

# DP Partners Floored by the Amazing Benefits of MPF Slabs

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Because the construction process is so labor intensive, the culture so engrained, and the risk level so high, change in the industry moves at a glacial pace. That's why DP Partners spent the last eight months testing macro polymeric fiber (MPF) concrete slabs on a 545,550 SF distribution facility in Reno, known as **LogistiCourt™ at Silver Lake**. These test areas were poured as the final step before implementing the new procedure throughout our new industrial park in southern Nevada, called **LogistiCourt™ at Lincoln**. Located in the heart of the North Las Vegas industrial corridor, all three new buildings, totaling 408,750 SF, are currently under simultaneous development.

Patrick Rucker, DP's Development Manager-Reno, headed up the technical team that tested the MPF slabs in Reno. We wanted to take our time, understand what we were dealing with, solve problems, work with our suppliers and contractors to educate them about the process, and verify the results before extolling its outstanding virtues to our clients.

Changing the way we pour slabs -- using high-volume synthetic fiber rather than conventional tried-and-true steel rebar as the concrete reinforcement material -- is a seismic event for an industrial developer, because a high-quality slab is the most valuable asset of our product. As a result of our comprehensive testing and other testing around the country, the bottom line is that MPF slabs outperform traditional industrial slabs, benefiting both the building owners and users by reducing maintenance costs and increasing usability over the life of the building.

## ***What is MPF?***

According to our consultant, Jerry A. Holland, P.E., FACI, Director of Design Services for Richardson, TX-based Structural Services, Inc., macro polymeric fibers (MPF) or high-volume synthetic fibers (HVSF) have only been in significant use for approximately eight or nine years; however, synthetic fibers are nothing new. The traditional fibers are currently known as low-volume synthetic fibers (LVSF) and have been used to enhance concrete for 30 years. These conventional fibers range from 0.375 to 0.75 inches long and are mixed at dosages from 0.5 to 1.6 pounds per cubic yard (lbs/cy). The benefits of LVSF are relatively short term, say, within the first two days of pouring. Macro polymeric fibers are thicker and longer – 1.5 to 2.25 inches long – and are mixed at dosages ranging from 3.0 to 7.5 lbs/cy. The benefits of MPF are both short term and long term, lasting for the life of the slab.

### ***What are the benefits?***

The most significant operating cost of an industrial floor is the long-term maintenance and repairs of the slab due to traffic-related problems at the crack control joints. MPF-designed slabs decrease the number of crack control joints (whose purpose is to influence the slab to crack at predetermined joints) by allowing micro cracking throughout the slab. Numerous joints increase the lifetime cost of slab maintenance by increasing the number of failures or damage in and around the joints due to forklift traffic. For us, there was a 75 percent reduction in joints, compared to the traditional number of joints with normal joint spacing. In our consultant's experience, even fewer joints are achievable with MPF designs and have been done with great success.

It is our experience MPF-designed slabs cost between six to eight percent more at the time of placement. The actual concrete alone is between \$41 and \$44 per cubic yard more than concrete used in the traditional steel rebar-reinforced slab. A portion of this additional cost is offset by the elimination of the traditional structural rebar and the reduction of overall labor needed for the preparation and placement of the slab.

The real benefits come in the remarkable sustainability of MPF slabs over time. For a developer who commits to the slightly higher up-front construction cost, the long-term savings are significant. Reduced lifetime maintenance and repair costs, combined with a higher degree of usability for the intended user, justify the additional placement cost. It is just a better floor for the application. Of course good care and maintenance practices are required to maintain the longevity of any floor.

This high level of performance particularly benefits tenants, because MPF-designed slabs are more resilient to heavy use, which is critical for distribution activities including stacking heavy loads, dropped or dragged loads, and repetitive forklift traffic over the floor surface. A floor practically free of joints and damage saves tenants wear and tear on forklift truck tires and other components, makes the floor more efficient, and increases safety. MPF slabs also benefit owners (developers, investors and institutions) by reducing operating costs, releasing costs, and adding value to their investment.

For DP Partners, there is another important benefit: MPF slabs are an important component of the DP "4 Green" program we introduced last year as part of our commitment to state-of-the-art, energy-efficient, environmentally friendly developments for the benefit of our clients.

### ***What did we learn from our tests?***

We began investigating the MPF slab about one year ago. At first, we were reluctant to try it, because it had not been widely used in a large distribution/warehouse even though it has a proven eight-year track record of performance in other applications. In our business, nobody wants to be the first to change such an established system as the steel reinforced slab on grade; however, the more we learned about it, the more intrigued we became. Since we were close to placing a floor slab for a new building anyway, the timing was fortuitous, so we decided to do our first test pour.

Our goal was to test the mixability, placeability, workability and finishability of the MPF design. The first pour occurred on the northwest corner of Building A at LogistiCourt at Silver Lake. It took about three hours to pour a 15,000 SF MPF slab, measuring 100 by 150 feet. We were impressed that MPF concrete was just as pumpable as plain concrete mixed to cover rebar.

Unfortunately, the devil is in the details. Our mix had too much water, and we did not get the results we wanted. Our consultant told us when we started down the MPF-slab path to throw out everything we know about concrete and start over. If the mix contains too much water, segregation occurs; the joints open more; and the slab curls. One of the greatest benefits of MPF concrete is that it produces more uniformity throughout the depth of the slab, reducing curling significantly.

Our second pour was 19,000 SF, measuring 100 by 190 feet on the south end of the building. The industry standard for joint spacing for both steel-reinforced and non-reinforced concrete slabs is 12.5 by 12.5 feet. We were able to reduce the joint spacing to 50 by 50 feet. Although we were being conservative, there is a MPF slab with joint spacing at 168 by 84 feet with no visible cracks after more than four and a half years. There is also a reduction of 50 percent in the number of dowels used in the slab, because they can be spaced further apart.

Our third pour was 1,800 SF slab, measuring 30 by 60 feet, installed in the southeast corner of the building on an exterior dock apron. We wanted to assess the benefit of the fibers in an outdoor application with exposure to northern Nevada's distinct seasons.

We are very excited to introduce this new technology to the Las Vegas industrial market. We expect the building industry to embrace this technology because of the benefits it delivers to both owners and users.