



DYN@LYZER - COMPACTION CONTROL & DOCUMENTATION SYSTEMS FOR DYNAPAC SOIL AND ASPHALT ROLLERS

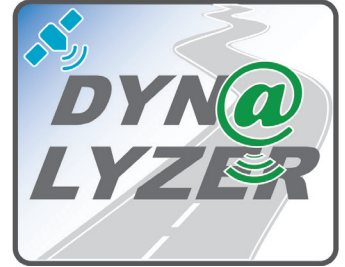


Sustainable Productivity

Atlas Copco

DYNAPAC'S EXPERIENCE in Continuous Compaction Control (CCC) or Intelligent Compaction (IC) dates back to the late 70s. Since then we have been able to offer our customers the opportunity to control the compaction work in real time and to document the completed work for improved quality control.

We can now offer the same advanced levels of control and documentation on both single drum vibratory rollers for soil compaction (the CA range) and tandem vibratory rollers for asphalt compaction (the CC/CG ranges).



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Two Level System

The DYN@LYZER system is built up in two levels.

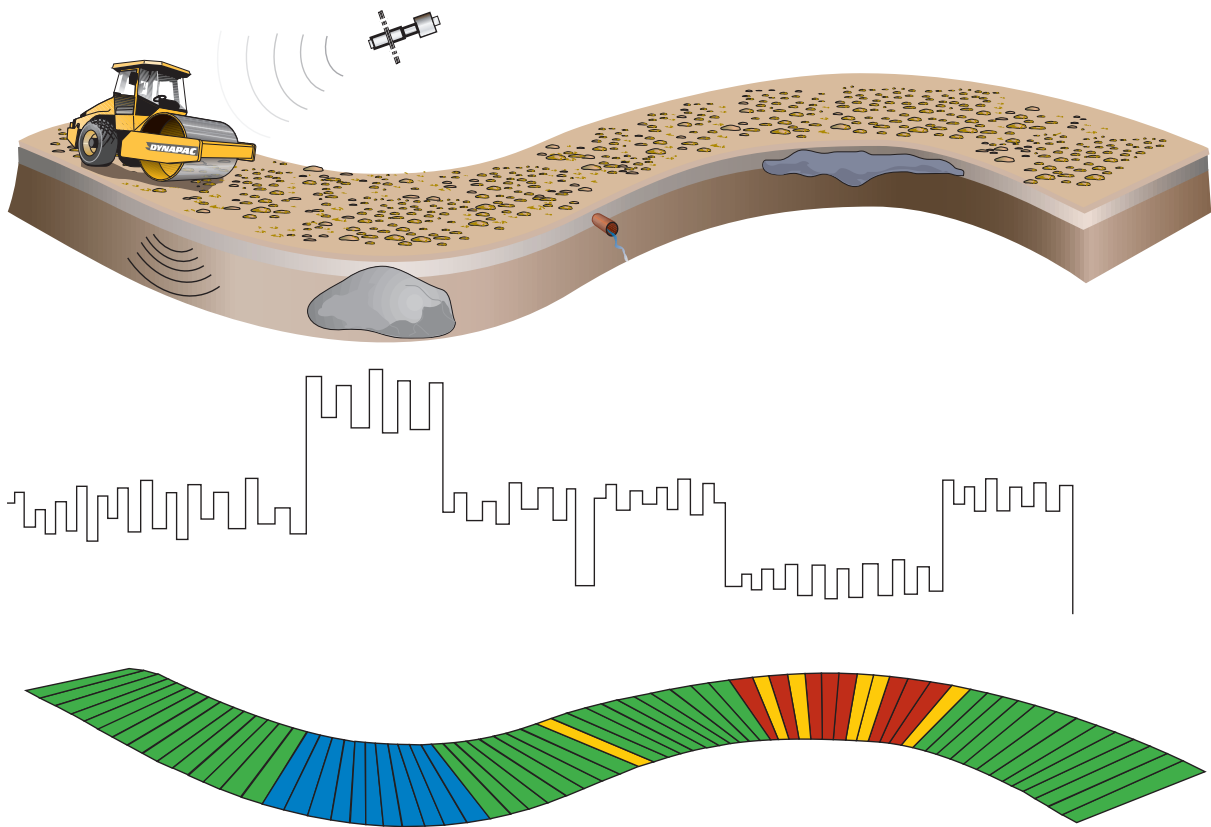
1. The first level is the Compaction Meter, now using E_{VIB} readings for both soil and asphalt:
2. The second level of the system is the Dynapac Compaction Meter plus the Dyn@lyzer with GNSS (Global Navigation Satellite System):

On asphalt rollers this is supplemented by the Asphalt Temperature Meter. It utilizes two temperature sensors, one at each end of the roller, to register the surface temperature of the asphalt. The temperature is measured by the sensor that is currently at the front depending on the driving direction. This minimizes the influence of surface water from the drum sprinklers.

