But more than one-half of the shoe was undermined to a depth of one foot or more which reduced the practical bearing substance by nearly one half. At the commencement of the shock, there was therefore a pressure of eighty tons per square foot, no allowance being made for impact, which may have doubled this rate. The caisson had settled ten inches. The shoe had buried itself so as to present a width of twelve inches and through the crushing of the blocks the frames were in many places resting bodily on the ground. The settling had therefore stopped when a bearing surface of seven hundred and seventy-five square feet had been reached giving a pressure of twenty-three tons per square foot.

The ultimate pressure on the base of the caisson due to the weight of the tower and superstructure will be only five tons per square foot; hence the margin of safety against crushing is ample. All the above extreme rates of transverse crushing are within the limits of good yellow pine. The fact that the majority of the blocks did crush is attributable mainly to their irregular bearing and to their shortness, a block of four feet in length will bear a much larger pressure upon one square foot of its surface than a block of two feet in length; the same is true in regard to relative breadth. Yellow pine is essentially a heart wood, and before yielding to compression it will split out sideways away from the heart. In the root of the caisson no effects whatever were produced by the pressure of posts. The timbers are bolted so close laterally that no yeilding sideways can take place. Subsequent examinations showed that the roof of the air-chamber has assumed a permanent average depression of four and one-half inches, being least in the end chamber, and greatest near the water shafts, where there was the least support by frames, and where these openings had cut the timber through from top to bottom. This deflection never increased any. The amount is comparatively small when we consider that the transverse span is one hundred and two feet between bearings, that the whole caisson and timber above it is a composite structure, bolted together, and that the joints in the timber are butt joints. That amount of