

# Eesti Asfaldiliidu 42. ASFALDIPÄEV

- 10.05 - 10.20      **ASFALDIPÄEVA avamine**  
*Sven Pertens, Eesti Asfaldiliit, Teedeklaster*
- 10.20 - 10.45      **Teehoiukava uuendused seoses muutustega teede rahastamises**  
*Kaupo Sirk, Maanteeamet*
- 10.45 - 11.10      **Sisetehingu perspektiivid hooldeturul**  
*Ain Tatter, Majandus- ja Kommunikatsiooniministeerium*
- 11.10 - 11.35      **Millised on lood teedevaldkonna kompetentsidega, Teedeklastri uuring**  
*Tarmo Puolokainen, Tartu Ülikool*
- 11.35 - 12.00      **BIM rakendamine Soomes teede ehituses ja korrashoius (inglise keeles)**  
*Manu Marttinen, NCC Roads*



Eesti Asfaldiliidu 42. ASFALDIPÄEV  
11. november 2014

BIM rakendamine Soomes teede ehituses ja  
korrashoius (inglise keeles)

Manu Marttinen  
Site Manager  
NCC Roads Oy

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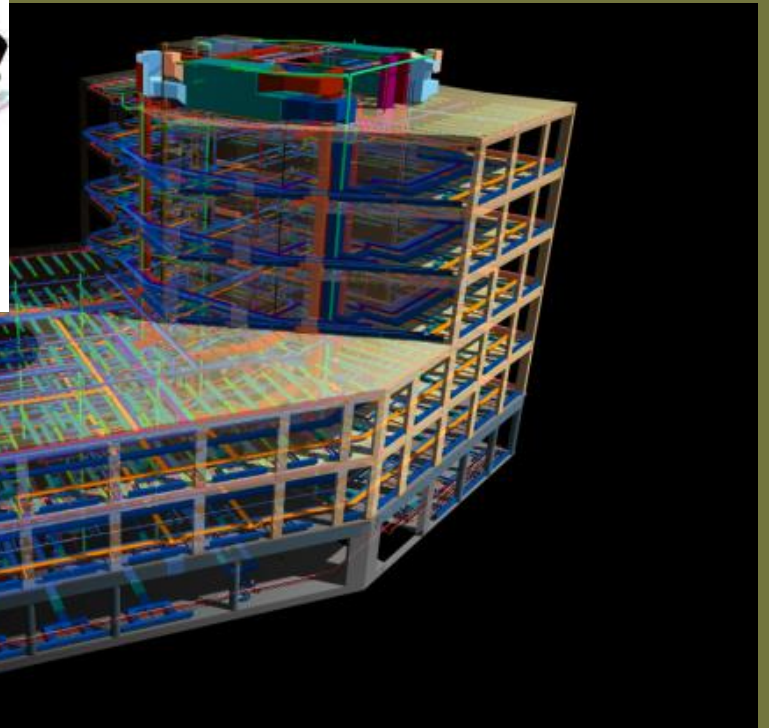
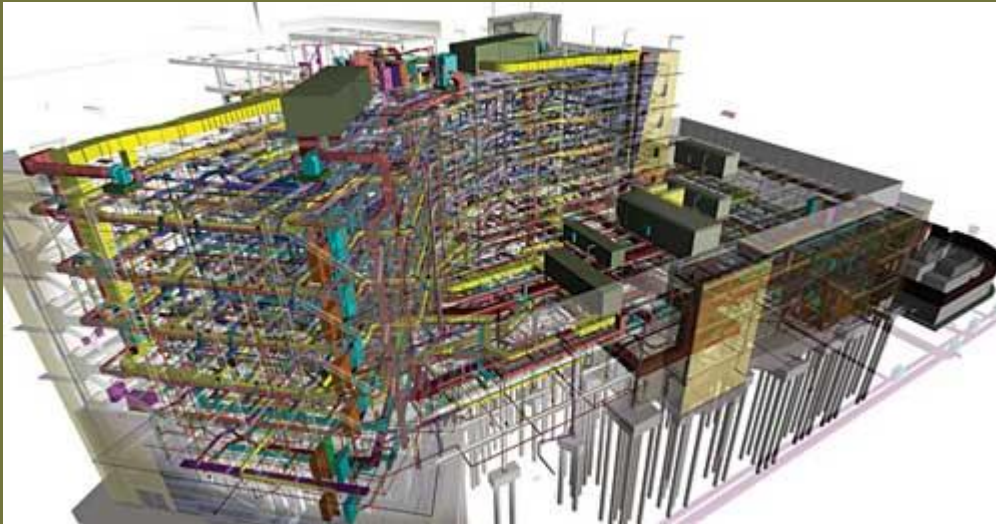
- Case Vt 6 (Porvoo – Kouvola) 2013
- Future

