Welcome

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WIRTGEN AMERICA

Outline

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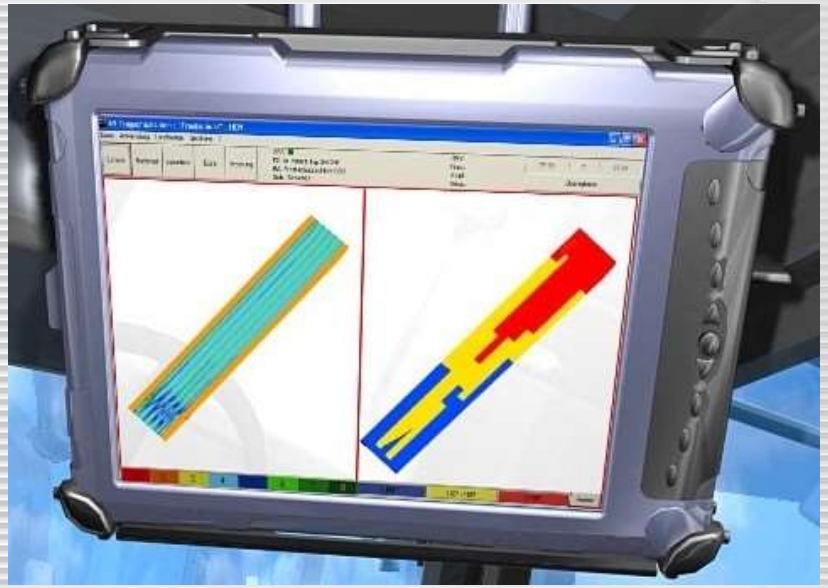

- Hamm (History)
- Where did we start?
- System Components
- System Features
- What affects stiffness?
- Summary

1911 to 2015. 104 years of roller production.

Hamm is the oldest continuous producer of Rollers in the world.

HAMM History

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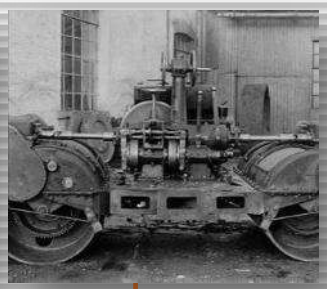
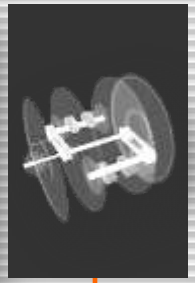
Year	Event
1878	Foundation
1911	Engine-powered roller
1932	All-wheel tandem roller
1956	Three-wheeled static roller
1963	Pneumatic-tired roller
1972	All-wheel roller with double vibration
1983	Oscillation
1998	Series HD
2000	Series 3000
2006	HD Compact Line
2008	HD+ tandem roller
2010	New generation of pneumatic-tired rollers
2013	Series H





Where did we Start?

HAMM CDS SINCE THE LATE 1980's

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CDS – Compaction Documentation System

- Road construction
- Railway construction
- Airports
- Industrial sites
- Dam projects
- Landfills

CDS

Compaction Documentation System

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Screen for the CDS

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CDS - Work screen

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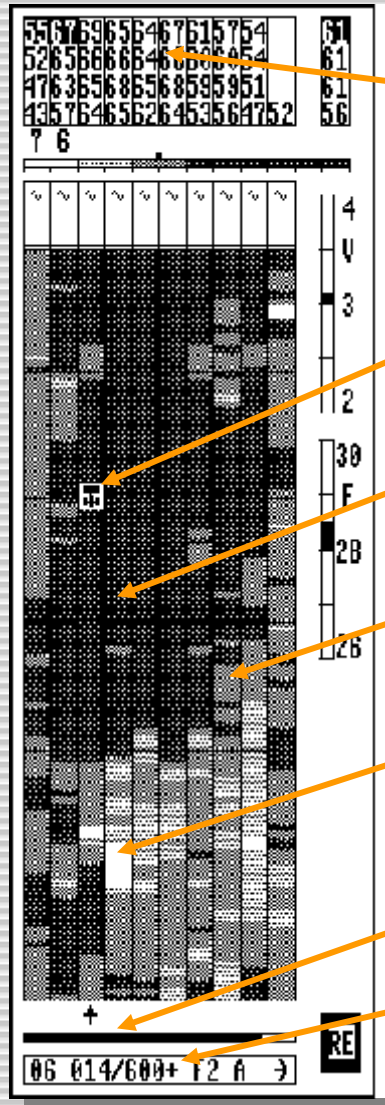

