

when it is remembered that the object of this part of the work is chiefly to furnish practical illustrations of the mode of calculation.

For the purpose of comparing the cost of different structures, an estimate has been made in each case for a single track railroad bridge, 16 feet wide between trusses, at the prices now paid for work on the Pennsylvania Railroad; in preparing an estimate from them, an engineer will of course vary these prices to suit his locality.

In making the calculations, only the dead weight has been considered; the effect of the momentum of a passing load depends so much upon contingencies, irregularities of surface, &c., that no attempt has been made to calculate it. It is proper to add from 25 to 50 per cent. in railroad bridges to compensate for these effects.

The deterioration of the resisting powers of timber caused by age must also be considered. After a wooden bridge has been in use for some years, it becomes much weaker than when erected. The allowance made for the safe limit of the resisting power of wood is 1000 pounds per square inch and of iron 10,000 pounds, but it is probable that 800 pounds per square inch for wood, and 8000 pounds per square inch for the tensile resistance of large rods of malleable iron, would be more nearly the true medium between economy and safety; of this, however, every engineer must judge for himself. It is very certain that there is no economy in risk,—an excess of strength is far better than a deficiency.