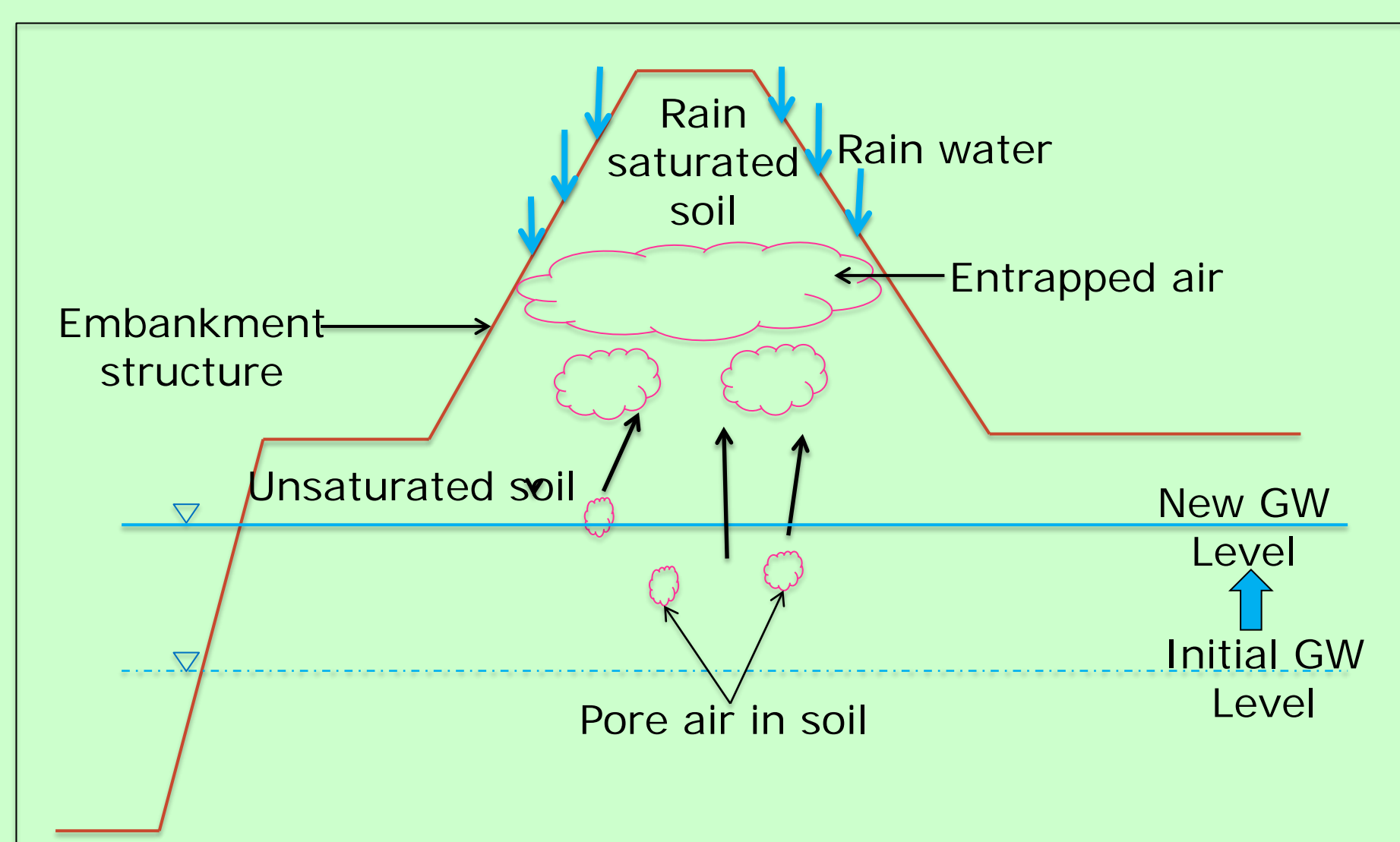


Entrapped air pressure development (and subsequent local ground failure) is investigated between wet DL clay overlaying unsaturated silica sand 8. During infiltration of water through the unsaturated soil, pore air pressure increased. Further infiltration led to upward displacement of the pore air by the infiltrating water causing air to be trapped just below the wet DL clay which had a relatively low air permeability. Displacement of the DL clay layer was observed. In this study, local failure occurred when the air entrapped between the wet DL clay and unsaturated silica sand no.8 uplifted the DL clay layer causing reasonable displacement.