# BIM in general

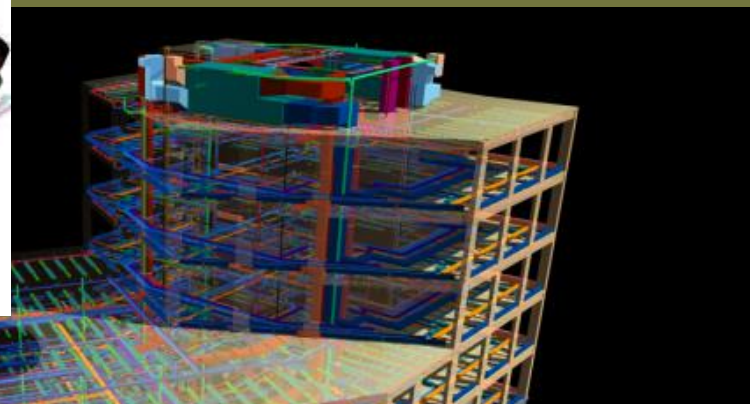
# What is desired in a representation?



# Building Information Model ??



# Building Information Model ??



“Instead of talking about modelling, we should talk about **data management**”

4.3.2014 Infrajohtamisen tulevaisuuspäivä @ Helsinki, Finland

Tiina Perttula

DI, BIM Manager Tiina Perttula, Road Administration

# Why we are using BIM?



# Tietoa hukkuu hankevaiheissa...



*Joka vaihe tuottaa hukkaa ja tiedon uudelleentuottamista  
Uudelleenlaskemista ja -aikatauluttamista  
Paperia käytetään tiedon välittämiseen  
Tiedon ja lisäarvon välillä ei mitään ilmeistä yhteyttä  
BIM tarkoitus on vahvistaa tietoa joka portaalla*



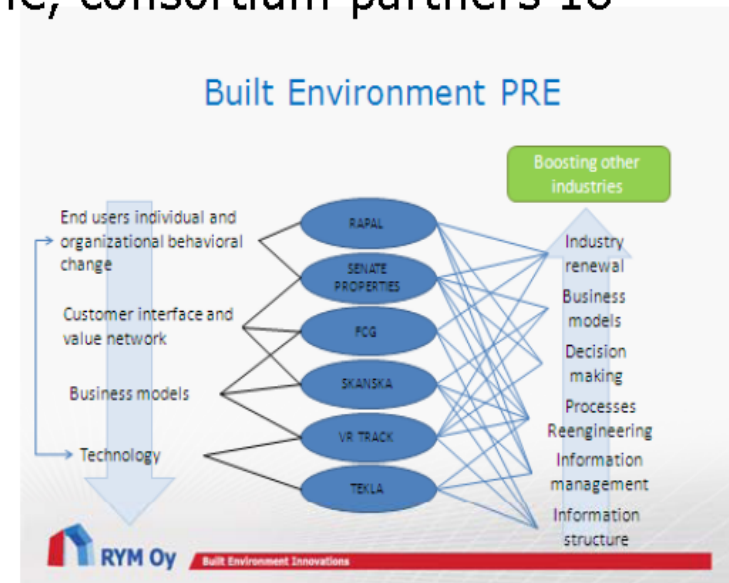


# Built Environment Process Reengineering (PRE): Infra FINBIM

buildingSMART and Infra FINBIM - Nordic Workshop in Helsinki November 30th 2011

# Built Environment PRE and Infra FINBIM

- Aim of PRE is to “promote BIM” in Building and Infra Construction areas
- PRE Program period 1.11.2010–31.12.2013
- PRE total budget is 21 M€, 37 industrial and 6 research partners
- Infra FINBIM is one of the six PRE work packages
- Infra FINBIM budget is about 6 M€, consortium partners 18