Average compaction values

Roller symbol

High compaction

Sufficient compaction

Weak spots

Storage indicator

Information block

HCQ System

Overview earthwork

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HCQ System

Components: acceleration sensor

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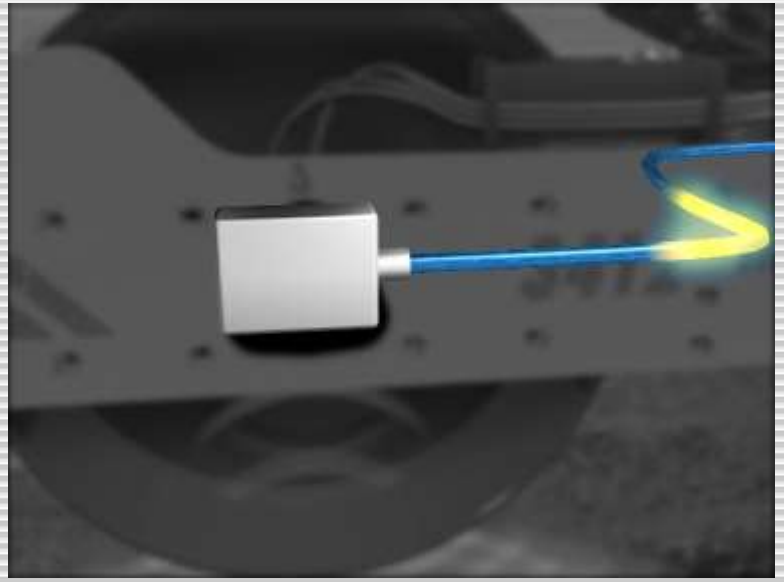

