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.

Variations of the inclinometer have been around since ancient times. Egyptian engineers used a type of inclinometer to build the pyramids. Portuguese sailors used them to explore the globe. Lewis and Clark used sextants to map their journey to the Pacific. A simple inclinometer helped Orville and Wilbur Wright fly. Another kept Charles Lindbergh in the air during the first solo transatlantic flight.

A carpenter's level is a kind of inclinometer. It is a rectangle with one liquid-filled tube embedded parallel to the base in the center, and another fitted perpendicular to the base on the end. On each tube are two marks. The device is perfectly horizontal when the air bubble in the center tube is located between the two marks. When the air bubble in the perpendicular tube is centered between the two marks, the level is perpendicular, or "plumb." Carpenters, plumbers, and architects are all concerned that the structures they are building are "level" and "plumb."

Sailors use a type of inclinometer called a sextant. This device helps them determine their position north or south of the equator (latitude). A sextant measures the angle of the sun in relation to the horizon (base) during the day. At night it measures the angle between the North Star and the horizon. Either 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. Finding the reading on the chart 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. They 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 them 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 them 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.