

#### OBSERVATIONS:

- UltraFiber500® provides the advantage of easier concrete surface finishing in comparisons to the macro synthetic fibers.
- UltraFiber 500® does not have the issues of macro synthetic fibers sticking through the surface.
- After 1 year, the cracking patterns were very similar between UltraFiber 500® and those with macro synthetic fibers.
- 56-Day Strength of Concrete with UltraFiber 500® and macro synthetic fibers were similar.

#### TESTING PROGRAM:

On July 8, 2009, eight 3' x 70' x 5.5" slabs were cast near Reno, Nevada at a local Ready Mix supplier. The purpose was to compare four different fibers (two slabs each) for their workability and performance during casting and long-term crack reduction performance. The four fiber types selected were: UltraFiber 500®, W.R. Grace Strux 90/40, Fora Ferro and Propex Fibermesh 650. When case, each truck had 4 cubic yards of concrete with 16 lbs of fibers added after initial batching.



Fibers to be Compared



Adding Fibers to the Truck

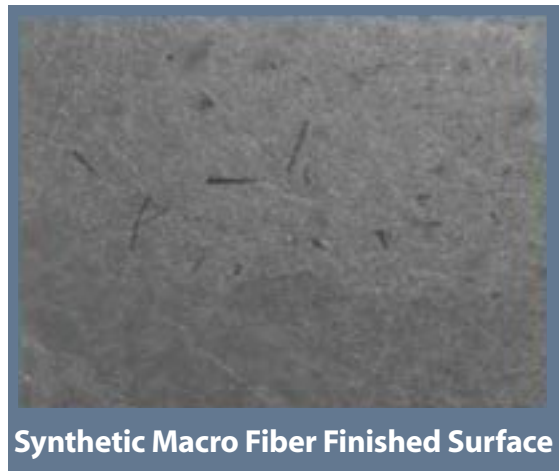
Test for plastic and hardening properties of the concrete were performed by Construction Materials Engineers of Reno. The 56-day compressive strengths were:

<b>UltraFiber 500®</b>	<b>6307 psi</b>
W.R. Grace Strux 90/40	6304 psi
Forta Ferro	6225 psi
Propex Fibermesh 650	6422 psi

The mixtures consisted of 6.3 sacks of cement/fly ash and a water cement ratio of 0.5. After fibers were added, 1 to 1.5 gallons of superplasticizer was added to each mix to increase workability.

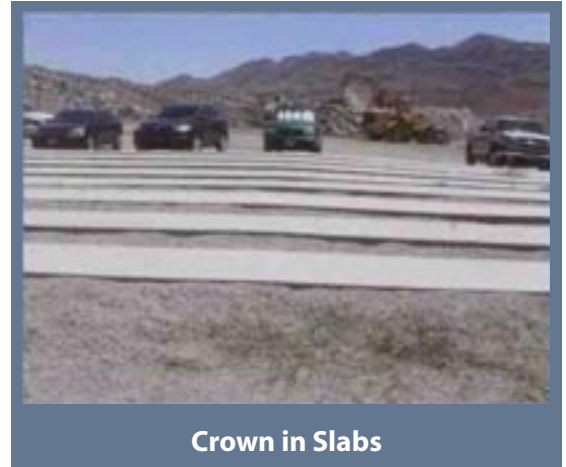
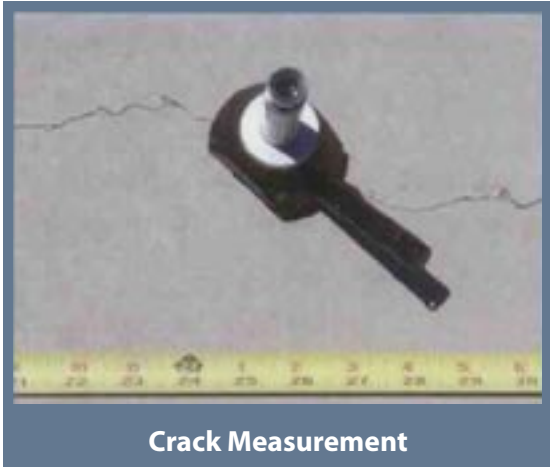


The UltraFiber 500® provided the advantage of not dealing with macro synthetic fibers sticking through the surface during concrete finishing, see Figures below.