地盤の表層が水で飽和かつ地下水位が上昇する場合、地盤内に空気が閉じ込められ、水の侵入に伴い空気圧が上昇し、地盤が局部的に破壊されることがあります。地層下部からの水の浸入に伴い不飽和層内の間隙空気は上部へ追いやられていきます。飽和土は空気をあまり通さないため上昇した空気が閉じ込められることで空気圧が上昇し、表層を押しやって変位させる可能性があります。本研究では、地盤内の間隙空気が地盤の破壊に及ぼす影響を実験により検討しました。上層の飽和層にDL-clay(細粒土)を、下部の不飽和層に珪砂8号を使用し、動水勾配を変化させ、浸透水量・間隙空気圧・上層土塊の変位の関係を明らかにしました。

間隙空気による盛土崩壊のメカニズム Hypothesis of failure mechanism in an embankment due to air entrapment

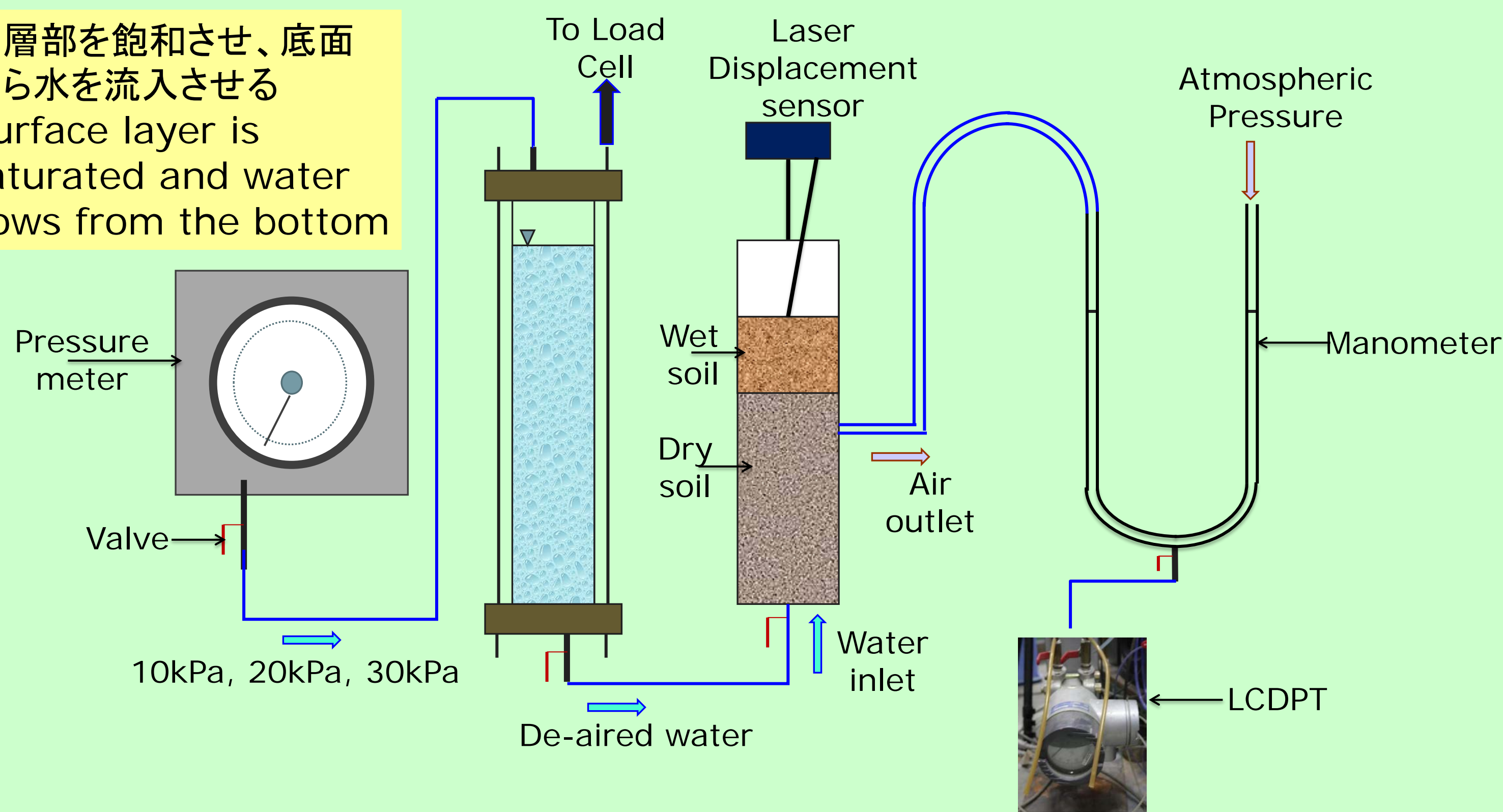


地下水位上昇と表層地盤の飽和により空気が閉じ込められ、空気圧が上昇。盛土内部にて局所破壊の可能性。

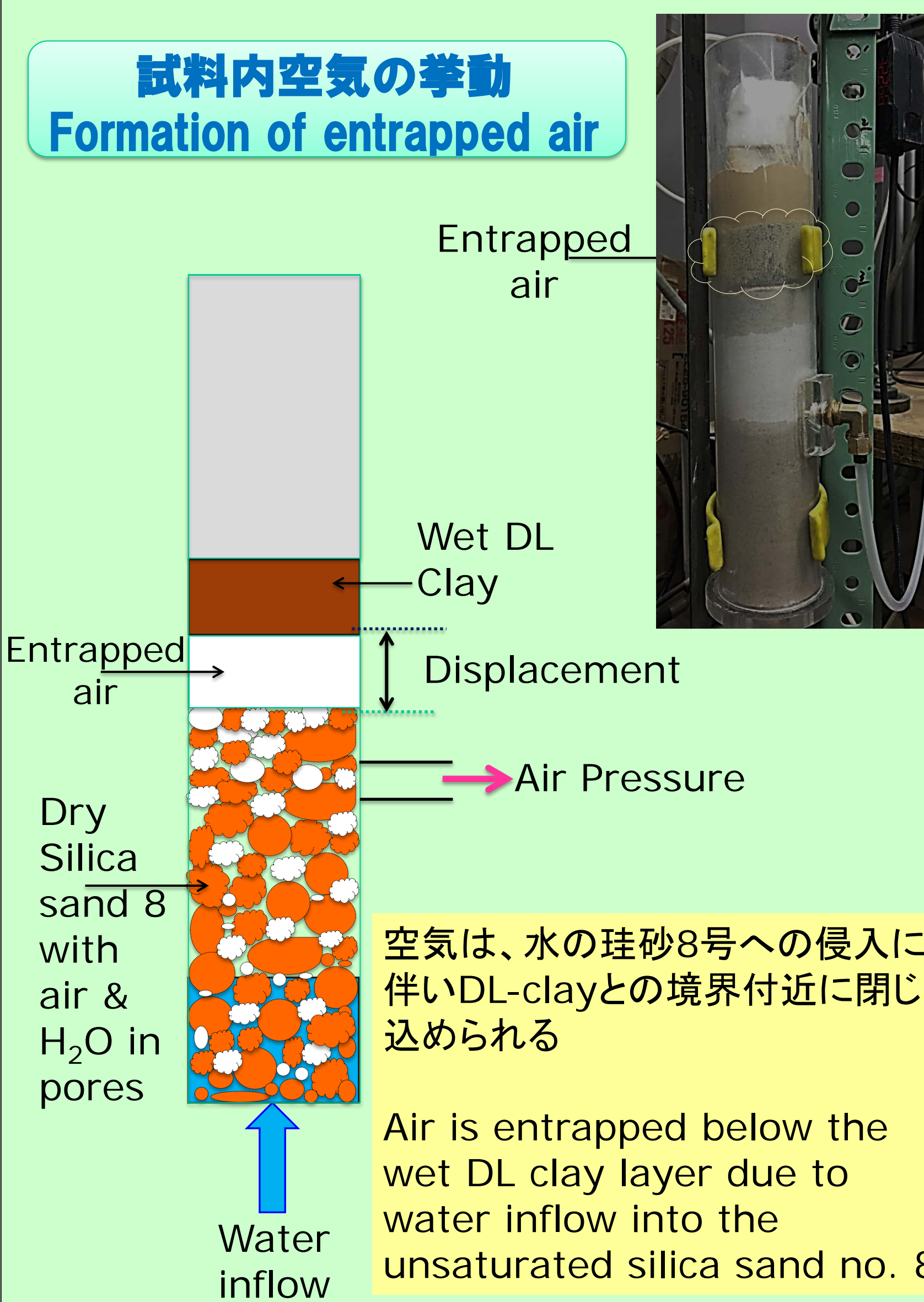
Air is trapped due to surface ground saturation and rise of ground water level. Increase in air pressure leads to local ground failure. Internal cracks develop in the embankment.

