

Mr. J. C. McAllister,  
Regional Bridge Location Engr.,  
Regional Office,  
NORTH BAY, Ontario.

Foundation Section,  
Materials & Testing Div.,  
Room 107, Lab. Bldg.

November 21, 1968

-- Englehart River Bridge --  
Lot 3, Con. IV., Twp. of Jack, Ont. 560  
District #14 (New Listcard)

68-F-76  
144-67-1

As requested by you, we have inspected the above mentioned bridge with a view to determining the reasons for the abutment movements which have taken place. Our report is as follows:

The structure, built in 1942, is a 3-span (45 ft.-30 ft.-45 ft.) bridge with a concrete deck and steel deck truss. The abutments and piers are of reinforced concrete and are supported by spread footings founded on bedrock. Bearings are fixed at the abutments and sliding at the piers. The abutments are the spill-through type with approximate 1:1 forward fill slopes. The approach embankments are built to a maximum height of 15 ft. above original ground level which results in a total height of 40 ft. above the river bed. Subsoil in the area consists of a thin layer of clay overlying bedrock. Backfill material appears to consist of a clay type earth fill.

Both abutments have been pushed or tilted forward towards the river. On the north abutment the holding down bolts are bent and there is now no clearance between the end vertical members of the deck truss and the abutment wall. According to the bridge drawings, this clearance originally was about 3 inches. Numerous cracks are visible on the abutment wall and one crack is visible on the west supporting column. At the south abutment, conditions are similar except that the holding down bolts are not bent. It is not known when the movements were first observed, but it appears as though the present situation has prevailed for many years.

Based on the foregoing observations, it is our opinion that no foundation problem exists at this site. The lateral movements which have occurred can be attributed entirely to the inadequacy of the structure to resist the lateral pressures on the abutments. These lateral pressures can be due either to the weight of backfill or to frost heaving in the winter. In the latter case, the forces are likely to be very large and would not have been taken into account in the design of the structure. The two conditions conducive to frost heave, poor drainage and fine-grained soil, are both present in the backfill to the abutments.

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November 21, 1962

In order to remedy the situation, or at least prevent further movements, the following steps are recommended:

- (1) Remove the present bal. fill and replace with free draining granular material.
- (2) Provide sufficient drainage to ensure no buildup of water within the frost zone (7 feet below surface).
- (3) Make the necessary structural repairs so as to ensure that the abutments can adequately retain the weight of fill behind them.
- (4) After the abutments have been repaired, the necessary adjustments to the deck truss can be made to ensure proper allowances for expansion.

KCS/46a2

cc: Messrs. S. McCombis  
C. B. Grebaki  
D. A. O. White  
A. Birch

Foundations Files  
Gen. Files

*K. G. Selby*  
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SUPERVISING FOUNDATION ENGR.  
For:  
A. G. Stenve,  
PRINCIPAL FOUNDATION ENGR.

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W.P. 144-67-1

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HWY. 560

LOT. 8, CON. 10

ENGLEHART R. BRIDGE

DACK TWP.

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