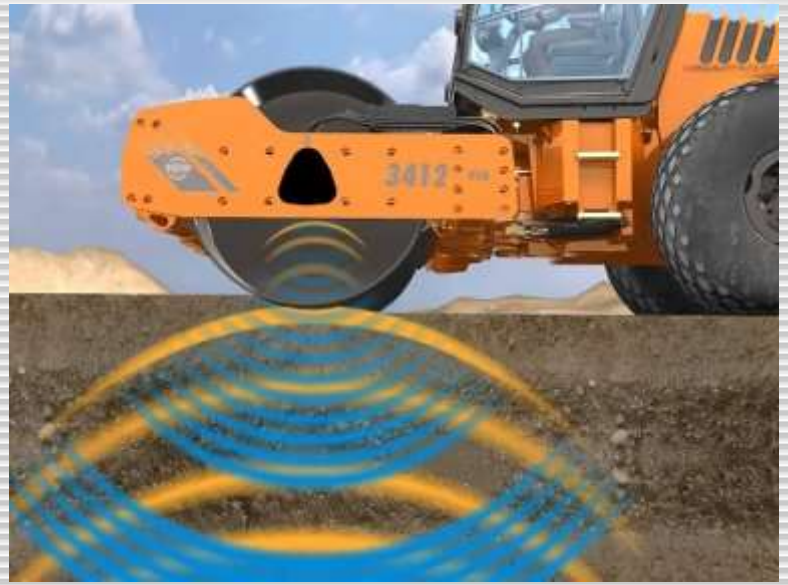

HCQ System

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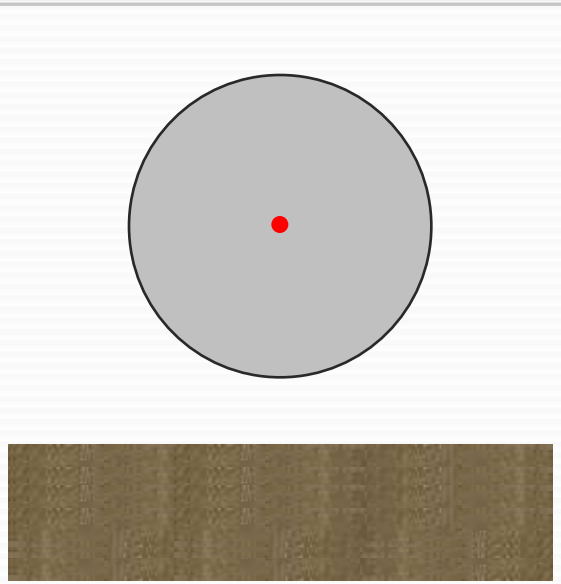
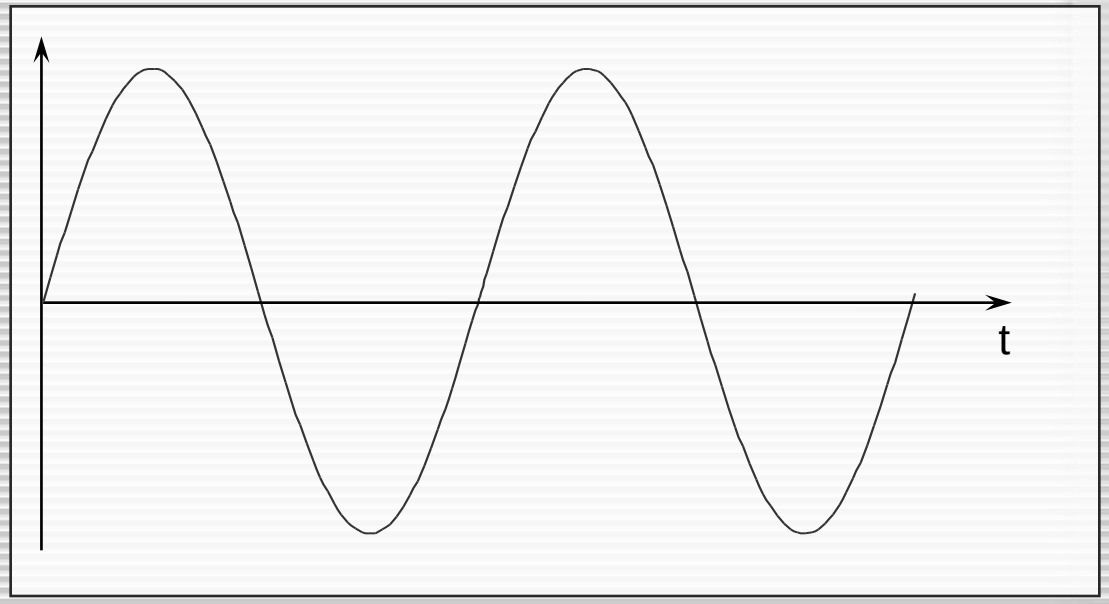
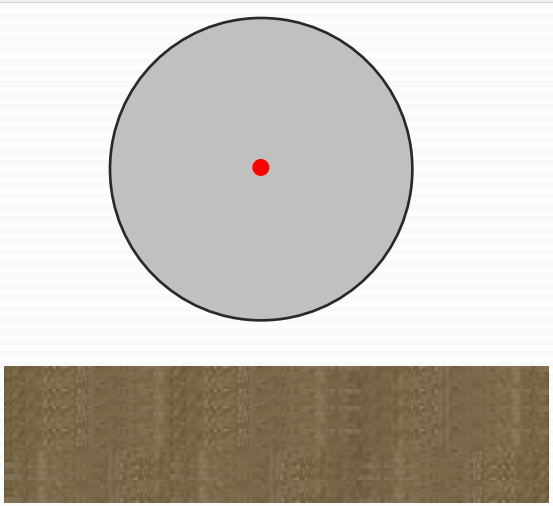
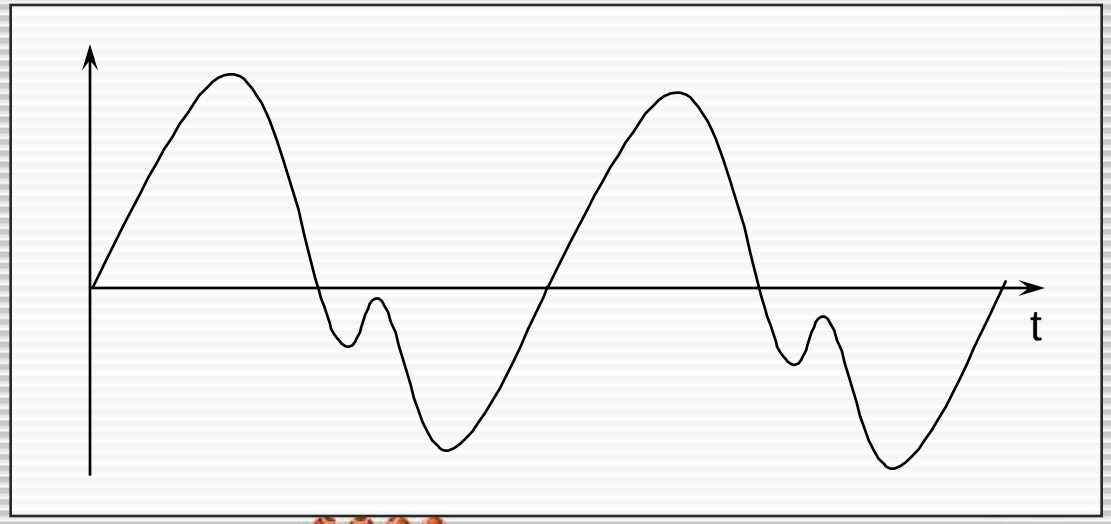
Acceleration sensor: measurement principle









