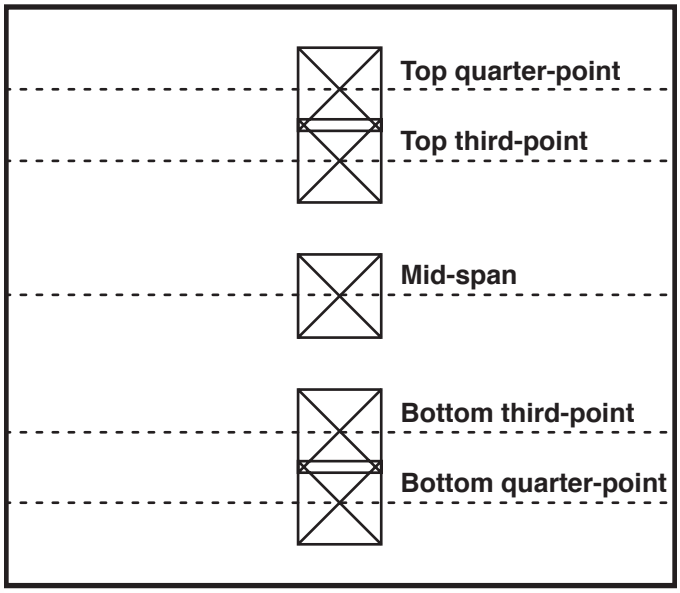

Figure 3. Location of Concentrated Loads

Strength and Performance of Fiber Reinforced Concrete Composite Decks

"It is important to note that at a typical design load of 70 psf (3.4 kN/m²), none of the specimens showed considerable crack widths." – pg. 33

"At equivalent load, fiber reinforced concrete slabs had a smaller opening of the crack over the concrete surface along the interior support." – pg. 80

Composite Slabs Under Concentrated and Line Loads

Four 10' x 9' composite decks were constructed. The four slabs contained the following secondary reinforcement:

- 6 x 6-W2.1 x W2.1 (152 x 152 – MW13 x MW13)
- Novocon® steel fibers at 25 lb/yd³ (14.8 kg/m³)
- Novocon steel fibers at 50 lb/yd³ (29.7 kg/m³)

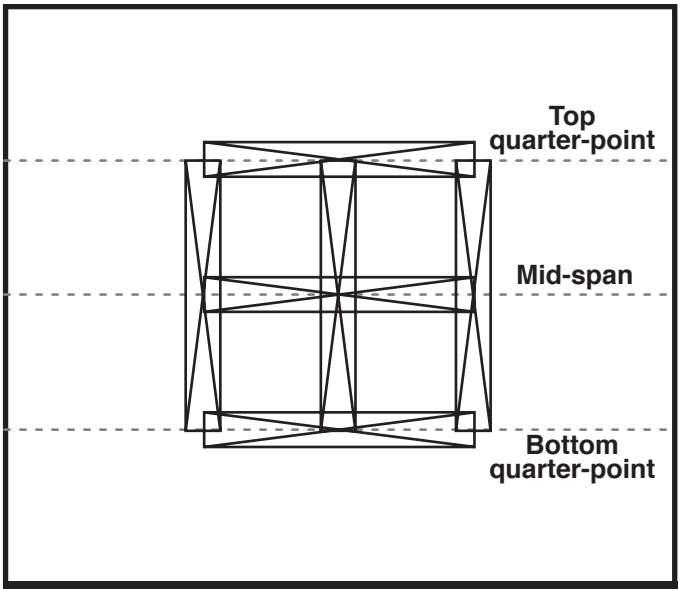

Figure 4. Location of Line Loads

Fabrication of the Test Slabs

The 20-guage (0.358"; 0.91mm) steel deck came from the same production lot. The rib height was 2" (51mm), and the slab thickness was 5.5" (140 mm). All specimens were constructed in the same manner, using concrete with the same 3,000-psi (20.7 N/mm²) mix design used in the distributed load test. The concrete was consolidated with an internal vibrator and all slabs were cured for a minimum of 28 days before testing. Eighteen strain gages were attached to the bottom of each slab.