# Infra FINBIM – the main Objective

**In 2014, major infra-sector clients procure only BIM based services, in all project phases from early planning and design to maintenance and operation**

Members of Infra FINBIM  
Year 2010





VR TRÄCK

Tekes

RAKENNUSTIETO

VIANOVA

Liikennevirasto

TEKLA

ESPOO ESBO

RAMBOLL

WSP



Infra BIM – Common Modeling Guidelines 2014

Helsingin kaupunki

SITO

PÖYRY

DESTIA TOIMIVAMPEL MAAILMA

TERRAMARE Beskalis Area Nordic

Infra Structures - Numbering and Naming

Inframodel - Open Information Exchange

Vantaa

AHTI

Lemminkäinen

NCC

OULU

FINNMAP Infra Oy

Together we can do it. YIT

OULUN YLIOPISTO UNIVERSITY OF ULLAS



A'' Aalto-yhteisö

VTT



# Road Rehab Process

## Case Kt 51 (in city of Espoo) 2012

# Maintenance BIM 2012: Highway 51 pavement rehabilitation pilot

- Old two-lane road will be part of a four-lane highway
- Aim to reconstruct wearing course by milling and paving
- Construction project along a very busy road
- Laser scanned and GPR measured model in 3D rehabilitation design
- Measurements, modelling and repair planning and cutting executed May-Aug 2012
- Destia & NCC Roads Oy