HCQ System

Components: display unit

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HCQ System

Components: HCQ-Box

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Accelerometer

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System Components

Hamm Double Drum IC System

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HCQ GPS Navigator

GPS Receiver

Temperature Sensors

Accelerometer

Control Panel

HCQ System

Components: HCQ-Case

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Panel PC

Documentation

GPS-Reciever

Charger for Panel-PC
Universal Travel Adapter
Hamm USB-Stick

HCQ System

Components: panel PC

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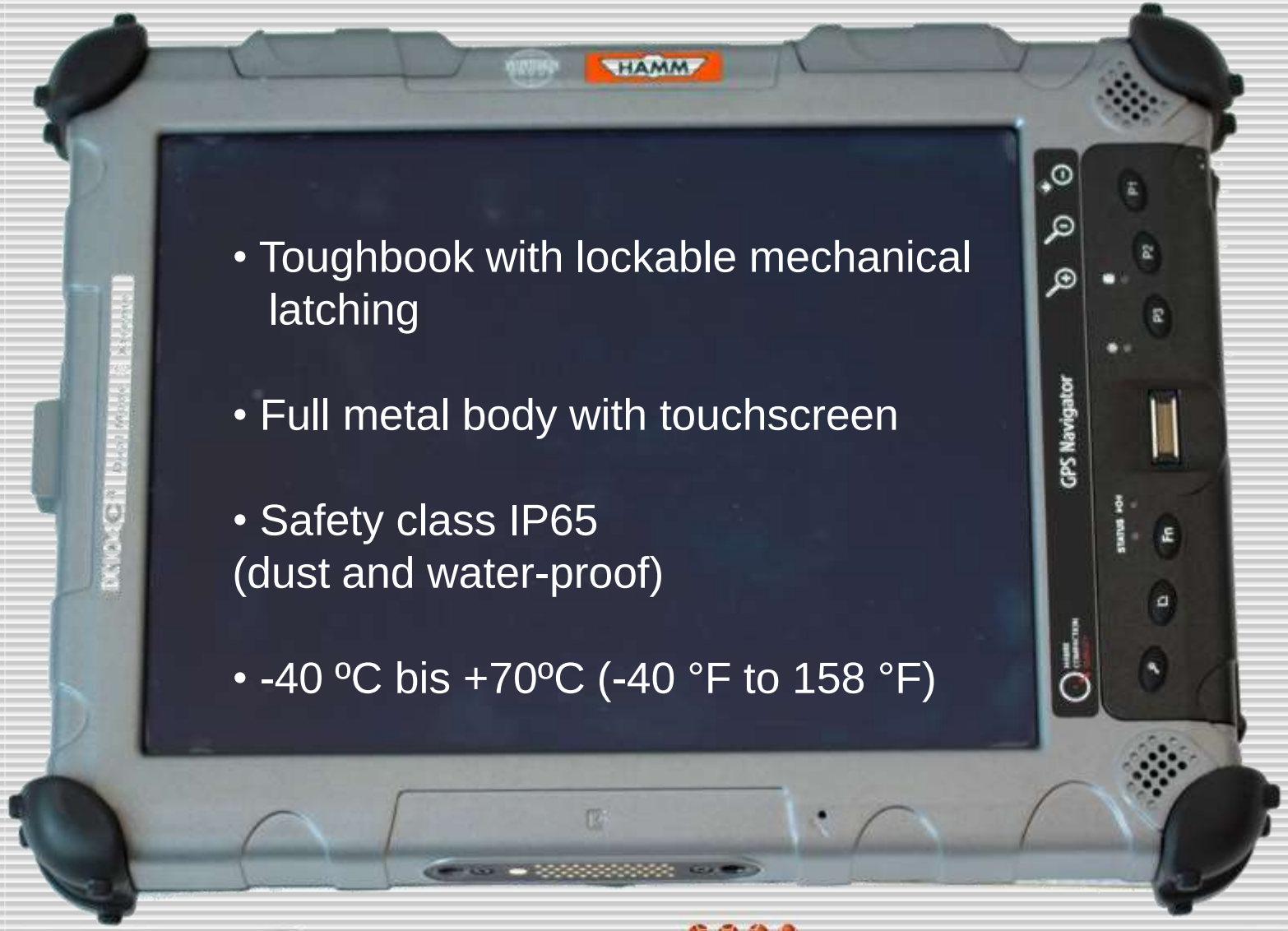

- Toughbook with lockable mechanical latching
- Full metal body with touchscreen
- Safety class IP65 (dust and water-proof)
- -40 ºC bis +70ºC (-40 °F to 158 °F)

HCQ System

Panel PC - Back

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HCQ System

Panel PC – mounting position

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HCQ System

Panel PC and central unit on a HD+

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HCQ System

New position GPS-antenna

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HCQ System

D-GPS accuracy

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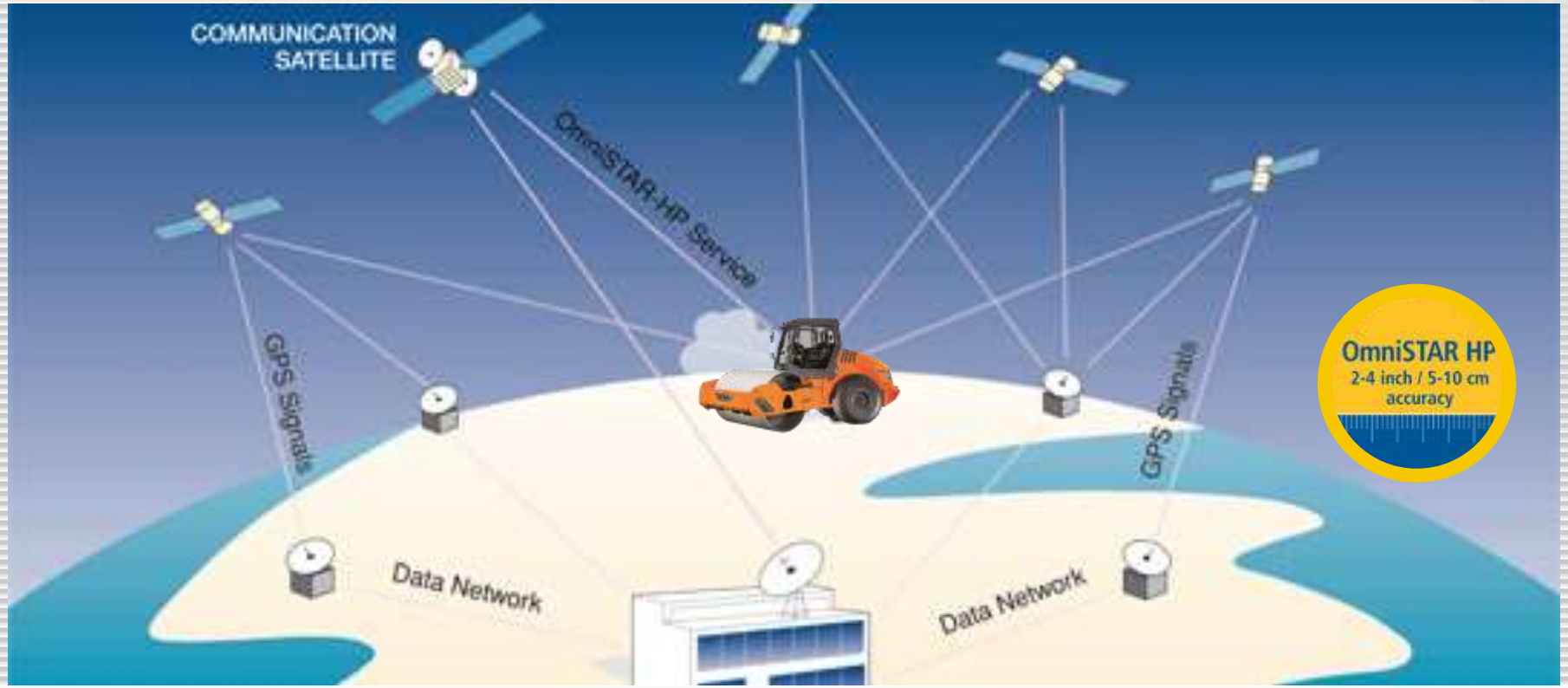