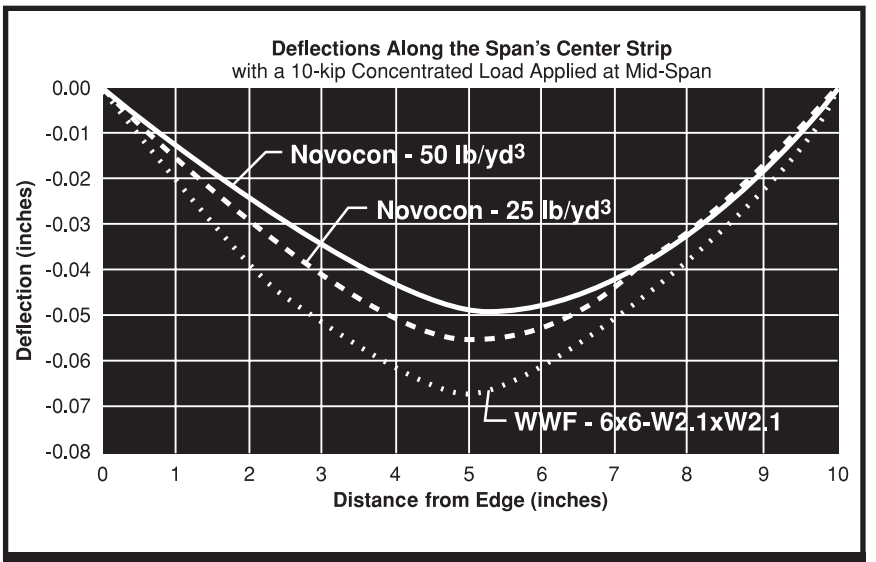

Figure 5. Deflection of Concentrated Loads

Test Procedure

Eleven load configurations were performed at various locations on each slab: five l-ft² (0.3 m x 0.3 m) concentrated loads, and six 4' (1.2 m) long line loads (See Figures 3 and 4). The test procedure and order were the same for all specimens. First, the specimen was loaded to 5,000 pounds (22.2 kN) and then unloaded. The 5,000-pound load was then reapplied, allowing the slab to settle. For the concentrated loads, the slab was loaded in 500-pound (2.2 kN) increments. The line loads were applied in 1,000-pound (4.4 kN) increments. The slab was then unloaded and the setup was moved to the next load point.

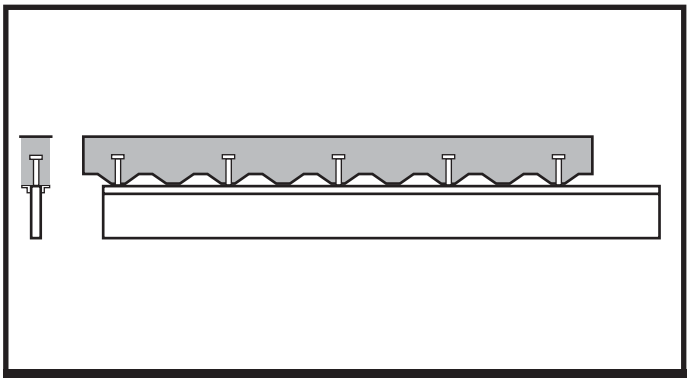

Figure 6. Beam Assembly

Excerpts from Concentrated Load Test Results

"There were no visible cracks while the slab was loaded up to 10-kips (44.5 kN)." – pg. 49

"Results showed that at the same load magnitude and location, the slabs reinforced with steel fibers had smaller deflections and strains than the slabs reinforced with welded wire fabric." – pg. 68 (See Figure 5)

Strength and Performance of Fiber Reinforced Concrete Composite Decks

Fabrication of the Test Slabs for Push-out Test

Twenty-four push-out specimens were constructed, each consisting of two 3'x 3' (0.9 m x 0.9 m) slabs. Two angles were welded to a 1" (25 mm) thick steel plate, forming a beam assembly. The steel deck was connected to the beam assembly with either standoff screws or steel studs. The steel deck and beam assembly were offset from each other to allow for a shear load (See Figure 6). The slabs were cast in the horizontal position then, after curing for 28 days, stood on edge and bolted to a sister slab via the double angles (See Figure 7).