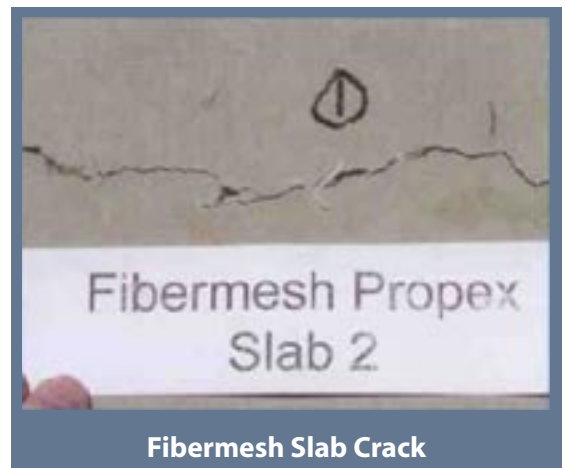
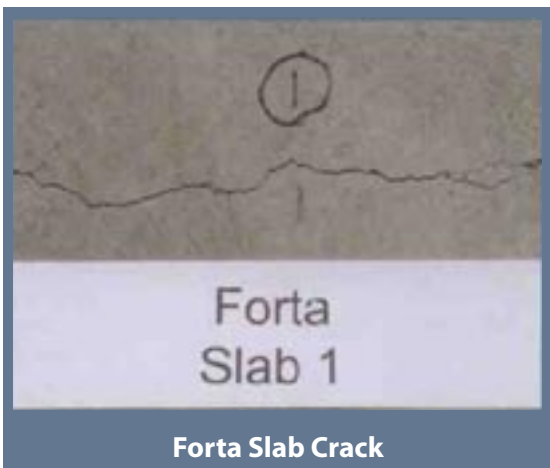
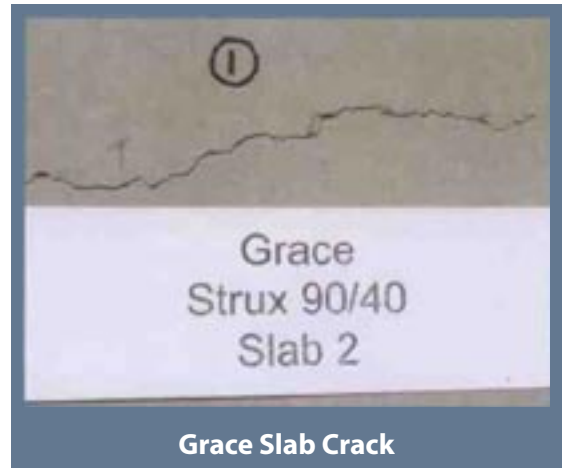
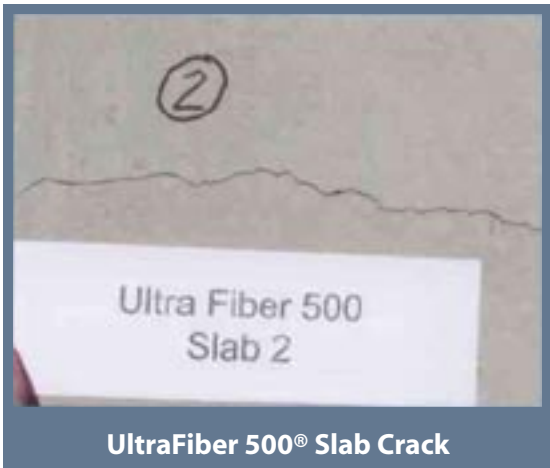


**ONE-YEAR RESULTS:**

On July 15, 2010, approximately one year after casting, crack measurements were taken on the slabs. Cracks occurred in all the slabs. All of the slabs had a slight crown near the middle of the 70-foot length. The degree of the crown was not the same for all the slabs. Cracks were measured using an Elcometer 900 (Direct Measurement Microscope) with divisions of 0.001”



Three measurements were taken at all cracks at the quarter points across the slabs. Each slab had at least one crack. All cracks extended across the entire slab. See example below.



After measuring all the cracks in all the slabs, the average crack sizes were as follow:

<b>UltraFiber 500®</b>	<b>0.032 in.</b>
W.R. Grace Strux 90/40	0.037 in.
Forta Ferro	0.028 in.
Propex Fibermesh 650	0.037 in.

### **CONCLUSIONS:**

The long-term performance of all the fibers was similar. The UltraFiber 500® provides the advantage of easier concrete surface finishing. UltraFiber 500® meets ASTM C 1116, section 4.1.4, Natural Fibers, and ICC Evaluation Services Acceptance Criteria 217.

David Sanders is a Professor of Civil and Environmental Engineering at the University of Nevada, Reno. He is a Fellow of the American Concrete Institute and the American Society of Civil Engineers. He was present during the casting of the slabs and was responsible for the measurements and observations made after one year.

For additional information please contact us at 800-624-0261 or visit [www.ultrafiber500.com](http://www.ultrafiber500.com). This publication should not be construed as engineering recommendation or advice. Users of this product should determine its suitability for their own particular application. UltraFiber 500® is sold with no express or implied warranty: seller's sole liability for claims is limited to replacement of defective or nonconforming product. The opinions of David Sanders are his and shall not be construed to be those of the University, ACI or ASCE.