




Complete
Instrumentation Solutions

PAVEMENT EVALUATION SERVICES



Pavement Evaluation Services

India has a road network of around 5.89 million kilometers of roadway, making it the second largest road network in the world. Maintenance and upkeep of such a huge network of roads, in a tropical country like India, is an uphill task. Pavements are invaluable asset to any airport/highway authority. These asset require huge expenditure for their creation and regular expenses on their maintenance and upkeep. The expenditure on maintenance and special repairs are periodical and are also

incurred for upgradation and strengthening works. These expenses, if minimized with the use of the latest technologies available, savings can be used for creation of additional assets. Maintenance and repair costs are increasingly influencing the life cycle costs of road constructions and in addition slowing down the economic growth. Highway authorities face an almost impossible challenge - how to maintain their road network and meet government performance targets, while satisfying the user expectations, all at the lowest possible cost.

Rutting/uneven settlement, cracks, potholes, warping of concrete slabs, joint malfunction etc are some of the major deformities one comes across during maintenance. When the problem aggravates strengthening or overlay works are proposed, that cost huge amounts. Generally, large stretches of pavements are overlaid inspite of the fact that the weak areas are existent in small stretches. To avoid such infructuous expenditure and best maintenance of pavements without compromising with the safety, we at CIS offer comprehensive Pavement Management Plans. CIS in close cooperation with its technical associates, who have



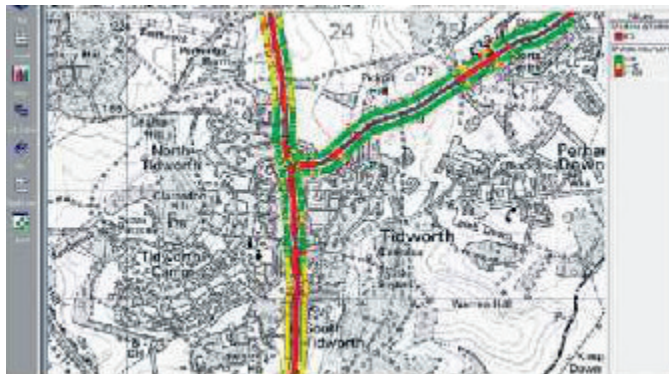
combined many decades of experience in practical road maintenance with high-technology know-how on software development, provides a host of services for comprehensive health evaluation of pavements including quality control and quality assurance audits and development of Integrated Asset Management System.



Integrated Highway Asset Management



Complete Instrumentation Solutions are associated with WDM Ltd., UK for promoting their services in India. WDM are among the leading service providers in the highway industry and have unrivalled worldwide experience and expertise in pavement and highway asset management systems.



WDM® operates a fleet of survey vehicles, including SCRIM and Deflectograph, to provide safe, reliable and cost-effective assessment of road condition.

SCRIM® and SCRIMTEX, which are the result of more than six decades of research, help target treatments to wet road low skid resistance sites. These survey vehicles provide accurate measurement of skidding resistance continuously along a survey route. They provide extremely reliable results over long distances and operate to closely controlled set up and equipment standards.

Deflectograph is used to measure the transient deflection of a road surface under the action of a rolling wheel at standard loading conditions. The measurements of deflection recorded by the Deflectograph are used to assess the structural condition of highway networks. The results can be used to estimate the residual life of highway networks and in this form are essential inputs to asset management plans.

WDM® has also developed the updated TM2 mini texture meter which transversely measures the road profile very frequently over a width of 100mm to build a detailed record of the surface to deliver the definitive macro texture measurement standard with

repeatable and reproducible results.

In addition the WDM® provides an Integrated Highway Asset Management System, which enables the user to link Pavement Condition data with Accidents, Structures/Bridges, Customer Services, Highway Inventory, Routine Maintenance Instructions, Works Orders & Street Lighting databases. Items completed/recorded whilst offline are held until the connection is re-established. The software will reattempt to upload once a new connection is made available.





