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BRIDGE ACCIDENTS.

BY P. A. PETERSON, M. INST. C.E.

The accidents that have occurred on this continent to iron railway bridges, built within the last fifteen years, have not been the result either of faulty design or of weakness of the material used, and while so much is being constantly written about design, nature of strains, safe loads, factors of safety &c., little or nothing has been urged as to the duty of protecting the bridge, after it has been well built, from the accidents caused by derailed trains, which experience has shown to be its greatest, if not its only, source of danger.

A large percentage of railway bridges are so placed that all trains going towards them have to go down a grade and round a curve to reach them, and have another curve to go round and grade to ascend in getting away from them, and with heavy freight trains and light engines, drivers run very rapidly down the grade and round the curve over the bridge, in order to get up the grade and round the curve on the other side, and consequently bridges are often crossed with heavy freight trains at speeds exceeding fifty miles per hour. Of course engineers will report against this practice, and superintendents will issue orders against it, and drivers will endeavour to carry them out, till they get stuck in the grade two or three times, and are censured for not *making time*, when they return to their old practice and their old pace over the bridge, of which the superintendent takes no notice—he has issued his order and thinks he has done his duty in the matter—and when one of the many things, that may throw a freight train off the track at this speed, happens and pitches a locomotive or car into the end post of a bridge, knocking it out, and so throwing the bridge and train into the river, the bridge has to take the burden

of the blame, and is found fault with for not fulfilling a duty for which it was never intended, and which it never should be called upon to perform.

Within the last five or six years bridge-floors have been very much improved, and generally, upon first-class lines, the floors are now so constructed, that an engine can pass as safely over a bridge off the track as upon it, providing it does not run into one side of the bridge and knock out an end post or some other important member. Upon a few lines, rails running from a point in the centre of the track, about 100 feet from the end of the bridge, diverge gradually, till near the face of the abutment they come close to the track, where cast iron inclines are placed to lift the wheels on the rails. This has been found very effectual when the speed has not been too great, in putting derailed trains upon the track.

With good floors, proper guard rails and safety points, "deck" bridges are comparatively safe, but something more is required for "through" bridges. The first thing that suggests itself is that they should be widened. The writer made an attempt to have this carried out some six years ago, and endeavoured to get two feet added to the width of all the bridges upon an important line of railway, he only succeeded in getting the addition of one foot sanctioned by the government, it being urged by the contractors as well as the builders of the bridges that even this was one foot more than the standard adopted on the American roads. The idea of additional width is, however, gaining ground, the Great Western Railway being the first to give a clear width of twenty feet between the inside of the trusses of its "through" bridges.

In addition to this increased width there should be some manner of more fully protecting the end posts, and the most ready method of accomplishing this seems to be by means of heavy masonry walls, laid in Portland cement and well dowelled together, carried up eleven feet apart, to the height of an ordinary passenger car. While it can not be said that these modifications and additions will prevent all accidents to bridges, yet it must be admitted that they will go a great way towards it, and in such an important matter all that can be done should be done.