地盤内への水の浸入を模擬した円筒実験装置 Experiment set-up of one-dimensional column test

表層部を飽和させ、底面から水を流入させる
Surface layer is saturated and water flows from the bottom



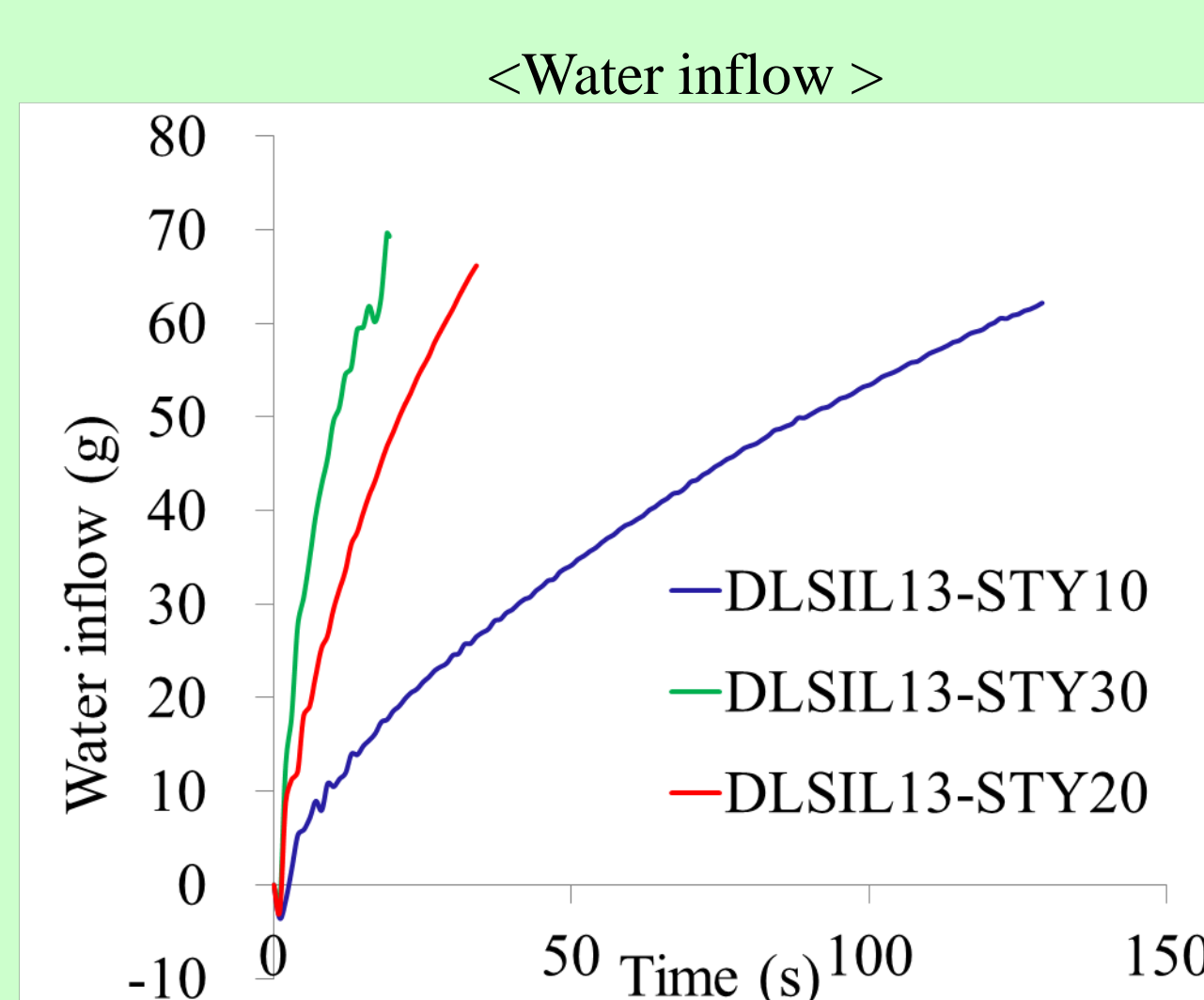
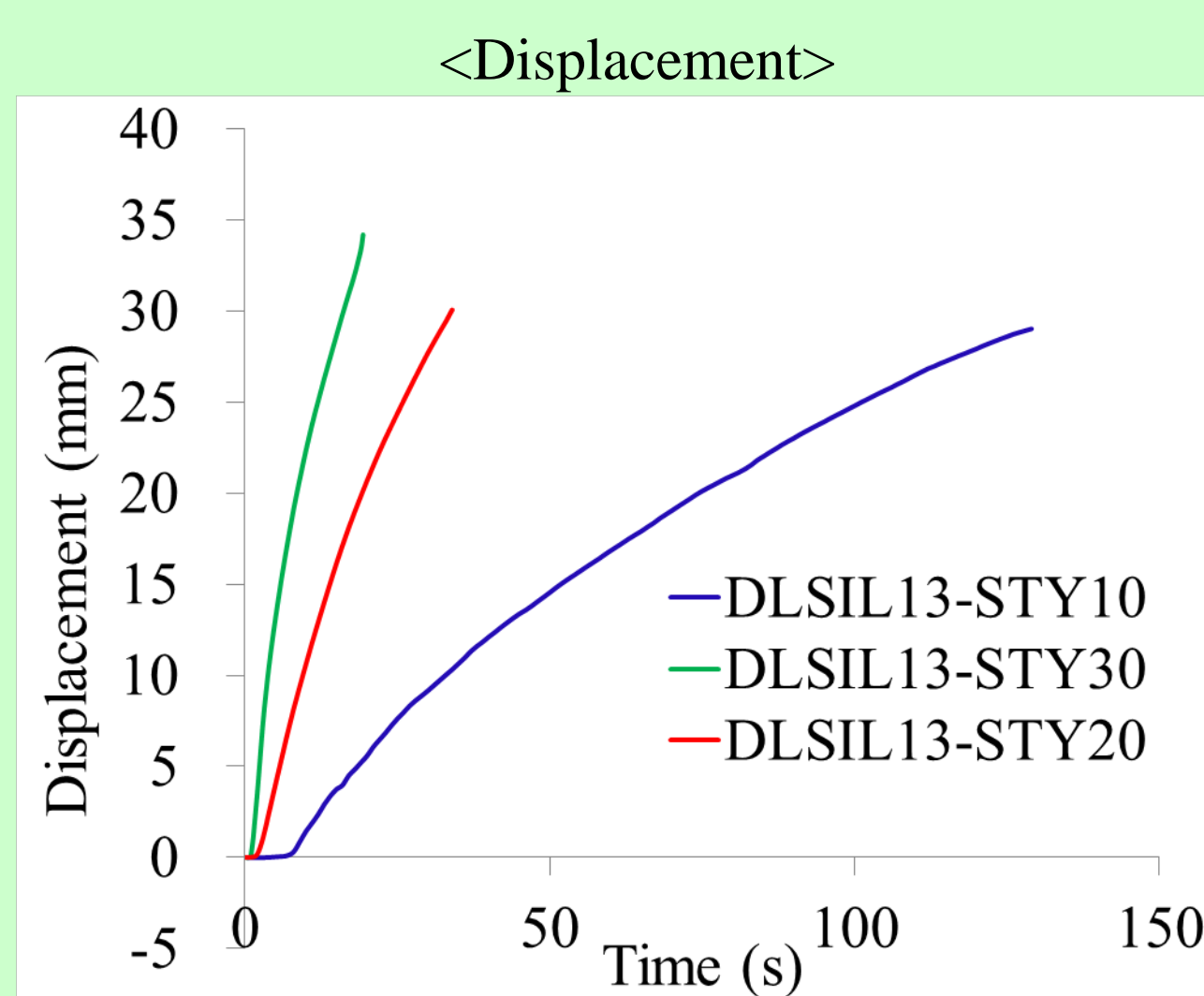
試料内空気の挙動 Formation of entrapped air