Moisture & Density Asphalt Content

MOISTURE & DENSITY

Quality control is an important aspect of any construction project. Building roads is no exception, and the moisture content and density of the materials used are very important. Non Nuclear Gauges are used for determining the density of asphalt, soil, aggregate (usually gravel or crushed rock), and concrete as well as the moisture content of the soil or aggregate. Complete Instrumentation Solutions is equipped with these gauges to carry



out these tests which are useful in controlling the quality of construction which eventually reflect on the life of the road. The gauge uses an advanced micro-processor-based technology to provide highly-accurate measurements of density and moisture that are automatically computed for direct readouts of wet density, dry density, moisture content, percent of moisture, percent of compaction (Proctor or Marshall), void ratio and air voids. This Gauge complies with all pertinent standards: ASTM D7113; AASTHO T 243-12

ASPHALT CONTENT

More than 99 percent of the 5.89 million kilometers of paved roads in India are asphalt, and accurate monitoring of the asphalt content of these roads is important to ensure that the mix design-tolerance is met. Improper mix designs and amounts of asphalt are major causes of premature failure in pavement structures. If asphalt content is too low, a pavement will crack; if the content is too high, rutting and shoving will result.

Asphalt concrete mixes are composite materials consisting of aggregate, asphalt, air, and other components that collectively develop structural characteristics capable of supporting highway



traffic. One of the critical factors in the design of these mixes is the proportion of the asphalt cement component. CIS is today equipped with Asphalt Content Gauge to conduct the tests on site to ensure that correct percentage of asphalt is being used in the mix design



Quality Assurance Drainage Condition Analysis



Services using Ground Penetrating Radar and other techniques with supporting engineering software, to facilitate the strengthening, preservation, design and management of Pavement Networks. The techniques used are inherent part of the Pavement Asset Management.

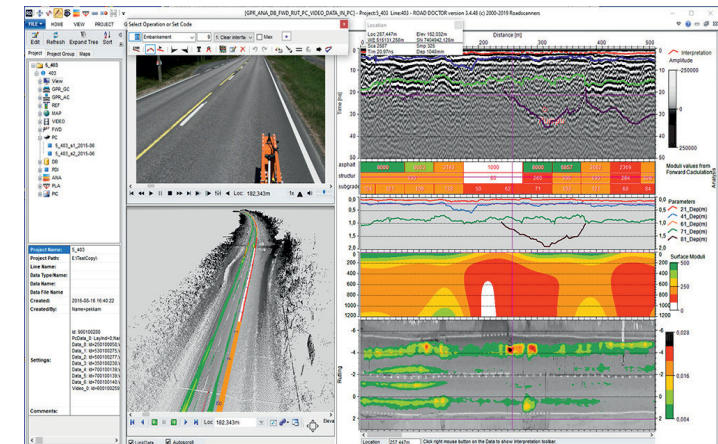
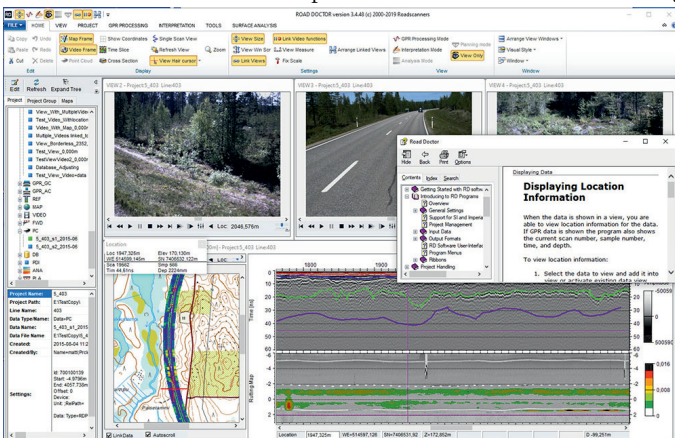
GPR and other NDT techniques are used in road condition monitoring, pavement diagnostics, rehabilitation design, quality control, and quality assurance works. GPR is a quick onsite method and it can also be easily fitted into the construction timetable to ensure compliance to design requirements, our technical associates. Road Scanners have developed comprehensive Road Doctor software package which allows integrated visualization and analysis of information from different types of surveys and also tools for importing data from databases. These products can also be used in targeted road condition management that optimizes the maintenance costs by focusing the measures at the precise place in optimum time and using optimum structural solutions.