This registers all the Compaction Meter data and continuously displays the compaction results to the operator on the computer screen. The data is, at the same time, recorded and saved allowing full traceability and quality assurance. The GNSS receiver (such as GPS, GLONASS, Galileo, etc) gives the precise position of the roller on the job site at all times. The level of accuracy depends on site requirements.



The on-board display shows a map of the recorded data to the operator; in this case passes and the asphalt temperature.



Continuous Compaction Control using accelerometer based on stiffness readings allows the roller operator to “see” below the surface.

The Compaction Meter registers the ground conditions and the data is positioned and mapped by the DYN@LYZER system in real time.

BENEFITS WHEN USING THE DYN@LYZER SYSTEM

- **No unnecessary compaction of already completed areas**
- **The risk of under or over compaction is eliminated**
- **The compaction work can be focused on specific areas that require additional compaction**
- **Each stage of the compaction work is documented and presented to the operator in real-time**
- **100% area coverage compared to only a fraction of a percent with traditional compaction control methods**

A much greater opportunity to achieve:

- **First-rate compaction results with maximum uniformity in terms of the bearing strength of each layer**
- **Simplified quality assurance**
- **More efficient compaction**
- **The best possible economy for both contractors and clients**

ASPHALT ROLLER CC/CG RANGE

IMPACTOMETER

The Impactometer shows the number of vibration impacts per meter. This is a function of vibration frequency and speed. The higher the speed, the lower the number of impacts per meter. It is recommended not to go below 30 impacts/meter (10 impact/feet) to avoid rippling.

The Impactometer is standard and is shown as a value in the lower right corner of the operator's display. It is also possible to use the "application view" in the display and set a range to operate within.

COMPACTION METER

The Compaction Meter measures the relationship between load and deformation. This is used to determine the E_{VB} value. The loading part of the vibration cycle results in E_{VB1} and the unload part in E_{VB2} .

The stiffness of the compacted material, which is what is being measured, can under the right circumstances be correlated to the achieved density

Asphalt stiffness is temperature dependent and should be used together with the Temperature Meter.

The readings are presented in the roller display. A target value can be set to make it easier for the roller operator to observe if the desired stiffness has been reached.

The Compaction Meter can be fitted as option to Dynapac vibratory asphalt rollers CC2200-6200 and CG2300.

High deformation at a certain load means low material stiffness and a low E_{VB} value. Low deformation at the same load means high material stiffness and a high E_{VB} value.





DYN@LYZER

Dynapac's documentation system records and maps stiffness and stiffness progress of the compacted layer in real-time as well as temperature and number of passes. A GNSS receiver is used for positioning. Positioning accuracy may be selected between Differ-

ential-GNSS (decimeter accuracy) or RTK-GNSS (cm accuracy) depending on site requirements.

The DYN@LYZER can be used as a quality control and assurance tool as well as a production tool to optimize the compaction effort.

DYN@LYZER Multi is to be used when two or more rollers are working together on the same layer. All machines that are connected get near real-time updates on the total number of passes that were made. Connection is made over short-range wireless communication.

The DYN@LYZER can be used in one or more of the three ways described below:

- Compaction to a target value.
- Compaction to a target compaction progress, relative increase between two consecutive passes.
- Counting number of passes, vibratory as well as static. Calibration is not required.

TEMPERATURE METER

One of the two temperature sensors measures and records the asphalt surface temperature, the sensor that is in the front, depending on the current driving direction, is the one that is active.

The Temperature Meter reads the temperature on the asphalt surface. It has to be considered that the surface temperature is lower than the core temperature, which is

most essential. The difference just behind the paver is close to zero, however, after a short time/distance the difference can be around 20 °C (70 °F).

The required temperature range can be set in the "application view" to guide the operator when the mix is too hot or too cold to be compacted. When the temperature is below the minimum limit, a warning appears.

DYN@LYZER for Asphalt

Compaction Documentation

Records and maps in real time:

- Compaction Meter values
- Progress of Compaction Meter values, relative
- Temperature Meter values
- Number of passes
- Supports the roller operator to optimize compaction effort

Analysis of the compaction

- Compaction Meter values (stiffness)
- Progress of Compaction Meter values (progress of stiffness)
- Temperature
- Number of passes
- Statistics and distribution
- Export PDF report and data text file

SOIL ROLLER CA RANGE

COMPACTION METER INCLUDING ABC

The operator information for the optional Compaction Meter is included in the standard display. It is the best tool to optimize compaction, identify weak areas and save passes, time and fuel. A target level can be set to make it easier for the roller operator to observe if the desired stiffness is obtained or not.

