Dynatest Explorer (DE)

A comprehensive pavement analysis software.

Dynatest Explorer is primarily used to evaluate the functional pavement condition with data from Dynatest Road Surface Profilers (RSP) or a Laser Crack Measurement System (LCMS), but can also be used to display data from Dynatest Deflectometers, Friction Testers, and GPR data.

Dynatest®

Dynatest Explorer (DE)- Analysis Software

DE is a comprehensive network and project-level pavement analysis software which can provide the user with a complete overview of the functional and structural pavement condition.

The program is available in English and Spanish.

With the DE program it is possible to view and store a large number of datasets from different equipment and/or from different years on the same screen.

DE can display 3D and 2D distress data sequentially alongside ROW images, rutting measurement, ride characteristics, geometrics, friction data, Falling Weight Deflectometer (FWD) data, pavement layer moduli output from ELMOD6, and pavement layer thickness data from Ground Penetrating Radar (GPR).

The Distress Rating Module (DRM) in DE can be used to check the automatic distress detection performed on the 3D and 2D pavement images collected, and review the identification, measurement and classification of surface distresses such as longitudinal and transverse cracking, potholes, patching, etc.

DE provides graphical and tabular views of datasets.

Data import

All data acquired by Dynatest equipment and collected by the Dynatest Collection software, Dynatest Data Collection, can be easily imported, managed, and stored inside the Dynatest Explorer software. Dynatest Explorer is able to import various data files as stated below.

Data types:

- RSP (*.RSP, *.ERD, *.PRO)
- Friction (*.SLM, *.SLF)
- FWD (*.F20, *.F25, *.MDB)
- ELMOD (*.MDE)
- GPR files (*.dzx, *.lay)
- Survey (*.SVY, *.MDB)
- DHDV (*.Wisinfoldx)
- TSI files (*.tsi)
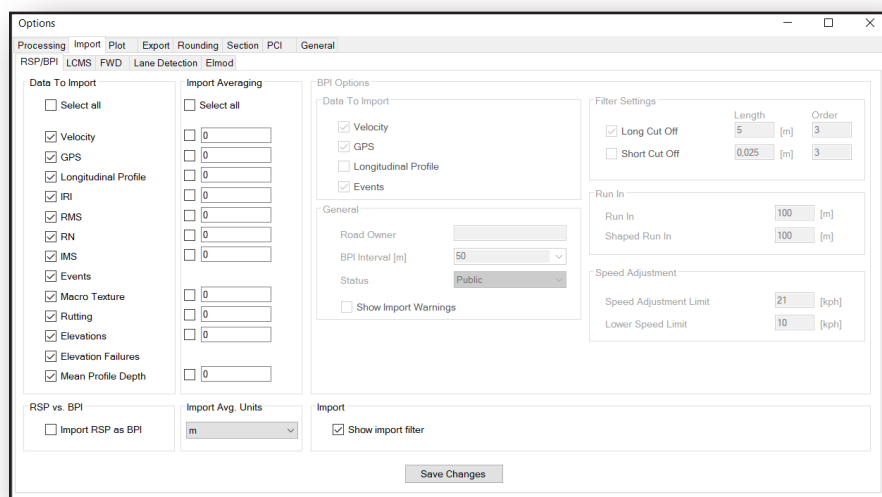
How can Dynatest Explorer help you?

Dynatest Explorer is primarily used to display and evaluate the functional pavement condition with data from Dynatest Road Surface Profilers (RSP) or Laser Crack Measurement System (LCMS®). DE gives you access to all the data, images, and distresses acquired during the survey, allowing for visualization, verification, reviewing, and reporting of results. Dynatest Explorer is able to automatically detect lanes when importing data. If you have Falling Weight Deflectometers or Friction Testers from Dynatest, you can also use Dynatest Explorer to store all the measurements data in one place - Dynatest Explorer is a great database for this.
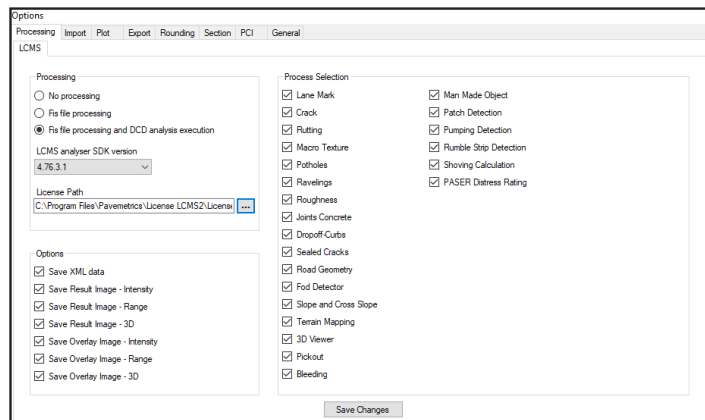
Dynatest Explorer can be used to visualize data like:

| FWD	FWD, FFWD, HWD, ELMOD
Surface Moduli	
Deflection and load data	
Drop histories	Deflection and load with time
Output from Elmod software	Layer moduli, thicknesses, overlay, residual life, PCN/ACN, etc.
Profile data	**RSPIII, RSPIV**
Longitudinal Profile	The longitudinal profile
IRI	International Roughness Index
Ride Number	Ride Number Index
Velocity	Driving speed
RMS Texture	Root mean square texture profile
MPD Texture	Mean profile depth
Rutting	Average and maximum rutting values
Geometrics	Crossfall, grade, radius of curvature
Friction data	**Dynatest Friction Testers, RFT, HFT, PFT, TTT**
Friction	Measured Friction coefficient
Velocity	Driving speed
LCMS data	**Laser Crack Measurement System**
Longitudinal Profile	The longitudinal profile
IRI	International Roughness Index
Velocity	Driving speed
RMS Texture	Root mean square texture profile
MPD Texture	Mean profile depth
Rutting	Average and maximum rutting values
Geometrics	Crossfall, grade, radius of curvature
Distresses	Pavement view and camera images, all cracks auto defined

Dynatest Explorer with Road Surface Profilers

Dynatest Explorer is the perfect tool to store and analyze the data from the Dynatest Road Surface Profilers. It is built up in various modules to help the user with complicated and time consuming calculations. The basic software functionalities are delivered together with your new equipment. Other modules come as a licensed version.

With the intuitive data import, it is easy to choose between all needed information and DE is able to store and analyze all required data.

The most used parameters are:

- IRI, International Roughness Index
- Rutting, both straight-line and straightedge method
- MPD, Mean Profile Depth
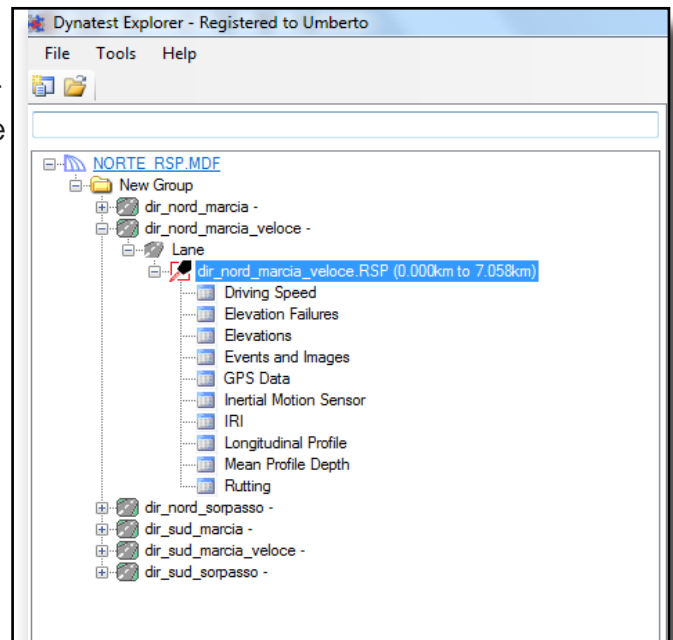
As shown in the picture above, all parameters collected in the field can be chosen.

Data Plotting

Data can be viewed as tables from which columns and rows can be copied and pasted into other programs, e.g. Excel.

