

63-F-30

OTTAWA

DISTRICT

PAINT SHOP

Mr. F. E. Cavell,
Superintendent,
Special Services Section.

Mr. A. G. Stermac,
Principal Foundation Engr.,
Foundation Section,
Materials & Research Division.
March 28, 1963

28-9.

CRACKS ON THE WALLS AT NORTH-EAST CORNER
-- OF OTTAWA DISTRICT PAINT SHOP --
M. J. 63-P-30 -- District No. 9

A request was received by this Office from Mr. F. E. Cavell, Superintendent of Special Services, on March 20, 1963, to investigate the causes of cracks in the north-east corner of the spray room of the Ottawa District Paint Shop.

The site was visited on March 25, 1963, by the writer, and three borings were carried out the same day. Two borings were carried out very close to the affected area and one boring adjacent to the boiler room. These borings revealed that the subsoil consisted of a heterogeneous mixture of clayey silt, sand and gravel with a stiff to very stiff consistency. It was observed that the subsoil was completely frozen down to a depth of 4.0' and that below this level for about one foot, ice lenses were observed in the soil samples recovered from the affected area. The footings for this building are founded 4.5 ft. below ground level.

A brief history of the building is as follows:
Construction was carried out during the winter of 1961.
Immediately after construction, cracks appeared in the north and

east walls of the spray room close to the north-east corner. These cracks were about 1/4" - 1/2" wide and approximately 4 ft. above the existing ground. The cracks partially closed up the following summer, but were still quite visible. During the present winter, the cracks opened up again to a maximum width of 2". In front of the building and adjacent to the walls, there is a concrete sidewalk approximately 4.0 ft. wide. Cracks in the sidewalk, due to frost action, were observed very close to the affected area. Drainage for the spray room and for the adjacent main Paint Shop is effected by means of two catch-basins emptying into a sewer (4" No-Corode Pipe) which passes some 6" below the footing into a so-called dry well some 26 ft. outside the spray room wall. At the time of the visit by the writer, it appeared that the dry well was not functioning properly, as pools of water 2" deep covered both catch-basins.

A review of the history outlined above, and of the results of the borings, indicates that the problem is caused by the presence of water below the footing which freezes during the winter, causing the footing to heave with consequent structural damage. When the soil at the base of the footing thaws, the footing tends to move back to its former position. It is likely that the situation will become progressively worse with time.

It appears that the most appropriate remedial measure would be to provide adequate drainage in the affected area and thus prevent constant percolation of water under the footings.

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To achieve this, it is suggested that the above-mentioned dry well be abandoned and the drain at present discharging into it, be connected to another sewer. In addition to this, it would be advisable to place perforated sub-drains at the edge of, and slightly below the footing in the affected area, which can discharge into an existing sewer. The placing and backfilling around the pipe should be carried out according to the D.H.O. Form 405. This should be designed so as to allow no possibility of water backing up. The excavation and backfilling should be carried out in sections so as not to expose too long a footing section and thus cause complete failure. A maximum length of 8 feet is recommended.

We believe that the above information is sufficient for your present purposes; however, if we can be of further assistance, please do not hesitate to contact our Office.

MD/MdeF

cc: Mr. F. E. Cavell (4)
Mr. L. E. Walker
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Gen. Files.

M. Devata
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For:
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