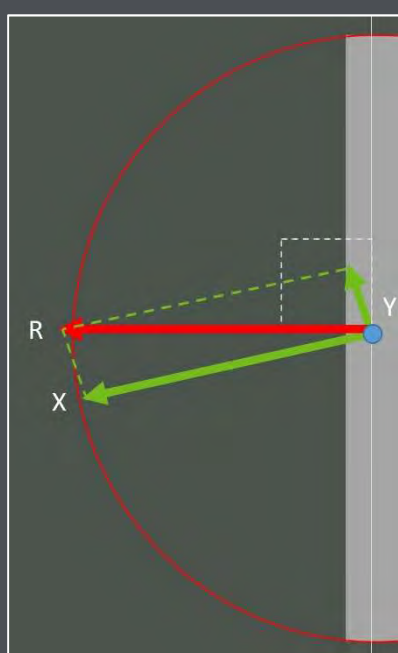


Why it is important to use biaxial sensors for making accurate measurements with in-place inclinometers

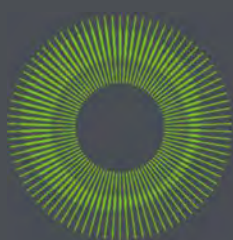
An in-place inclinometer consists of an array of displacement sensors connected by gauge rods. Sometimes, probably for economic reasons, displacements are only recorded in one direction using a uniaxial sensor or if biaxial sensors are used the displacements recorded in the orthogonal direction are ignored. Doing so makes the implicit assumption that measurement in the principal direction is aligned perfectly with the direction of the maximum expected displacement. This is important because if a threshold is defined the same assumption has been made and if the measurement isn't correctly aligned an alarm could be raised at the wrong time.



This is illustrated in the figure, which shows schematically a displacement sensor with the principal (X) sensor slightly misaligned with the direction of principal displacement, which is perpendicular to the structure. The presence of the minor (Y) sensor helps to identify this problem because it measures some displacement. Vectorising the X and Y displacements produces a resultant displacement in the direction of principal displacement. If the threshold (shown by the red circle) is applied to the measurements in the X direction it will not issue the associated alarm at the correct time. Using biaxial in-place inclinometers like ShapeArray is therefore vital to any successful monitoring project.

The Institution of Civil Engineers' Specification for Piling and Embedded Retaining Walls (Third Edition, 2016) says that "Non-torpedo type inclinometers shall be incorporated such that their effective gauge length is 0.5m and each gauge length jointed to the next gauge length to provide an accurate continuous deformation profile in orthogonal planes."

For more information about inclinometer measurements visit our website at www.geo-observations.com



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