However, all the information acquired during the RSP test (elevation, acceleration, profile, speed, GPS) and the main coefficients (IRI, RN, MPD) can also be plotted in single graphs for better comprehension.
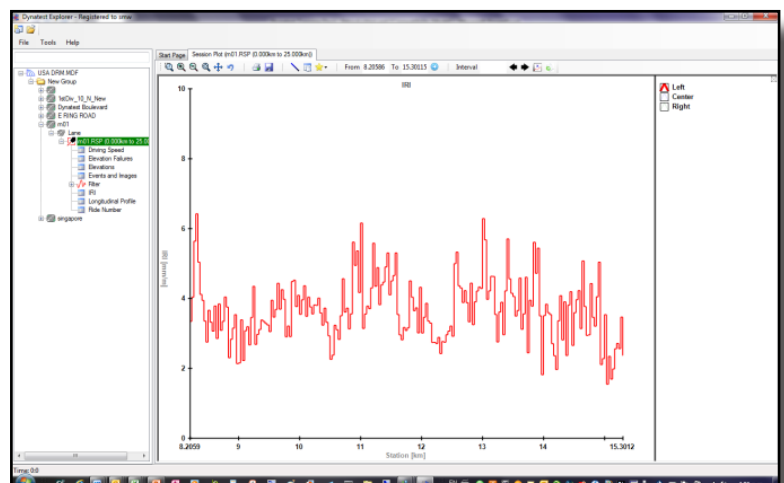
At the same time, all data can be visualized/exported in numerical format.
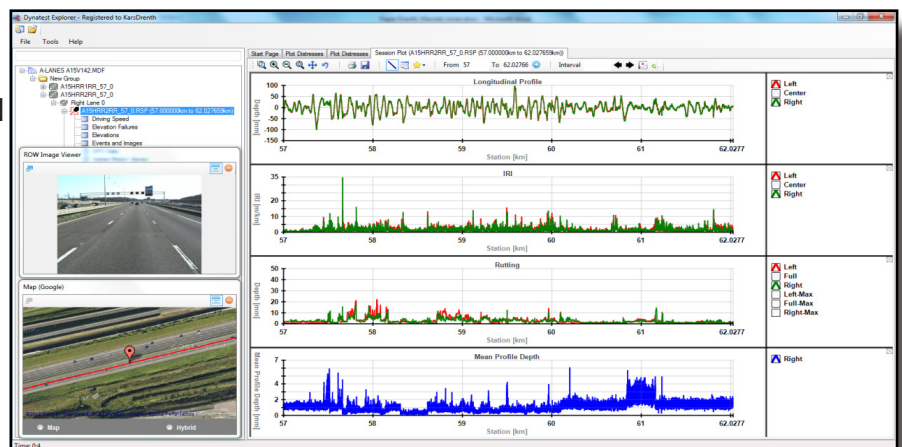
Elaborate data

The system uses easy drag & drop functionality and icons, for a more user friendly experience.
It is possible to elaborate further into the dataset and into a specific part of the test section with zoom in a graph.

Dynatest Explorer with Road Surface Profilers

Use of GPS and cameras

The data can be combined with the use of cameras and GPS. When the RSP file includes the GPS coordinates, the images are georeferenced by writing latitude/longitude data to the image EXIF header. Selecting a chainage it's possible to have a panoramic front view of testing area, and all the RSP measured values.

With the data being georeferenced, it can also easily be exported into Google Earth.
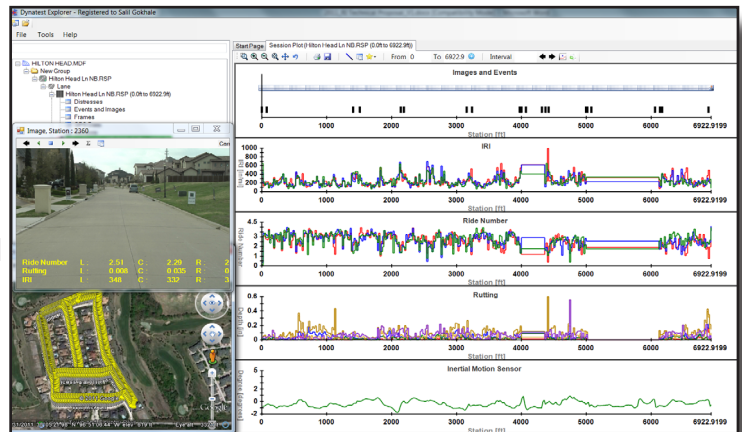
Calculations with Dynatest Explorer

If Longitudinal Profile data is available for a RSP session, it is possible to apply a number of different calculation filters within Dynatest Explorer. If the "IRI" type filter is applied, the International Roughness Index, Ride Number and Ride Quality Index are all calculated.

