Churchill grain elevator settlement tests

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SUBJECT Churchill Grain Elevator Settlement Tests

Visiting the Churchill Grain Elevator I met Mr. Twolan the "Port Manager, Churchill Harbour", who is also the Elevator Superintendent. Mr. Twolan turned me over to Mr. Luck and his assistant in the Engineering Office. There I was given all the assistance and co-operation possible.

Since the time of building, records have been kept of the footing elevations on the various components of the elevator. These elevation checks are taken with a "Dumpy Level" using for a bench mark a notch chiselled into a large solid rock outcrop some five hundred feet from the elevator. The accuracy of their elevation determinations they do not think is high enough to detect with certainty minute movements but will definitely show any movements over half an inch.

The elevator proper consisting of the Track Shed, Workshop and Storage, and the Storage Annex were built on some 618, 2316 and 3980 reinforced concrete piles respectively. The holes for these piles being bored presumably down to bedrock. The footing on these three sections settled approximately three inches up to 1932, but since then very little movement has been detected. This settlement was fairly uniform, although in the track shed there was enough differential settlement to mis-align one of the car unloaders.

The "Shipping Gallery" (belt conveyor from the elevator to the dock) has footings on gravel fill. Frequent movement occurs on these footings. These footings must from time to time be raised or lowered up to two inches in order to keep the conveyor belts properly aligned. The "Transit Shed" (a warehouse type of building on the dock) also has footings on gravel fill. Frequent movements occur on these footings but not enough to cause any serious damage.

Another building being checked rather closely is the "Staff Building". This building has a shell of cinder concrete blocks and has 2 x 4 studs with fiberglass blanket insulation between, a vapour barrier and insulboard inside. An addition is presently being built.

Several rather severe cracks have developed in the block walls of the older building and a few have appeared in the new construction. These cracks it would appear cannot be explained on the basis of footing movements alone. Like the grain elevator the building is set on reinforced concrete piles. Footing elevation checks show some slight movement but no drastic changes. It is possible that most of the cracks are caused by dimensional changes in the cinder concrete blocks accompanying changes in moisture content. The most severe cracks occur on a section housing a stairway just behind the kitchen. This section was not insulated and has no vapour barrier. Large quantities of water vapor are given off in the kitchen from the steam dishwasher and the normal cooking. The door between this section and the kitchen is probably left open most of the time in an attempt to cool the kitchen. Thus, it is very probable that very humid conditions are maintained in this uninsulated section. Added to the water vapour problem, the water protection on the outside of the blocks appears rather inadequate.

I must say this visit was extremely interesting. Mr. Twolan and his staff were most co-operative and would be only too pleased to pass along any information they have.