Cracking and Seating Concrete Pavement on I-74
Part II—Construction Conditions and Methods

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Cracking and seating operations on I-74 began on July 10, 1984, with section 474 +00-768 +00. This section was completed August 17, 1984. A second section, 924 +77-1050 +00, was started October 3, 1984, and completed October 4, 1984.

On this project several impact spacings and energy levels were tested on different pavement sections, varying the number of blows and alternating the spacings. Very little surface spalling occurred as long as the proper impact angle was maintained.

Along different patterns three different machines were tried, namely; whiplghammer, arrow-type pavement breaker, and Wirtgen Drop-Hammer or guillotine type.

Also in one area relief joints were cut to see if expansion of pavement, due to high temperature, made it more difficult to induce the desired cracking pattern.

Test sections were used to assure that the desired pattern was achieved. Conditions to note in setting up patterns and test areas are: pavement condition, thickness, and type of reinforcement, if any, as well as existing conditions such as surface spalling, weakness, and existing cracks.

When pavement conditions change, check sections should be observed to see that the desired pattern is achieved and unnecessary pavement damage is limited.

Methods of checking pattern:

1. Sprayed or misted water on surfaces shows cracks as the water dries. Early morning light and rainshowers make the cracks show best.

2. The use of flour was suggested by the equipment supplier. Flour is spread on the pavement then broomed to an even dusting. When the machine strikes the pavement, the flour moves away from the cracks and highlights them.

While different patterns and machines were being used cores of pave-
ment were taken in series to show how cracks traveled through the pavement slab.

All during the cracking and seating, operation tests were made with the dynaflect, before and after cracking. After each pass by a 50-ton roller, and after testing several areas, it showed that three passes by the roller achieved all the seating possible on this project.

The roller used by the contractor on this job was a single-axle roller with a 4000 gal capacity. It was pulled by a rubber-tired dozer. The tank of the roller was filled with aggregate material, then soaked with water to achieve the desired weight. This method worked well especially for moving across bridges; the contractor would unload part of ballast on one side of the bridge and reload at the desired location.

Because cracked and seated sections could be combined with standard overlay sections, four-mile sections of pavement were worked at a time.

At times, during operation, traffic was placed on cracked and seated pavement areas before they were overlayed. On this project, areas subjected to traffic showed no additional spalling or damage and maintaining traffic flow was not a problem.

During the cracking and seating operation the dynaflect was used each day. At that time, with the cooperation of Moellering, the dynaflect was carefully worked in combination with the cracking and seating process in an attempt to find out what was happening to the pavement throughout the process, as well as the most effective number of passes to attain the best slab seating. This was done by marking a 100-foot test section into ten test stations. Each station was then tested with the dynaflect before cracking, after cracking and before rolling and after each single pass of the roller. Rolling and testing was continued until it was felt that maximum seating had been achieved. In most cases, rolling more than one pass did not provide significantly better seating and too much rolling was, as expected, detrimental to seating; seating improvement was not near what we had originally expected. Due to these findings most of the contract has been rolled the specification minimum of three passes. We also found that the areas that had carried traffic after the cracking and seating process, and before the overlay, showed a small seating improvement over areas that were overlayed immediately after cracking and seating.

Another experimental feature added to this project was the use of a polypropylene fiber-reinforced asphalt. In October 1980 the Crawfordsville District placed a Type A fiber-reinforced surface on a portion of I-65 at the intersection of SR-43. The outstanding performance of this test pad prompted the IDOHR to examine this material on a larger scale. We had originally planned to place the material on a section of CRC on I-65 just south of Indianapolis, however, due to some conflicts within
the department it was removed from that project and added to this project. The objectives are to determine the benefits gained by the introduction of fibers into the mix, mainly to determine whether or not the fiber can reduce cracking and control rutting.

Following are the construction details for this portion of the project.

Fibermix bituminous overlay laps over both a standard overlay section and a cracked and seated section on this project.

Approximately 4780 tons of the mix were applied to both base and binder. The plant used by the contractor was a drum-mix type. The addition of fiber seemed to help segregation especially in the #5 base and gave a more even looking mat texture. Fiber-reinforced material also showed less signs of raveling on tapers when subjected to traffic.

Binder-lay with fiber looked tighter, as if it had more fines. As far as placing material, apparent differences were not noticed except maybe there was slightly less roller imprint. At the present time all base and binder operations are complete with only miscellaneous operations such as grading and approach work. The Type IV Sand Surface will be completed next year. The contract has a calendar completion date of November 1985, but it should be done by mid-summer.