Other high-pass and low-pass filters with editable wavelengths and order can be applied to the profiles. With an option to recalculate rutting, it is possible to recalculate rutting using either a String-Line or a Straightedge algorithm.
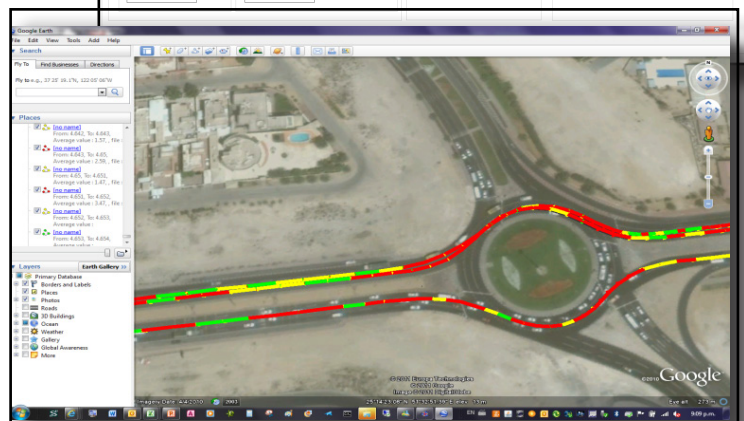
The CPI Simulation filter calculates the California Profilograph Index (CPI) of a longitudinal profile. This will bring up an interface where it is possible to set various parameters for the simulation, such as Bump Template settings and Blanking Band placement.

Export from Dynatest Explorer

Dynatest Explorer offers many different ways of exporting your profile data. It is also possible to export the results of your applied filters e.g. IRI, RN and RQI filters to a regular text file.

The data can be exported as:

- Excel (*.xlsx)
- Google Earth (*.kml)
- Drawing Exchange Format (*.dxf)

Dynatest Explorer with a Laser Crack Measurement System

Dynatest Explorer is the perfect tool to store and analyze the data from the Pavemetrics LCMS® system mounted either on the Multi Functional Vehicle (MFV) or the Mobile Multi Functional Vehicle (MMFV).

The data analysis of IRI, Rutting, and MPD is identical with the Dynatest Explorer calculations from the RSP.

The LCMS® has the ability to collect distress data and Dynatest has built a special module in Dynatest Explorer to store and, at a minimum, analyze this data. The module for analyzing LCMS data is called Distress Rating Module (DRM) and has a seamless integration from the Dynatest Data Collection Software.

The Distress Rating Module

For equipment with a Pavemetrics® Laser Crack Measurement System (LCMS®), the Distress Rating Module (DRM) in Dynatest Explorer can be used to check the automatic distress detection performed on the 3D and 2D pavement images collected and review the identification, measurement, and classification of surface distresses while simultaneously being able to see Right of Way (ROW) images and map location.

The Distress Rating Module uses the images from the LCMS® sensors and the distresses identified in the LCMS® data processing will automatically be added to the distress table.

When opening the rate distress function, the DRM module will start up and the screen will show three windows: Pavement view, ROW Image View and the Summary Tabs as shown on the picture below.

The pavement viewer allows for viewing the pavement images. All images collected are stitched together automatically in Dynatest Explorer and shown as one long stretch of road which can be manipulated in several ways: by zooming, navigating, rotating the view, and rating the pavement.
The ROW Image View displays the collected ROW image for the current station.

The summary tab can show different information via five overall tabs and gives you the possibility to see general data, distress related data, frame, or section data.

Within the DRM module, there is a possibility to manage a global list of distress types. The user may manually add new distress types, edit an existing type, or delete a distress type. It is also possible to create your own lists of distresses and even create hotkeys to either distress types or severity levels. The severities have default colors, with the option to adjust them to user preference.
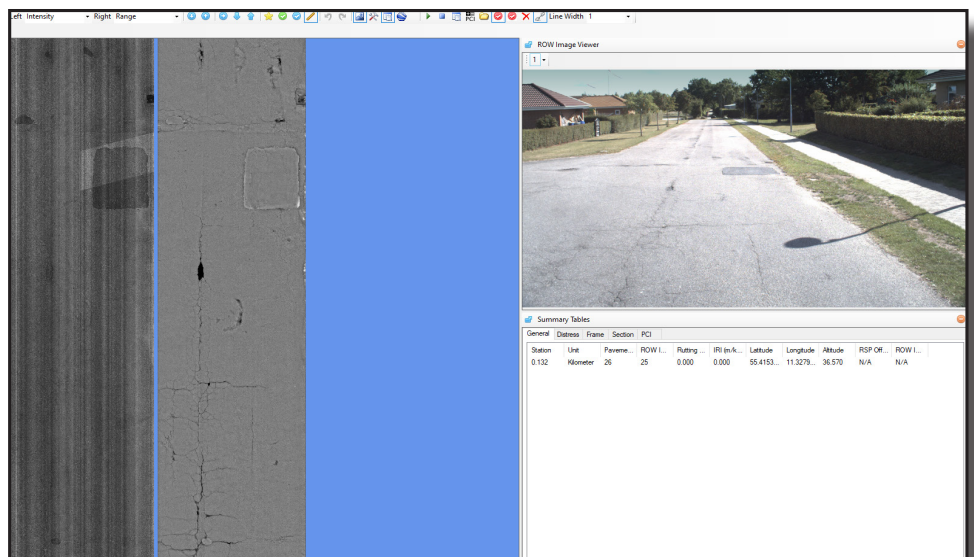
## Automatic Crack Classification

