sure, and are large enough and strong enough to render the service expected from them.

Engineers, as a rule, when dealing with pile-driving, are too apt to follow a well trodden path by specifying hard and fast requirements, irrespective of the service a pile has to perform; and, in the opinion of the writer, full consideration of such service should be given before a specification is completed. In explanation of this, the following is offered: A masonry pier supporting the ends of two iron trusses of 150 feet span is to be built on a pile foundation comprising 60 piles, capped and covered with two tiers of timber 24 inches deep. Now, the dead load to be borne by 60 piles will be equal to the timber caps and flooring, the masonry pier, a proportionate part of the trusses and track; and the live load will be equal to that of the heaviest train which can be placed in one span, which though intermittent in its action must be provided for. Assuming the weight of the dead and the live load to amount to 1,800,000 lbs., the weight to be borne by each pile will be 30,000 lbs. Using *eight* as a factor of safety, the "energy" to be developed by the ram employed will be 240,000 foot-pounds. Using previous data as to the weight of ram and fall, it can easily be determined from Major Sanders' rule that a "set" of 0.5 in. will be required. Now, if it be specified that the piles shall be driven by a ram weighing 2000 lbs., falling from a height of 5 feet, until a "set" of 0.5 inch is obtained at the last blow, or is the average of a specified number of last blows, then reliance can be placed on the piles so driven.

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