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USE OF COMPRESSED AIR IN TORONTO SEWER CONSTRUCTION

A DESCRIPTION OF METHODS OF TUNNEL CONSTRUCTION WITH COMPRESSED AIR AND COST OF OPERATING A COMPRESSOR PLANT.

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COMPRESSED air was introduced into sewer tunnel work in Toronto for the purpose of lowering the cost of construction where the ground was of a fluid nature, such as in fine, wet sand which becomes fluid when the overhead pressure is removed. Tunnelling is, of course, possible in most cases without the

of ground does not arch, but forms a dead weight on the sheeting. When this fluid ground extends to a depth below the proposed tunnel, and compressed air is not used, the bearing power of the soil must be strengthened, and to do this, it is generally necessary to open-cut from the surface, as the dead weight of the ground above will

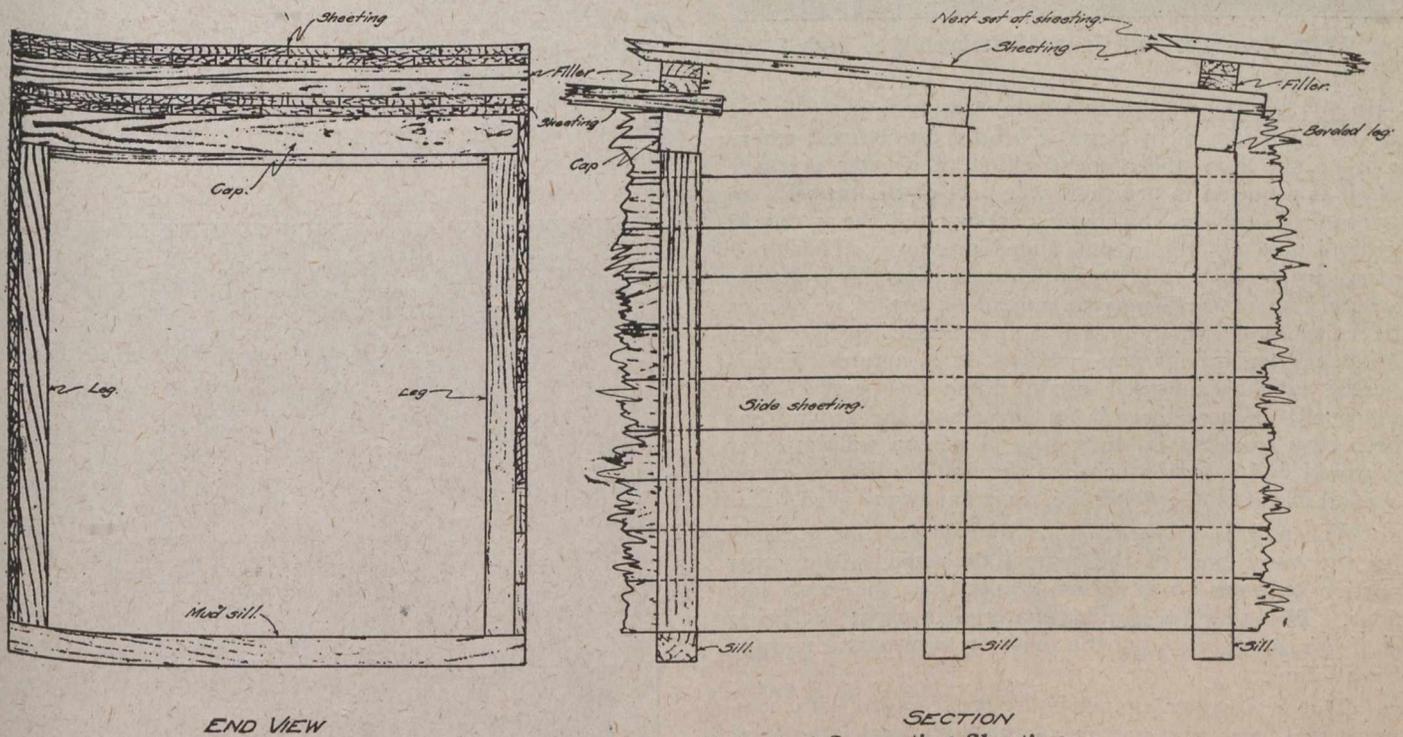


Fig. 1.—Detail of Cap and Leg Method of Supporting Sheeting.

aid of compressed air, but is much more expensive, for not only is a smaller length of tunnel completed each day but a greater quantity of and heavier timbering is required, and the difficulty of placing it is much greater. The sides and roof have to be solidly sheeted in order to prevent the water and sand from escaping into the tunnel in such quantity as to undermine the roadway or pavement or any overhead utilities, such as water mains, gas mains, conduits, etc. Tongue and grooved lumber is sometimes used, or two layers of planks placed one overlapping the joints of the other. This timbering must be heavy enough to withstand the overhead pressure (Fig. 1) as this kind

cause the timbering to sink if tunnelling is attempted (Fig. 2). In order to tunnel such ground successfully, then, without undermining overhead utilities, the water which causes the fluid nature of the ground must be forced back. When this water is removed, the ground becomes solid. It is loose enough, however, to be easily mined. To remove the water, compressed air is used, the function of which is to exert a greater pressure in the tunnel than is exerted by the overhead ground, thus forcing the water back beyond the line of the tunnel.

The pressure of air required varies directly as the depth of the proposed work, the quantity of water and the