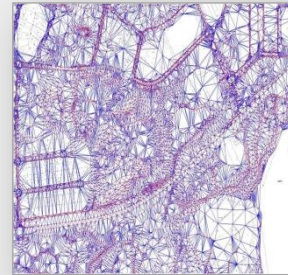
# Road rehab process model



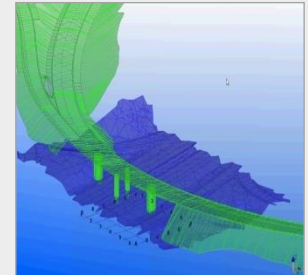
GPR & Core samples



Mobile Mapping  
Trimble MX8



Point cloud processing,  
Terrasolid



Terrain model (TIN) creation,  
Tekla Civil



Alignment design and optimization,  
Tekla Civil



Alignment export  
in VGP and line  
format

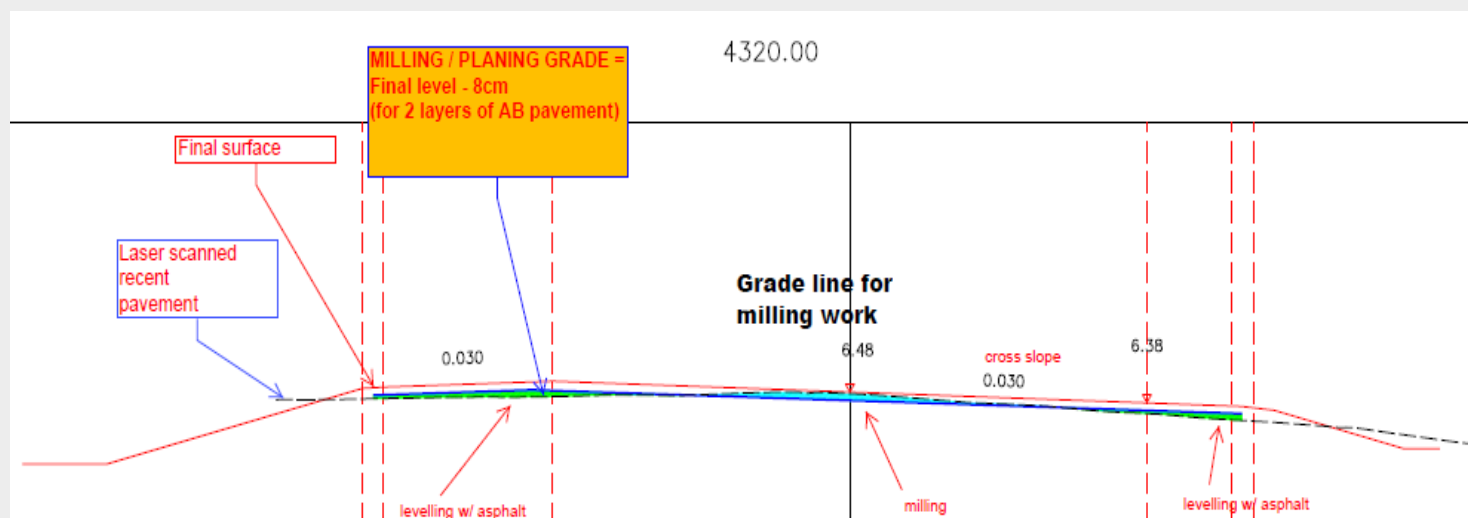


BC-HCE, Export  
in binary to  
GCS900



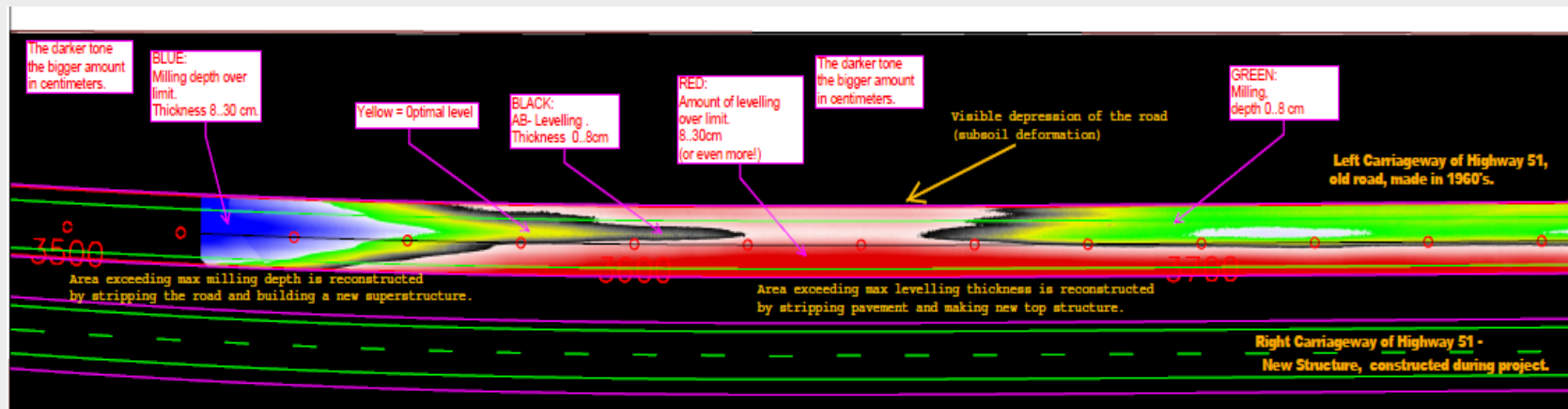
# Model based reconstruction design

- Horizontal geometry and staking follow new highway's road line
- Vertical alignment geometry by previously made construction plan
- Pavement surface model created as in original construction plan
- Milling level surface 8 cm below upper surface



# Optimization and detailing

- Mass quantities calculation by using designed layers
- Milling and filling areas also visualized by coloured surface difference maps
- Major change was to convert two-sided cross-sections into one-sided
- Machine control model from Tekla Civil as 3D-lines



