MEASURING DEVICES

INCLINOMETERS

An inclinometer is a device that is used to measure the degree of an upward or downward slope. Surveyors, engineers, pilots, sailors and physical therapists use inclinometers everyday, yet most of us are unaware of their importance or their existence.

Inclinometers built for use on land all contain the same basic elements. Each has a flat side or base, and a hollow disk half-filled with a liquid. A graduated scale surrounds the glass face of the disk. The gradations measure the angle at which the surface of the liquid stands with reference to the flat base. A reading of 0^0 means that the liquid is parallel to the base and the flat side of the inclinometer is horizontal. This is the same measurement that a standard carpenter's level provides. A reading of 90^0 on the inclinometer means that the liquid is perpendicular to the base; the flat side is then perpendicular or "plumb." Carpenters, plumbers, and architects are all concerned that the structures they are building are "plumb."

Sailors use a type of inclinometer called a sextant. This device is very important because it helps them determine their position north or south of the equator (latitude) and their location east or west of the Prime Meridian (longitude). Instead of using water to measure the angle of difference from the base, a sextant measures the angle of the sun in relation to the horizon (base) during the day, or the angle between the North Star and the horizon at night. This reading gives the latitude. That same reading can then be found in a chart that lists the readings according to time of day and time of year. That information provides the ship's longitude. In the middle of the ocean and without landmarks, sextants help sailors determine exact location.

Inclinometers are also used in aviation. Because it measures the angle of an object in relation to a baseline, inclinometers tell pilots their position in relation to the horizon. A special inclinometer called a "slip indicator" also helps pilots keep their planes in the air as they make turns.

Park rangers and foresters use inclinometers to calculate the height, growth rate and lumber content of trees. Heavy equipment manufacturers install inclinometers to warn operators that their vehicles are about to tip over. Resort operators use inclinometers to check the slope of a ski run. Physical therapists and orthopedists use inclinometers to test the range of motion in joints of the body. Inclinometers are some of the most widely used tools across all industries, yet most of us have never before heard of them.