



Readers' Comment Discussion

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OF

**"THEORETICAL AND PRACTICAL DISCUSSION OF THE DESIGN, TESTING,
AND USE OF PRETENSIONED PRESTRESSED CONCRETE PILING"**

by **G. C. Strobel & John Heald**
(September, 1961 Journal)

I would like to support the contribution to the discussion by Professor Samson (June 1962 Journal) on this interesting paper and in particular also believe:—

(a) The velocity of the ram at impact is more important than hitherto appreciated.

(b) The larger types of diesel hammers are more likely to cause high instantaneous driving stresses unless appropriate precautions are taken. This is because of their long stroke, and the greater velocity of impact of the ram than that of usual comparable single acting steam hammers and also of comparable drop hammers.

(c) The diesel hammer does not operate at a greater frequency of blows than comparable other types of hammer but rather the reverse.

(d) With usual lengths of pile there is plenty of time for tensile stress to develop in the pile between blows when the driving resistance is small.

However both the authors and Prof. Samson would perhaps agree that because of the greater velocity of the diesel hammer at impact softer and thicker cushioning material is most desirable. This is not only to avoid excessive compressive

stress but also to avoid the lesser but more destructive tensile stress which is reflected from the foot whenever resistance to penetration is small.

The figures given by Prof. Samson appear however to over-estimate the actual maximum tension that could be developed. First it is not generally possible for a pile being driven not to have any resistance to penetration, usually there is some side friction or toe resistance or it will sink of its own accord until it has. Also of course only some fraction of the stroke of a diesel hammer is effective, perhaps 85% to 90% according to the type of hammer etc. Taken together the diesel hammer is unlikely to cause tensile stresses sufficient to damage a prestressed concrete pile with a residual prestress of the order of 700 to 800 psi provided a more effective cushion or pile head packing is used than usual for steam hammers.

Of course a prestress of lower value is often adequate where there

is reasonable resistance to driving throughout the penetration. On the other hand if a hard layer is immediately penetrated, and then if the pile then meets almost no resistance, it will depend on whether there is substantial side friction and the adequacy of the prestress as to the magnitude of the net tensile stress that is caused in the pile by the reflected wave.

Prestressed piles at least have the advantage of some resistance to longitudinal axial tension. On the other hand ordinary reinforced concrete piles have more longitudinal reinforcement which is initially under some compression due to its resisting and balancing the shrinkage stresses in the concrete. To avoid any computations it can be said briefly that the advantages of the diesel hammer are likely to be best obtained with both types of pile by thicker cushioning material than usual for single acting steam hammers of the same reputed energy of blow.