DRAINAGE CONDITION ANALYSIS

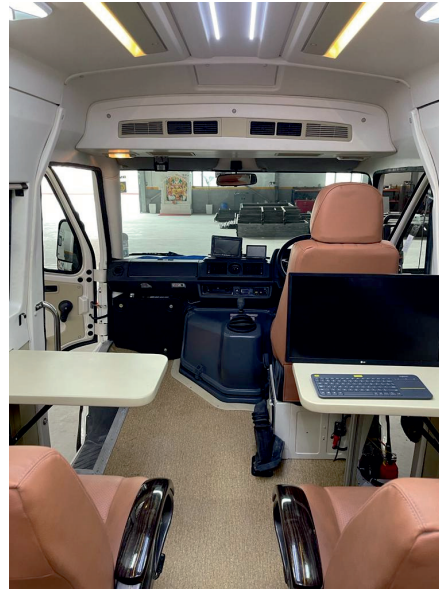
Videoring the road network using 360° camera enables efficient drainage condition analysis. Drainage condition has a vital role in network level road condition management, since it has the biggest effect on road lifetime. GPS stamp on this data helps in importing this data sheet to Software for integrated visualization. This is a very useful tool when the client is not ready to invest in state-of-the-art specialized devices for this particular application.

QUALITY ASSURANCE

To understand, quantify and synthesize the complex relationship between Pavement Performance & Material Quality, Axle Loading and Environmental Influences, Complete Instrumentation Solutions provides advanced Pavement Testing



Structural Testing Pavement Condition Surveys



STRUCTURAL TESTING

Pavement structures are expensive to construct and maintain. The methods used for selecting material types and layer thicknesses are therefore important. A wrong choice may either result in premature failure or in an important waste of resources. Pavement surface deflection basins provide valuable information for the structural evaluation of pavements and are used as an indicator of the load-carrying

of the pavement.

CIS uses Double Mass FWD for measurement of pavement structural properties which is more representative measurement on soft soil, and also maintains its accuracy on damaged and gravel roads.

PAVEMENT CONDITION SURVEYS

High traffic intensity in terms of commercial vehicles, overloading of axles and significant variations in daily and seasonal temperature of the pavement have always been responsible for early development of distress symbols like ravelling, undulations, rutting, cracking, bleeding, shoving and potholing of bituminous surfacing.

The assessment of functional pavement condition is nowadays fully machine based and CIS offer comprehensive solutions which cover all the data input required for a modern Pavement & Asset Management System. The Multi - Functional Network Survey Vehicle is capable of real time continuous highway speed measurements of the longitudinal profile (IRI), transverse profile(rutting) , macro texture , road geometry (cross-slope, curvature and gradient), video based automated visual assessments, crack , potholes etc



detection and measurement in 3 dimension etc. which can easily be integrated with GIS. This gives performance indicators to enable maintenance work to be prioritized and National Indicators to be calculated.



Mobile Bridge Inspection Unit Retro Reflectometer



Mobile Bridge Inspection Unit

This unit integrates truck, machinery, electric and hydraulic systems as a special purpose vehicle. The Volvo/Bharat Benz truck sourced locally is equipped with bridge inspection equipment for mobile inspection and professional maintenance for various bridges, with advantages such as light weight, compact, easy to operate, safe, fast, efficient etc.



The platform type inspection unit uses working platform, which has good stability and large load capacity. The inspection personnel can enter the platform or return to the ground conveniently from the bridge deck. It is ensured that continuous and uninterrupted operation can be realized. This unit has a relatively large operation range (upto 22mts), with an advantage of wide platform, high load capacity and high work efficiency. Hydraulic gear composed of a motor, reduction gear and negative brake mounted on chassis propeller shaft, enables the low speed traversing manoeuvre of the vehicle at a variable speed in forward and reverse on bridge deck (up to 15 m/minute max.) with platform/booms deployed in work position. The gear gets engaged from chassis cab prior to starting equipment operation.

Platform type Mobile Bridge Inspection Units are available from 8.5 mts – 22 mts platform length and the Bucket type units are from 11-20 mts reach beneath the bridge

Retro Reflectometer

The new MINI is smart, light and robust. It is time to forget the old dinosaur's technology.

Android smartphone bluetooth interface (optional). The new MINI can make around 8000 sequential measurements per battery charge. The MINI uses standard AA size batteries that are easy to and to replace at any time. Light and small handheld instrument: only 2.1 kg and very compact dimensions. Exclusive Airplane carry-on luggage compatible carrying case - dimensions sum less than 100 cm. Ergonomic operation and wireless remote control. Works with up to 15 mm profiled markers.





Complete
Instrumentation Solutions

Complete Instrumentation Solutions Private Limited
Suite 508, Suncity Business Towers, Golf Course Road, Sector-54, Gurgaon- 122002 Haryana
e-mail: info@instrumentation-solutions.com www.instrumentation-solutions.com