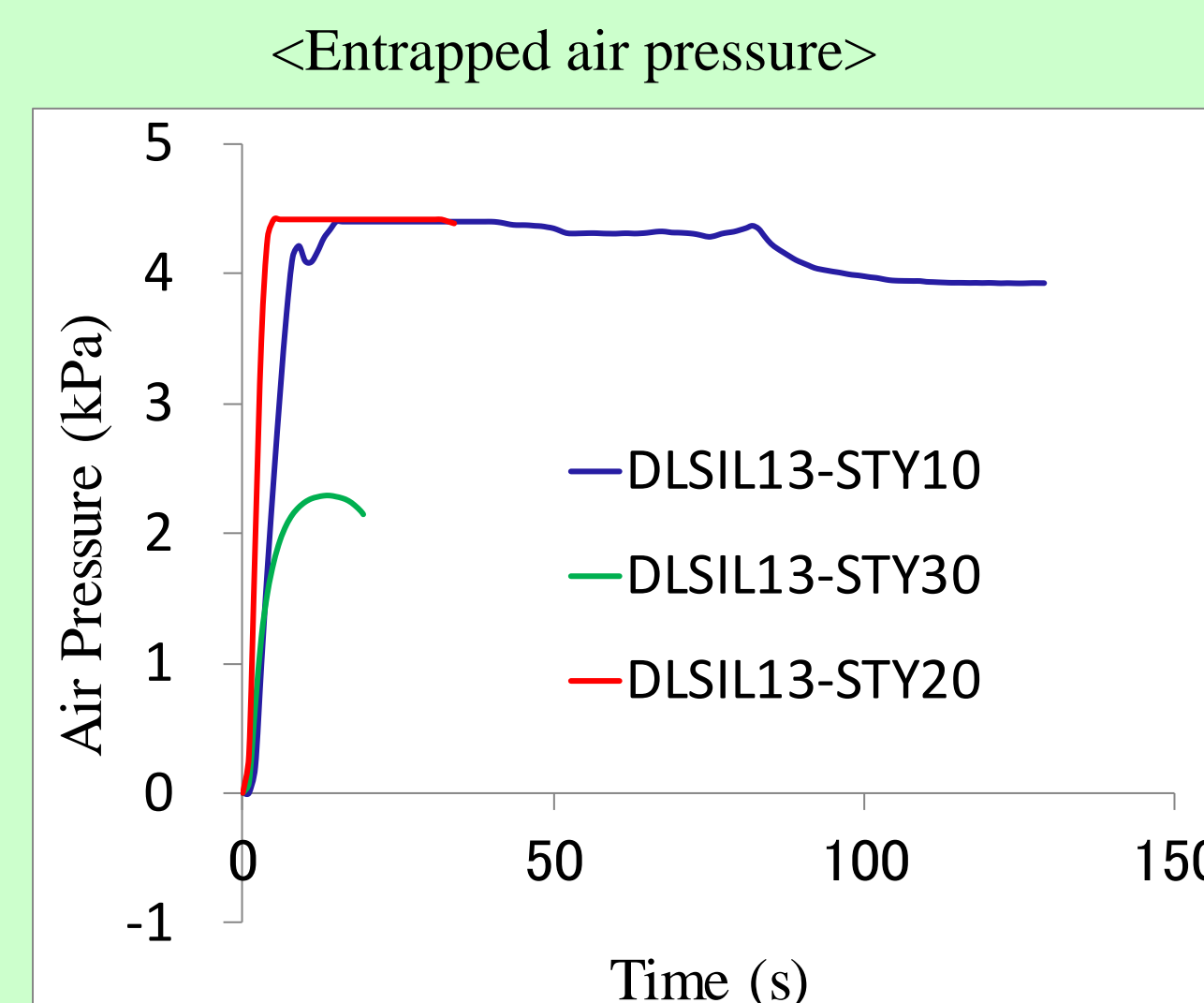
空気は、水の珪砂8号への侵入に伴いDL-clayとの境界付近に閉じ込められる

Air is entrapped below the wet DL clay layer due to water inflow into the unsaturated silica sand no. 8.