**PLANING OF RECENT ROAD SURFACE -  
DIFFERENCE MAP (Recent asphalt surface vs. designed planing surface)**

Left Carriageway of Highway 51







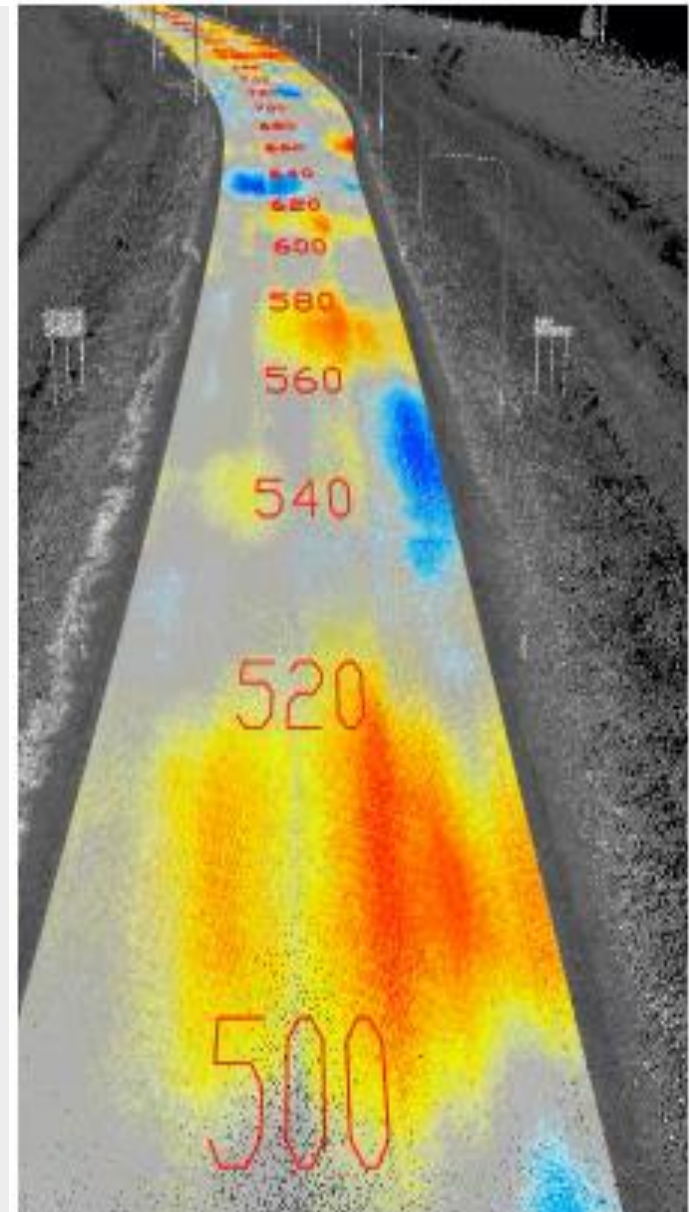
# Conclusions

- Old road surface model produced quickly, model accuracy even better than 15 mm
- Design of pavement repair based on accurate surface model – well planned job, half done
- Road repair actions and quantities can be planned and optimized in advance → shorter lead time
- Road geometry can be repaired based on model – optimization saves materials (milling/hauling)
- 3D Machine control systems in milling machine and paver improve accuracy and efficiency - work quality improved