Test Procedure

The procedure was the same for all tests. The specimen was first pre-loaded to approximately 5 kips (22.2 kN) to allow the assembly to settle. The specimen was then unloaded and all gauges were zeroed. The load was then applied in 5 kip (22 kN) increments to a level of 25 kips (111 kN) and in 3 kip (13 kN) increments until failure. The test was stopped when the specimen would not accept any higher loads. The specimens were then taken apart to determine the mode of failure.

Excerpts from Push-out Test Results

"The use of fiber reinforced concrete in place of welded wire fabric produced no visible changes in the behavior of the grade-8 standoff screws." – pg. 81

"Fiber reinforced concrete specimens with headed studs had similar results as tests done in previous research where welded wire fabric was used." – pg. 81

"There were no major differences in the performance of specimens reinforced with welded wire fabric and those with fiber reinforced concrete ... the performance of the fiber reinforced concrete once again proved to be equivalent to that of welded wire fabric." – pg. 77

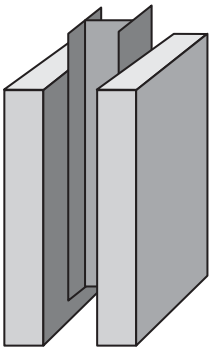

Figure 7. Push-out Specimen

CONCLUSIONS

- *"The ease of mixing the fibers with the concrete is an advantage over the tedious process of placing the welded wire fabric correctly."* – pg. 80
- *"Given that all slabs failed in a similar manner and at similar loads, the use of fiber reinforced concrete is an attractive alternative to welded wire fabric for temperature and shrinkage reinforcement in composite slabs under distributed load."* – pg. 34

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ONLINE CERTIFICATIONS DIRECTORY

CBXQ.R14701
Fiber Reinforcement

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Fiber Reinforcement

See General Information for Fiber Reinforcement

PROPEX CONCRETE SYSTEMS CORP R14701
SUITE 425
6025 LEE HWY
PO BOX 22788
CHATTANOOGA, TN 37422 USA

Type Novocon XR Steel Fibers for use as an alternate or in addition to the welded wire fabric used in Floor-Ceiling D700, D800, D900 Series Designs. Fibers may also be used in Design Nos. G256, G514. Fibers added to concrete mix at a rate of 10 to 50 lb of fiber for each cu yard of concrete.

Type Fibermesh 300 fiber. For use as an alternate or in addition to the welded wire fabric used in Floor-Ceiling D700, D800, D900 Series Designs. Fiber may also be used in Floor-Ceiling Design Nos. G229, G243, G256, G514. Fibers added to concrete mix at a rate of 1.5 lb of fiber for each cu yard of concrete.

Type Fibermesh 150. For use as an alternate or in addition to the welded wire fabric used in Floor-Ceiling D700, D800, D900 Series Designs. Fibers may also be used in Floor-Ceiling Design Nos. G229, G243, G256, G514. Fiber added to concrete mix at a rate of 1.0 lb of fiber for each cu yard of concrete.

Type Novomesh 850. For use as an alternate or in addition to the welded wire fabric used in Floor-Ceiling D700, D800, D900 Series Designs . Fibers may also be used in Floor-Ceiling Design Nos. G256, G514. Fiber added to concrete mix at a rate of one 24 lb bag of fiber for each cu yard of concrete.

Type Novocon Steel Fibers for use as an alternate or in addition to the welded wire fabric used in Floor-Ceiling D700, D800, D900 Series Designs. Fibers may also be used in Design Nos. G256, G514. Fibers added to concrete mix at a rate of 10 to 50 lb of fiber for each cu yard of concrete.

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