To: W. W. McLaughlin  
Testing and Research Engineer  

From: W. A. Finney  

Subject: Rigidity Tests on Universal Form Clamp Dowel Bar Joint Assembly (Type M) Report No. 289 which Supplements Report No. 200, 237, 259, 276 and 287. Research Project 39 F-1(3).  

The Universal Form Clamp Company has modified their dowel bar joint assembly by welding the dowels on alternate sides to the assembly. Previously the dowels were held in the assembly by friction. In conjunction with this change they have eliminated some of the supporting wires.  

At the request of Mr. Rathfoot, Road Construction Engineer, we have conducted rigidity tests on the subject assembly (Sample No. 58 W-54), in accordance with the regular procedure described in Report No. 200. The test results indicate that this assembly is 1.55 times as stiff vertically and 1.70 times as stiff laterally as the Bethlehem assembly which has been considered as a standard of acceptibility.  

Figure 1 shows a dimensional cross-section, while Figure 2 shows a detailed and an overall view of the subject assembly. Figure 3 illustrates the vertical and horizontal load-deflection relationships for the Universal Form Clamp Company (Type M) joint assembly compared to the Bethlehem (Type C) contraction joint assembly.  

On the sample submitted for testing, and illustrated in Figures 1 and 2, two improvements were suggested to the manufacturer. These suggestions were as follows:  

1. The end wires should be extended beyond the last dowel a minimum of 4\(\frac{1}{4}\) inches. The sample had four wires extending only 1\(\frac{1}{4}\) inches beyond the center of the end dowel, and two wires extending 2\(\frac{1}{4}\) inches. This 4\(\frac{1}{4}\) inch extension is necessary in order to provide for more or less automatic lateral positioning of the assembly in the pavement lane.  

2. For the expansion joint assembly the center longitudinal wires were satisfactory. However, for the contraction joint assembly submitted the longitudinal wires were close together beneath the transverse joint, making it difficult to place the concrete readily at this point. It was suggested that at the dowel bar these center wires should be a minimum of 3 inches apart, or 1\(\frac{1}{2}\) inches away from the center of the joint. These wires could slope down coming close together at the bottom of the assembly in order to position the base plate.
To illustrate the way the Universal Form Clamp Company plans to modify the sample submitted in order to comply with the above suggestions a revised blueprint is attached. This assembly as modified appears satisfactory, for the changes which were made would not affect the rigidity of the assembly.

E. A. Pinney, Director
Research Laboratory

cc: C. B. Laird
C. A. Weber
C. H. Cash
H. J. Rathfoot

Encl.
SUCCESSIVE DOWELS ARE WELDED ALTERNATELY AT EITHER 1 & 2 OR 3 & 4

"O" GAGE (0.3065) TYP.

UNIVERSAL FORM CLAMP COMPANY
JOINT ASSEMBLY
SAMPLE 58 MR - 54
FIGURE 1
Figure 2
Overall and close up view
FIGURE 3