# Information Models in Maintenance Case Vt 6 (Porvoo – Kouvola) 2013

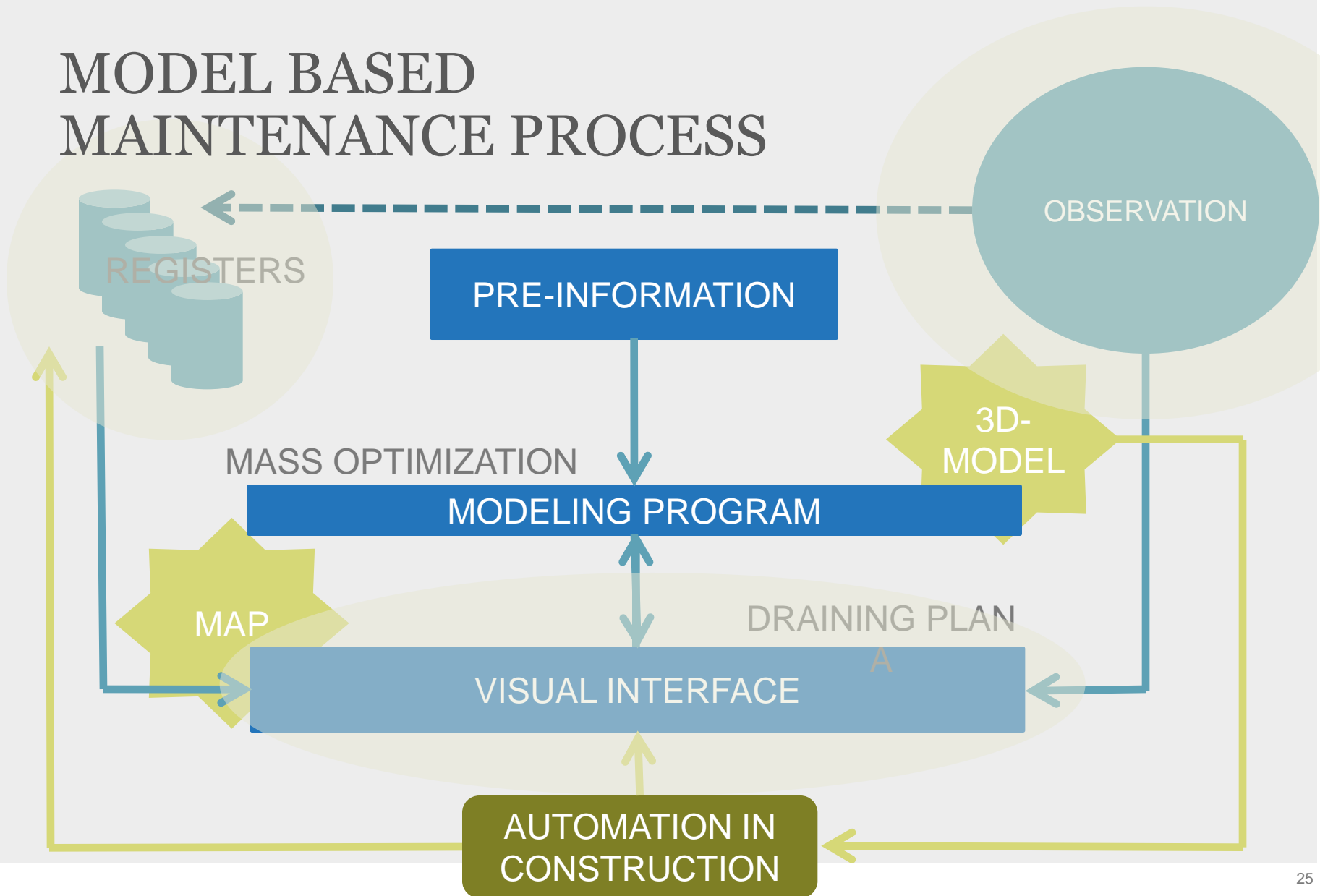
# Maintenance BIM 2013: Vt6 Porvoo - Kouvola

- Based on laserscanning data
  - KAS ELY – NCC Roads Oy
  - Roadscanners Oy
  - Calculated model of evenness
- 1 unit money to extra measure / desing
- 5 unit money save in use of asphalt mass
- Excelent result in IRI / RUT
- Good driving feeling!



# Information Models in Maintenance Future

# MODEL BASED MAINTENANCE PROCESS



# What is desired in a representation?





HALB KAUP??



FINNISH IDIOTS...



HALPA  
KUKKA-  
KAUPPA!!!







