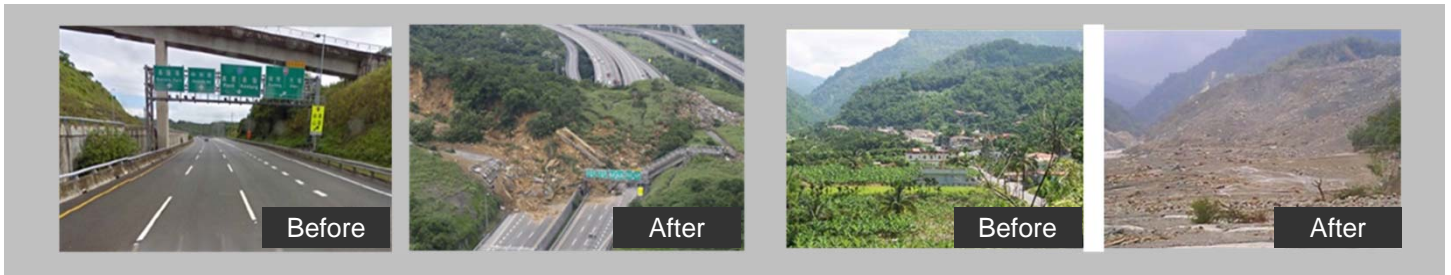




### Description:

The hillside residential areas are numerous located in Asia-Pacific. However, it is unfeasible to install safety monitoring and warning systems in those widespread areas with tight budgets. Therefore, to develop a low-cost, durable, reliable, portable device in the tilt monitoring systems would be an urgent issue. Optical Inclination Monitoring Apparatus (OIMA) is an innovative product to detect and monitor inclination or sliding of a retaining structure or building on the hillside areas.

# Tilt Monitoring Apparatus (Optical Inclination Monitoring Apparatus, OIMA)

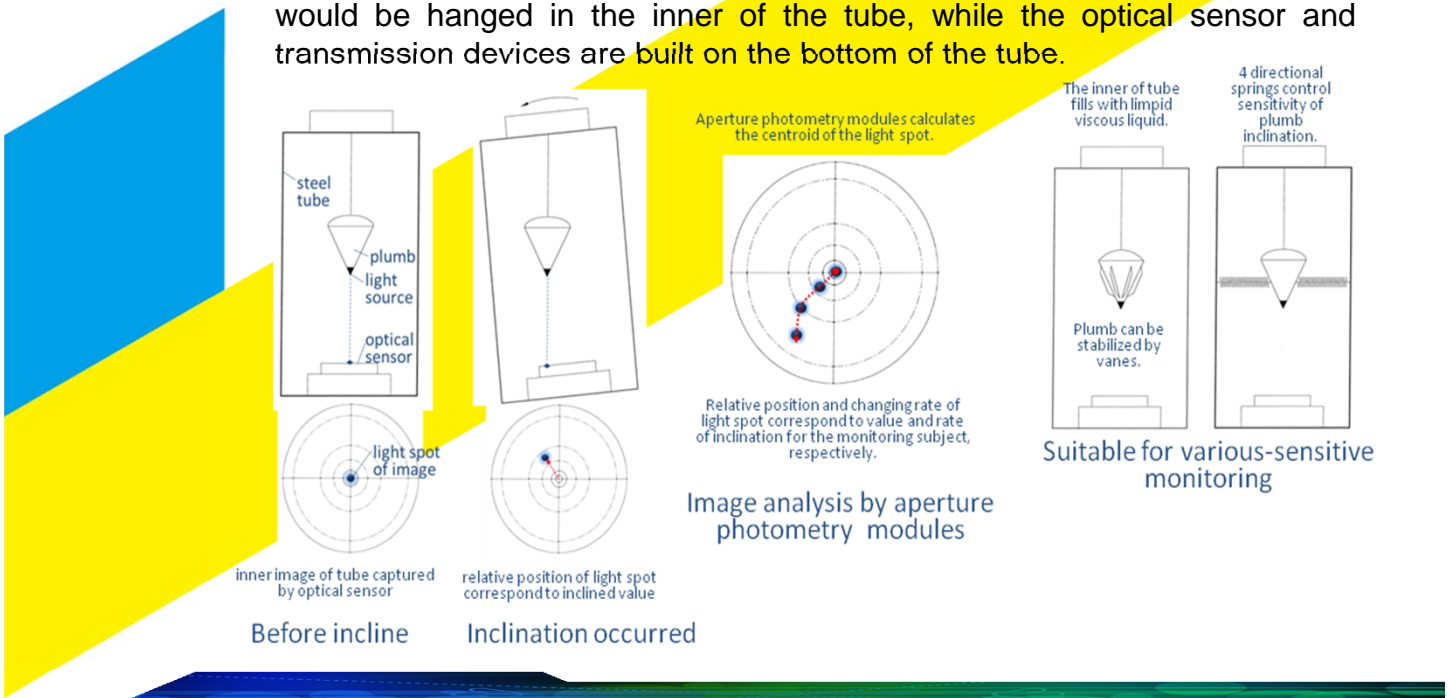


### Designs and Features of OIMA

The detection of the inclination of retaining walls and buildings on the hillside area according to OIMA will be described in the following ways:

### Hardware Component:

OIMA is composed of plumb, light source, optical sensor, transmission devices and aperture photometry analysis software modules. The developed hardware components are embedded in steel tube. Plumb with light source would be hanged in the inner of the tube, while the optical sensor and transmission devices are built on the bottom of the tube.



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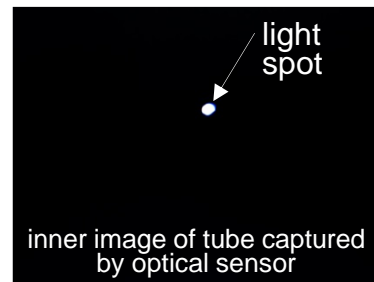
### Operation process:

- Light source embedded on the tip of the plumb. Plumb is perpendicular due to gravity.
- The sensitivity of plumb inclination can be stabilized by viscous liquid filled in the tube or adjust by the 4 direction springs connected between plumb and tube.
- Optical sensor captures the inner image of the tube, and transfers to analysis software modules via transmission devices.
- There is a light spot in the inner image of the tube. Aperture photometry software modules analysis the image and calculates the centroid of the light spot.
- Compare the centroid of the light spot during monitoring period, the relative position and changing rate of light spot correspond to value and rate of inclination for the monitoring subject, respectively.
- In addition to tilt-sensitive subject, OIMA are also suitable and fit the requirements by adjusting the viscosity of filling liquid or spring constant of 4 direction springs.

### Main Advantages of Invention:

- Effectively, simply and efficiently mount on the monitoring subject
- Adjustable precision, suitable for tilt-sensitive subject
- Pre-warning alarm is involved in OIMA system
- Biaxial inclination measurement
- Reasonable price

*At present, OIMA has been applied for patents and we are seeking the cooperation with more instruments or engineering organizations.*



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