Introduction:
Nebraska Department of Roads - Materials and Research (M&R) Division determined in July 2012 that cutting the tie wires on the dowel bar basket assembly is allowing the dowel bars to shift as concrete is placed. As a result of field observation and field performance, M&R has concluded leaving dowel basket assembly tie wires uncut.

This brief summary presents the field observation and field performance findings. M&R has concluded the likelihood of a joint becoming locked due to the movement of the dowel bar assembly is greater than becoming locked as a result of the un-cut tie wires in the dowel basket assembly.

Field Observation:
M&R noticed the dowel bar movement within the basket assembly during the pavement operation as shown in Figures 1 to 5. Two projects where observed, Waverly to Greenwood and 56th Street to Waverly Interchange and is documented as follows:

Figure 1. Dowel Movement During Placement
The red arrow shown is the dowel bar translation movement during concrete placement.

Figure 2. Dowel misalignment
The measured translation movement from the original dowel bar assembly was 1 ½ inches as shown in Figure 3 and 4.

Figure 3.

Figure 4.

Figure 5 shows the possible result of the dowel bar translation movement as the paver passes. This figure shows the dowel bar vertically aligned from the surface of the pavement.
The research team experimented with 4 uncut dowel basket assemblies on the I-80 Waverly to Greenwood project. Figure 6 shows dowel bar assembly with uncut tie wires.

![Figure 6. Uncut Tie Wires Dowel Bar Assembly](image)

Dowel basket assembly steps during paving concrete operations were:
1. Shipping wires were not cut (Figure 6).
2. Measure the translational movement of the dowel bars and spray paint on the dowel bar basket assembly to visualize the movement during concrete placement (Figure 7 and 8).
3. Identified location of uncut wire assembly for future for field monitoring (Figure 9).

In summary, these projects identified/showed potential problems due to the translational movement of the dowel bar in the dowel bar basket assembly. This impact the effectiveness of individual dowel bars in performing the intended function (i.e., provide load transfer). Therefore, the experimental section has shown the dowel bar basket assembly is resistant to movement when tie wires of the assembly is uncut prior to concrete placement. Leaving tie wires intact will strengthen the dowel basket, making more resistant to movement and deflection while paving.

**Field Performance:**
In 2007, the Department of Roads experimented with a section of pavement in District 2 on the Hooper East & West project. For the last 5 years the M&R Portland Cement Concrete Pavement Research and Development Section has been monitoring a section built with uncut dowel bar basket assemblies, as shown in Figure 10.
After 5 years of monitoring on the Hooper East & West project, the field performance of the uncut dowel bar assembly has shown no signs of distress at the transverse joints, as shown in Figure 11. Therefore, the field performance has shown the impact of not cutting the wires is negligible. In fact, this result in smoother pavement, as well as dowel that are better aligned, which strengthen dowel baskets.3

![Figure 11. Transverse Joint-2012 Field performance](image)

**Summary:**

The transverse joint performance with uncut dowel bar assemblies and the observations of the translation movement as the paver passes has led the M&R to recommend leaving dowel bar basket assemblies tie wires uncut.

**References**