The Distress Rating Module offers Automatic Crack Classification based on various settings as shown on the picture on the right. All parameters and colors can be easily customized. The algorithm concept within the Automated Distress Classification mimics the human rater in the idea that pattern cracks have a high crack / area ratio.

Each distress is characterized by:

- Classification type
- Severity
- Width, Length (area), Depth
- Chainage
- GPS coordinates
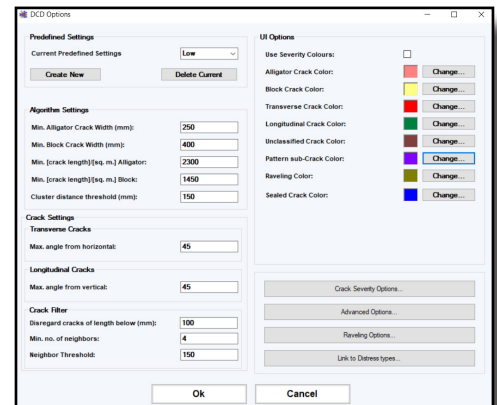
The identified cracks can be visualized with green, orange, or red lines depending on the severity of the cracks. Green indicates the lowest severity and red indicates the highest severity. Inspect the result visually and verify that you are satisfied with it (i.e. that it locates the cracks that are visible on the image and does not introduce false positives). If not, it is possible to change the processing parameters and run the analysis again, or correct them manually.
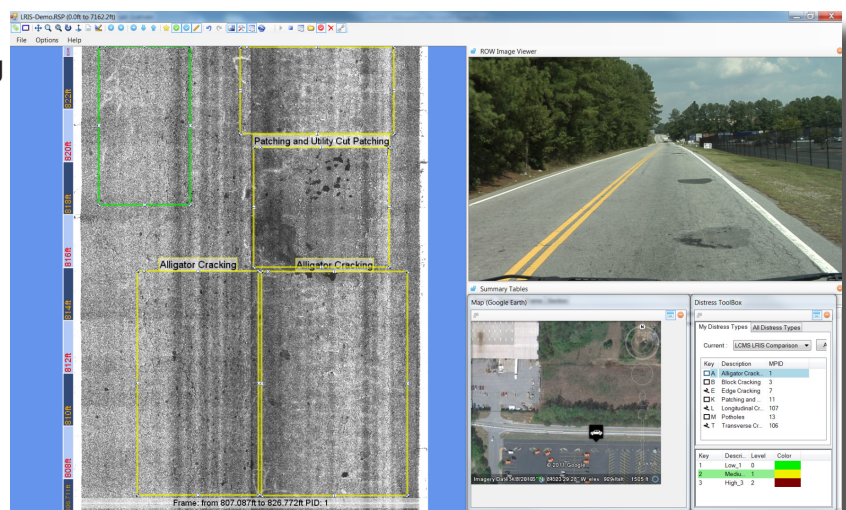
As an extra licensed module in Dynatest Explorer the Pavement Condition Index (PCI) for an area can be calculated, depending on the amount and severity of the rated distresses. The PCI calculation in DE works for flexible paved road or for flexible paved airport pavement and the ASTM standards followed are the ASTM D6433 and the ASTM D5340. The results can be shown as tables, graphs, or directly on a map.

DTMap

DTMap is a module for displaying condition and point-related data on a map with the option of customizing the appearance and layout of the displayed data. DTMap is capable of remembering various user defined profiles that contain specific customizations relating to a particular type of data.