Correction calculation of the GPS-signals via geostationary reference stations.
Correction signal transmitted via communication satellites to D-GPS-receiver (rover).

Accuracy: 2 – 4 in.

HCQ System

Documentation

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Compaction & Position Data

+

Asphalt?

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Difference between earthwork and soil

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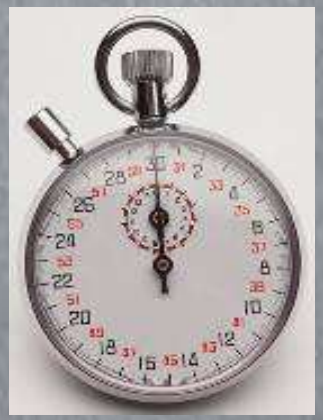
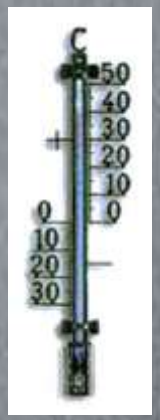
Bearing capacity





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HCQ System

Documentation

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Passes
Temperature
Positioning

+

System Features

HCQ System

Multiple rollers – data interchange via radio

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HCQ System

Software – split screen

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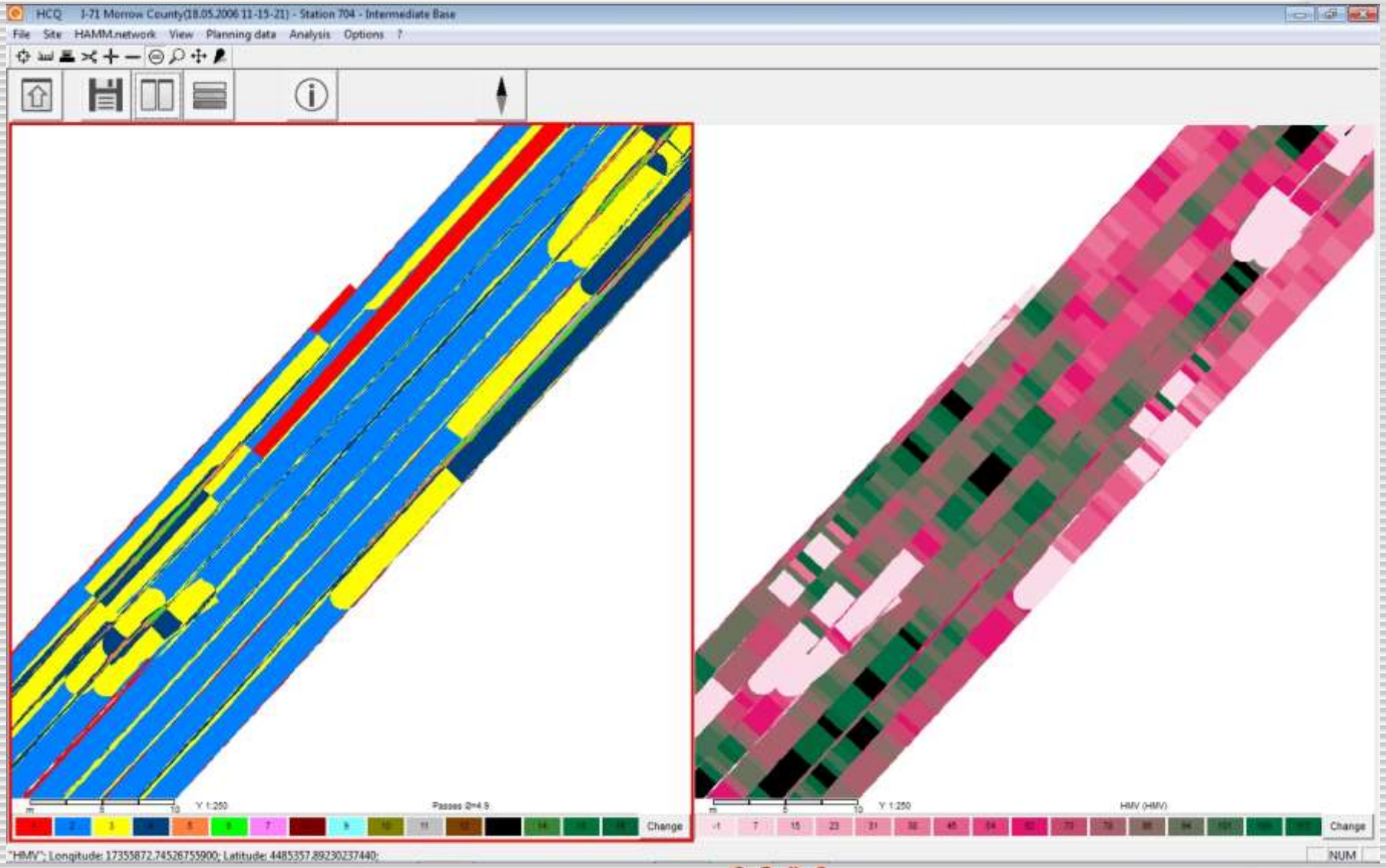

