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TRACTION STRESSES.

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(To be read at the first meeting of the General Section, Oct., 1910.)

In the design of bridge piers, trestle towers, and other similar structures, the effect of traction is an important consideration. Traction may be defined as the force parallel to the centre line of track produced by the live load, and acts at the level of the top of rail. Hence, in order to get structures that will be safe for the forces they have to resist, and that will be at the same time economically designed, it is essential that the actual conditions producing these forces be considered.

There are two conditions where stresses due to traction would occur:

(1) When a train is being hauled over the structure by a locomotive, with brakes off. In this case there would be a pull on the rails from the driving wheels of the locomotive, and an equal and opposite force due to the rolling and journal frictions and atmospheric resistance in the rest of the train. On a structure of any length these would tend to neutralize one another, and on a span long enough to take the whole train, would obviously produce no traction stresses in the piers.

(2) The second and most important case is the one where the brakes are applied to the wheels of a moving train. In this case, as long as the wheels revolve, the pull of the rails on the wheels =