Export from Dynatest Explorer

Dynatest Explorer offers many different ways of exporting your data. The data can be exported as:

- Excel (*.xlsx)
- Google Earth (*.kml)
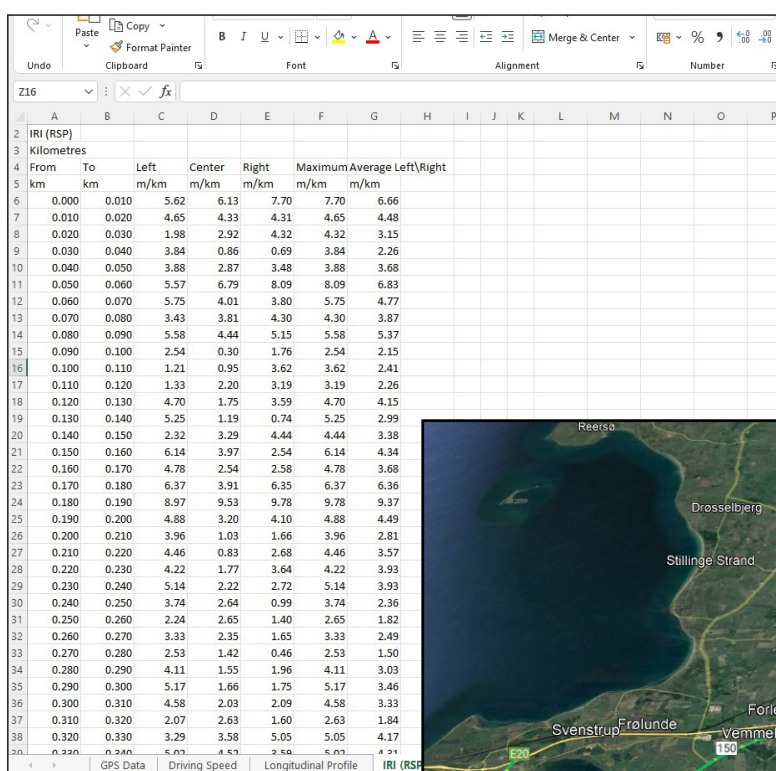- Drawing Exchange Format (*.dxf)
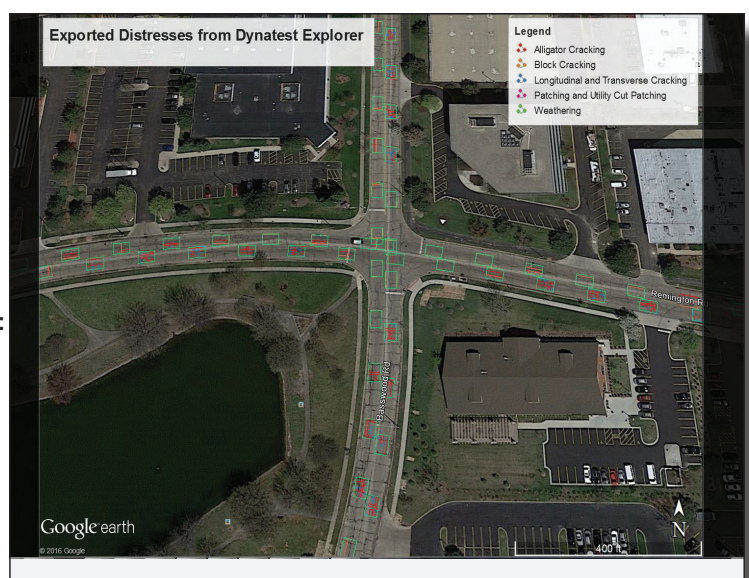
Dynatest Explorer Reporting

Dynatest Explorer is the ideal tool to support your data analysis from the Dynatest Road Surface Profilers (RSP) or Laser Crack Measurement System (LCMS), from field test to the final reporting of your pavement condition.

Whether you like to output the data from Dynatest Explorer into Excel in order to do further analysis or create a management report, Dynatest Explorer ensures a very structured and user friendly export.

It is possible to export all measured data from any Dynatest equipment, and Dynatest Explorer will create a separate tab in the Excel sheet for every parameter, as shown below.

To get at clear view of the pavement status, export into Google Earth and get the values shown on a map, clearly showing the performance of individual stretches via color overlaying. The map report will show the project name, date and time, and an overall status of the pavement performance, as shown below.

With all the enhanced functionalities, and more to come, Dynatest Explorer will be the perfect tool for you to start an effective Pavement Maintenance Planning.