HCQ System

GPS-Antenna - AG 262

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- 2 frequency receiver (higher accuracy including RTK possible)
- Accuracy can be activated and adjusted via software
- Easy modem connection

yard test 2(14.10.2011 18-34-25) - Section-01 - Layer1

File Site HAMM.network View Planning data Analysis Options ?

GPS no Data
chassis no.

machine point 1
machine point 2

m 18.4 36.8 Y 1:920 Passes Ø=10.0

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Change

machine point 1
machine point 2

m 18.4 36.8 Y 1:920 Temperature

38 40 43 46 47 50 52 54 57 59 61 63 66 68 70 73 Change

"Temperature"; Longitude: -86.63070519585; Latitude: 36.03353424190;

NUM

Practical example: Counting of passes

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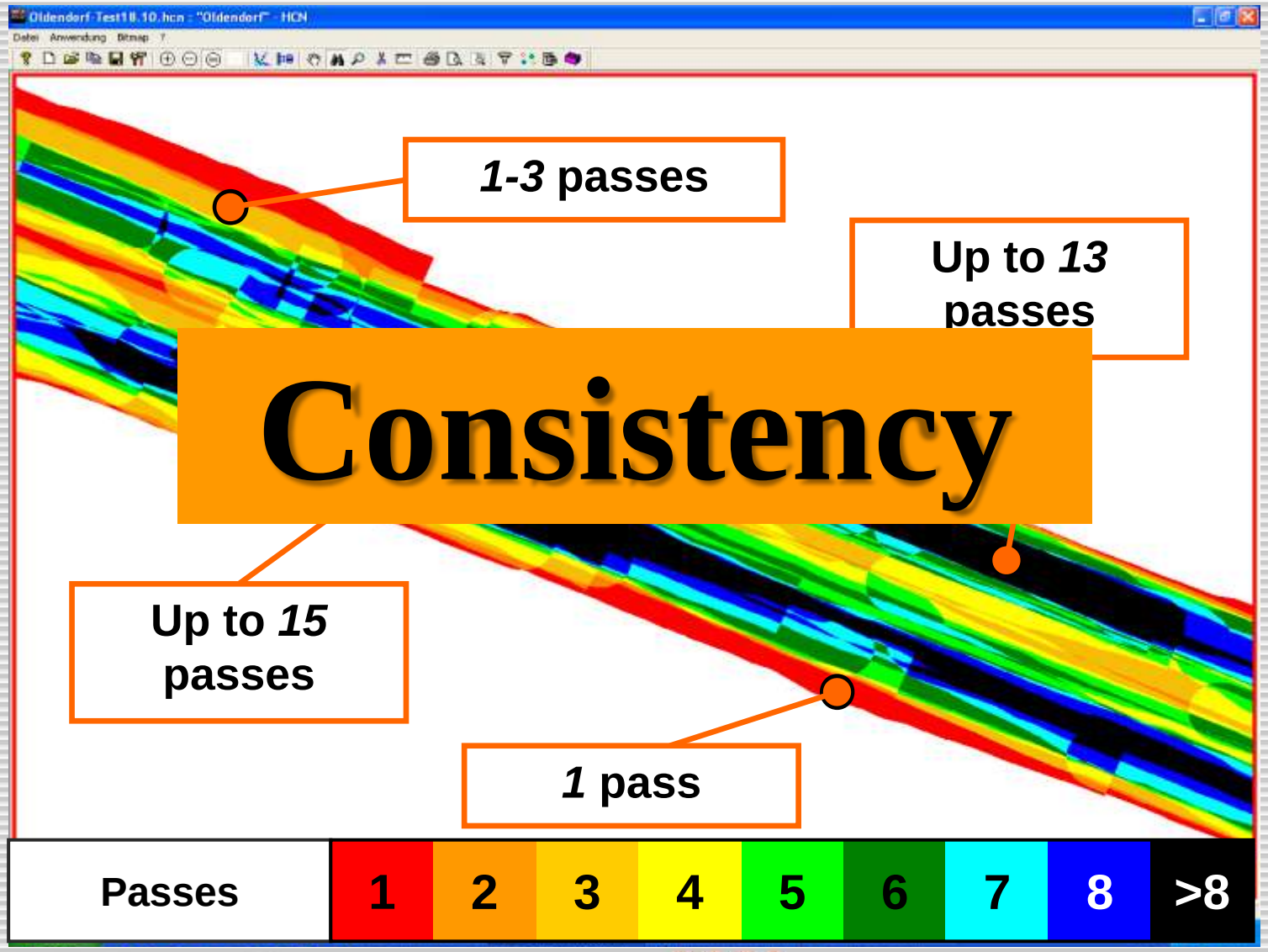

