Instrument for time optimization in slope measurement- CAMBIMETER

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Abstract: ***In this project instrument for time optimization in slope measurement called as cambimeter- a novel construction of instrument is done with spirit level, measuring tape, monochromatic light, iron rods with welded measuring scale on them in order to develope a high accuracy instrument in slope measurement.The primary purpose is always to develop a instrument with high accuracy, easy to handel and carry places, low construction cost and to achieve precise vertical, horizontal and angular measurements. Experiment's specially suited to measure camber slope during execution of slope as it gives instant results. The present study aims that slope reading can be determined easily and quickly with high accuracy monochromatic light and measuring scale . Different readings were obtained after measuring the camber of various roads. The readings obtained from various roads using the cambimeter were almost accurate and quickly obtained than other slope measuring instruments.***

Keywords: Camber, slope measurement, prompt result, apparent handling, optimum economic.

I. INTRODUCTION

Cambimeter is an instrument for measuring angles of slope, elevation or depression, rise or fall in the staff with respective gravity. It is designed with three basic equipments i.e spirit level, measuring tape, monochromatic light.This instrument is specially suited to measure camber slope during execution of slope as it gives instant result which assists engineer for immediate corrections.

Camber is the slope provided to the road surface at the transverse direction to drain off the rain water out of road surface. It is also known as the cross slope of the road. Incorrect slope of camber leads to overloading, fatigued. Improper camber can make the tire wear on one edge and may cause the vehicle to pull to the side that has the most positive camber. Zero camber will result in the most uniform tire wear over time, but may reduce performance during cornering

II. OBJECTIVE

Precise measurement of camber's element : angular measurement, vertical measurement, horizontal measurement.
Prompt results with optimum economy.

III. LITERATUREREVIEW

From research work done by Takahiko Yoshino, Hiromichi Nozaki it is concluded that both stability and the steering effect in the critical cornering range are improved by implementing ground negative camber angle control that is proportional to the steering angle using actuators. Dramatic improvements in cornering limit performance can be achieved by implementing ground negative camber angle control that is proportional to the steering angle.

Jieh-Shian Young *, Hong-Yi Hsu and Chih-Yuan Chuang observed an alternative approach to the camber angle measurement for vehicle wheel alignment. Instead of current commercial approaches that apply computation vision techniques, this study aims at realizing a micro-control-unit (MCU)-based camber inspection system with a 3-axis accelerometer. This paper has proposed a feasible approach to camber angle inspections for vehicle wheelalignments. The accurate alignment of the x-axis for Coordinate Sand Coordinate Vis not imperativesince the proposed approach compensates for this misaligned angle. This approach will facilitateoperations during camber angle measurements of wheels.

Daniel Osorio, University of Sussex, United Kingdom found that that human ability to discriminate the wavelength of monochromatic light can be understood as maximum likelihood decoding of the cone absorptions, with a signal processing efficiency that is independent of the wavelength. This work is built on the framework of ideal observer analysis of visual discrimination used in many previous works. A distinctive aspect of work is that we highlight a perceptual confound that observers should confuse a change in input light wavelength with a change in input intensity. Hence a simple ideal observer model which assumes that an observer has a full knowledge of input intensity should over-estimate human ability in discriminating wavelengths of two inputs of unequal

intensity.

The calculated factors of safety by Sarma Method (Variant I), confirmed that any overrun load is an increased risk of landslide. As confirmed by the calculated factors of safety for Variant II, due to rain and infiltration of rainwater into the slope there was a landslide. After finding the most unfavorable slip surface has been made a proposal of remediation measures (Variant III and Variant IV). Variant III was proposed as a reinforced of slope with geogrid. Variant IV was proposed as a reinforced of slope with ground anchors. By comparing of the factors of safety it was determined as the best Variant III. Roads are considered as significant structures and therefore it is needed to pay high attention the design and assessment of these constructions. Because of their importance, security and reliability throughout their lifetime remains the top priority.

IV. MATERIALSUSED

A. **Ranging rod** : Two 2m rods linked precisely to each other where one of the rod has vernier scale graduation.

B. **Vernier scale** : 0.5m scale with least count of 0.1mm

C. **Measuring tape** : 5m tape for measuring horizontal distance.

D. **Monochromatic light** : Red colored light for measuring vertical difference.

E. **Spirit level** : For leveling purpose.

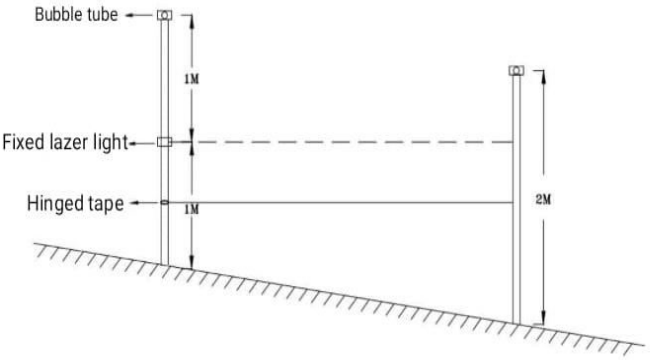
V. METHODOLOGY

Hold both the rods in position one at crown and one at edge.
Level both the rods such that they are exactly parallel to each other and strictly horizontal.
After leveling flash the monochromatic light fixed on one rod on other rod and note the level difference.
Considering the level difference X and the horizontal distance Y we get ,

$$\tan \theta = X/Y$$

$\theta = \tan^{-1} (X/Y)$

Here θ is the required camber of road.



VI. CONCLUSION

The instrument facilitates evident regime which not only helps in apparent handling but also helps in convenient transportation without compromising accuracy.
The inbuilt tape calculates the distance between the crown and the edge unaffected by the ground undulations.

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