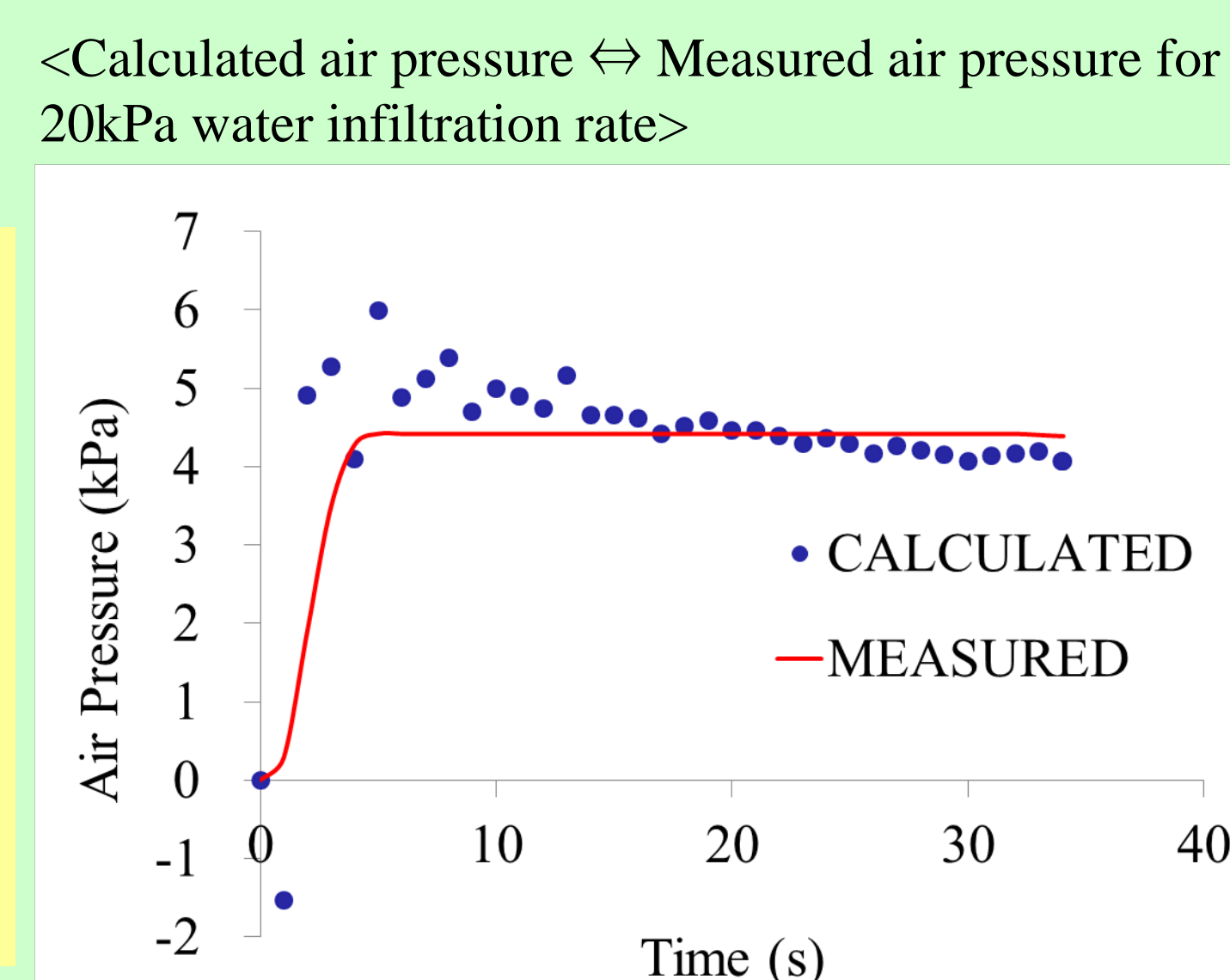
試験結果 Test Results



変位(空気層の厚さ)は侵入した水量と相関有
Displacement (thickness of air-layer) increases with water inflow



空気圧
計算結果と実験結果はほぼ一致した
Calculated (theoretical) air pressure ≐ Measured (experiment) air pressure



本研究に関する担当研究室は桑野研究室です。
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