HCQ System

HCQ-Asphalt Navigator – quality by consistency

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HAMM
Compaction
Quality

Conventional spot-testing

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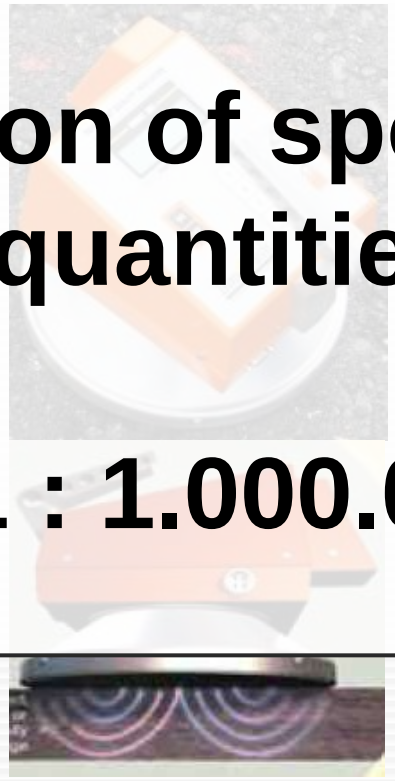
non-destructive
spot-testings

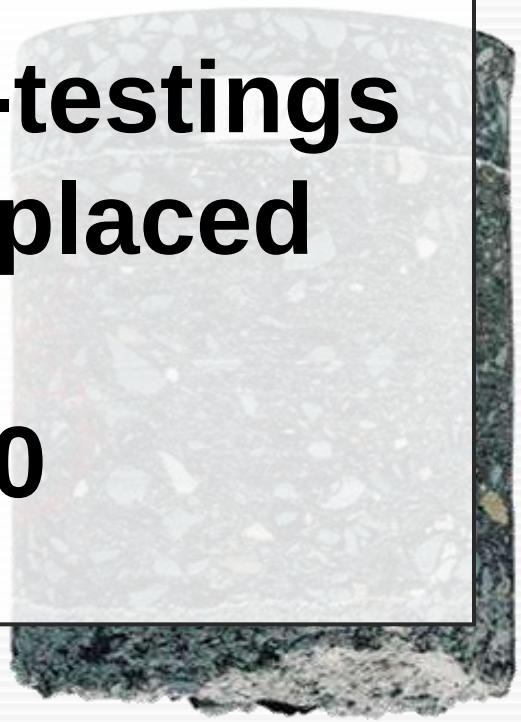
Troxler

PQI/PDM



destructive
spot-testings

Drill-core



Proportion of spot-testings to the quantities placed

1 : 1.000.000

Sampling Coverage

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What affects stiffness?

Comparing HMV-values

Consistent machine settings

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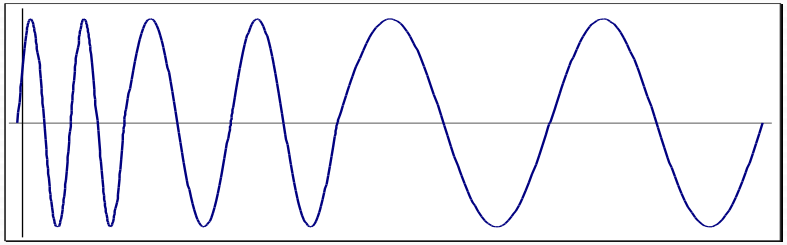
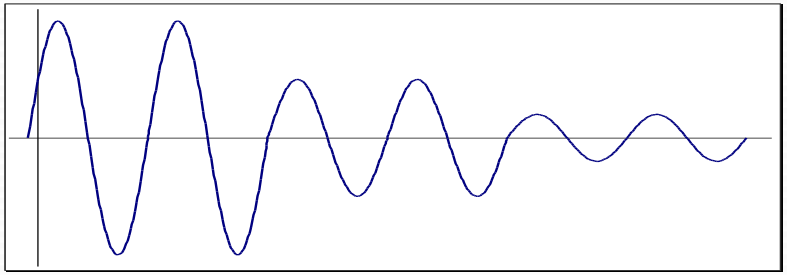
Vibration drum

Frequency (Hz)



Amplitude (mm)



Type and weight

Speed

Factors influencing stiffness reading

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changing asphalt temperatures	changing layer thicknesses
Non-Homogeneous subbase	deeper reading depth of the rollers
no static rollers	no oscillating drums