The Compaction Meter measures the relationship between load and deformation. This is used to determine the E_{VB} value. The loading part of the vibration cycle results in E_{VB1} and the unload part in E_{VB2} .

The loading part of the vibration cycle consists of elastic, plastic and creep deformation. The unload part, on the other hand, consists of elastic deformation.

The stiffness of the compacted soil, which is what is being measured, can under the right circumstances be correlated to the achieved density.

The double jumping, in Dynapac parlance "bouncing," is also measured and used in the Active Bouncing Control (ABC) to control the vibration. When double jumping occurs there is a considerable risk that the compacted material is crushed. The vibration level on the operator's platform may also be too high and it may be harmful for the roller itself. The Compaction Meter can be fitted as an option to Dynapac vibratory

soil rollers CA1500-6500. The Dynapac Compaction Optimizer (DCO) version uses the Compaction Meter as standard to optimize the amplitude. By adjusting the amplitude it also avoids bouncing even without ABC.





DYN@LYZER

Dynapac's documentation system that records and maps stiffness, stiffness progress and the number of passes of the compacted

layer in real-time. A GNSS receiver is used for positioning. Positioning accuracy may be selected between Differential-GNSS (decime-

ter accuracy) or RTK-GNSS (cm accuracy) depending on site requirements.

The DYN@LYZER can be used in one or more of the four ways described below:

- Compaction to a target value. Calibration is required.
- Compaction to a target compaction progress, relative increase between two consecutive passes. Calibration is not required.
- Counting the number of passes, vibratory as well as static. Calibration is not required.
- Finding weak areas to perform adequate spot measurements. Calibration is not required.



Compaction Analyzer for Soil

Compaction Documentation

Records and maps in real time:

- Compaction Meter values
- Progress of Compaction Meter values, relative
- Support to find weak spots
- Number of passes
- Supports the roller operator to optimize compaction effort

Analysis of the compaction

- Compaction Meter values (stiffness)
- Progress of Compaction Meter values (progress of stiffness)
- Weak spots listed and mapped
- Number of passes
- Statistics and distribution
- Export PDF report and data text file

Facts about the DYN@LYZER

- Multiple machines can be factory prepared. This ensures a cost effective way to prepare a fleet of machines with the DYN@LYZER as they can share DYN@LYZER computer and GNSS equipment for use as required.
- User-friendly, modern user interface
- 11.6" full color touch screen
- Electronic keyboard for entry of data
- Mobile memory for permanent storage

- Several languages to choose from
- Runs on the roller's 24V battery or internal battery
- Tablet weight: 1.4 kg
- 220V adapter for office use
- Rugged tablet, resistant to dust, moisture and vibrations
- In Multi version, office software is included as well as machine-to-machine communication

Factory installed or as a field kit for the following machines:

CC2200-CC6300 & CG2300

- Impactometer (standard)
- Temperature Meter with two sensors (option)
- Compaction Meter, EVIB (field kit when Temperature Meter is on machine)
- Compaction Meter, EVIB with Temperature Meter, two sensors (option)

CA1500-6500

- Active Bouncing Control, ABC (option)
- Compaction Meter, EVIB including ABC (option) included in Dynapac Compaction Optimizer, DCO

DYN@LYZER

	Includes onboard tablet with some preparation and post-processing capability
Preparation	Dyn@lyzer preparation CA (requiring Compaction Meter) Dyn@lyzer preparation CC/CG (requiring Compaction Meter & Temperature Meter)
No GNSS (user supplied)**	Single roller, 2D recording and mapping
Decimeter (DGNSS) accuracy GNSS	Single roller, 2D recording and mapping. Includes Differential GNSS system with decimeter accuracy. Requires subscription for position augmentation
Centimeter (RTK) accuracy GNSS	Single roller, 2D recording and mapping. Includes RTK GNSS system with centimeter accuracy. Requires subscription for position augmentation

*) Multi-roller capacity includes short distance wireless communication between machines working on the same layer on site. Recording and mapping is done for all machines working together
 **) GNSS is required to run the DYN@LYZER

COMMITTED TO SUSTAINABLE PRODUCTIVITY

We stand by our responsibilities to our customers, to the environment and to the people around us. We make performance stand the test of time.

This is what we call - Sustainable Productivity.

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