These factors are primary cause of variable readings in the HMV values

Factors influencing the measurement on asphalt

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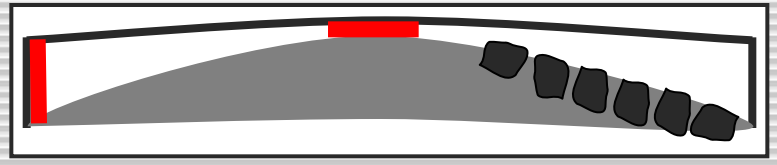
Factors:

- **changing layer-thickness**
- **extreme transverse camber**
- **non-homogeneous subbase (cobblestone-pavement)**

Factors:

- **non-homogeneous subbase (antifreeze-layer, milled wearing-course, ...)**
- **changing layer-thickness**
- **patched spots**



Parameters of the asphalt-compaction III

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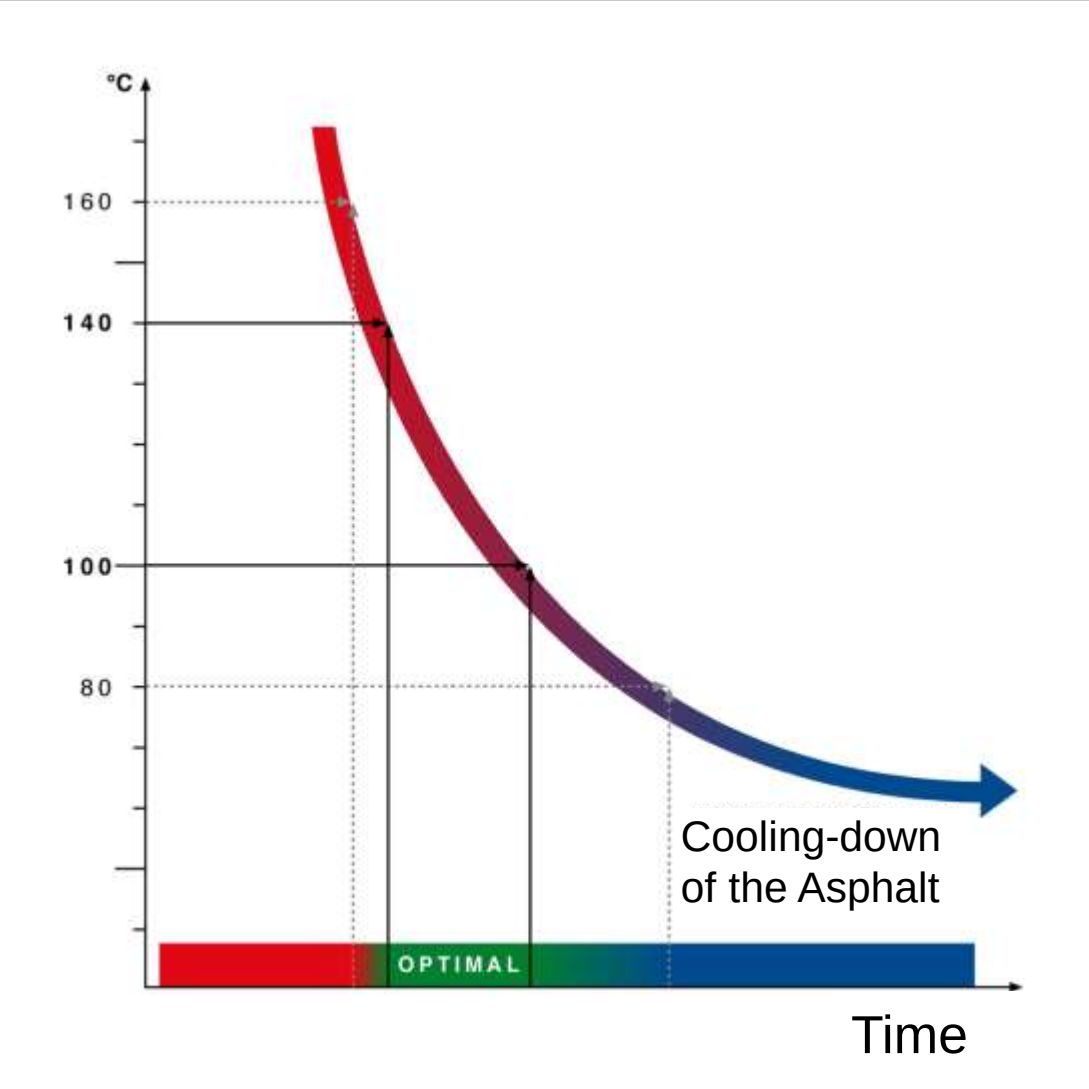
Cool-down-behaviour



Parameters Affecting the Process Evaluation

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- passes
- compaction type (HMV)
- cool-down-behaviour and weather-conditions
- asphalt temperature
- Mix type & Thickness
- amplitude
- frequency
- type and weight
- speed

%

Compaction Degree

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Stiffness

is *not the same* as

Density!

Summary

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- **Why IC?**
  - QC Tool
  - Consistency
  - Permanent Record
  - Pre-mapping
- **GPS system**
  - OmniStar
    - Annual Subscription
  - Land Base
  - VRS - cellular
- **FHWA**
  - System Requirements
  - Correlate Density to Stiffness
- **States Involved**
  - 33 Total
- **Overall Benefit:**
  - Improved Pavement performance!

Thank You

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