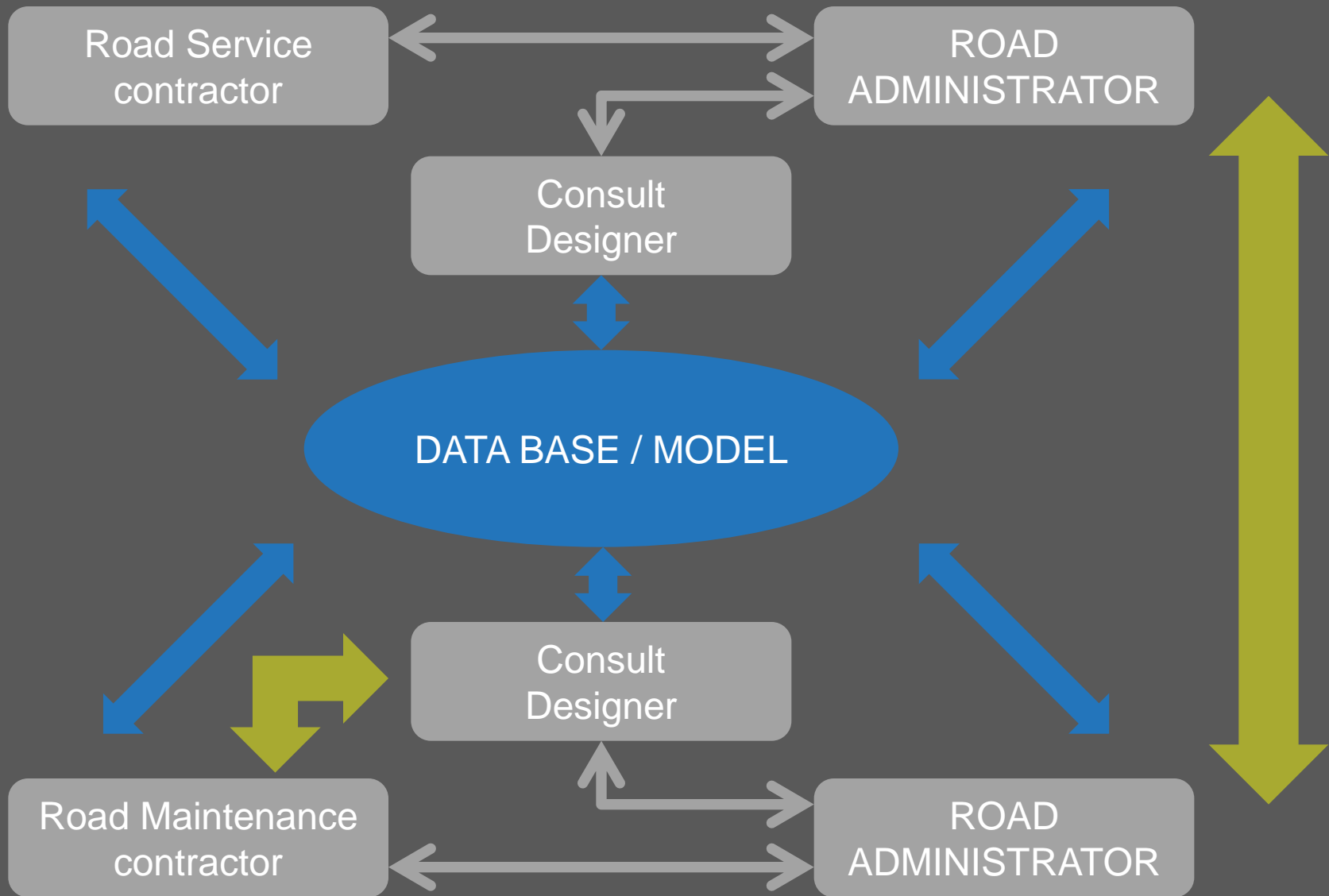
FINNISH TOURISTS  
FOUND SOME  
**CHEAP** FLOWERS  
TO BUY.. GO  
AHEAD!!

**ASSUMPTION!!!**



HALPA  
KUKKA-  
KAUPPA!!!





# BIM LEVEL 3

↑ INTELLIGENCE

REACTION

SIMULATION

VISUALIZATION

**INFORMATION MODELING**

Design Modeling

Analytical Modeling

Construction Modeling

Connected Infrastructure Asset

**INFORMATION MOBILITY**

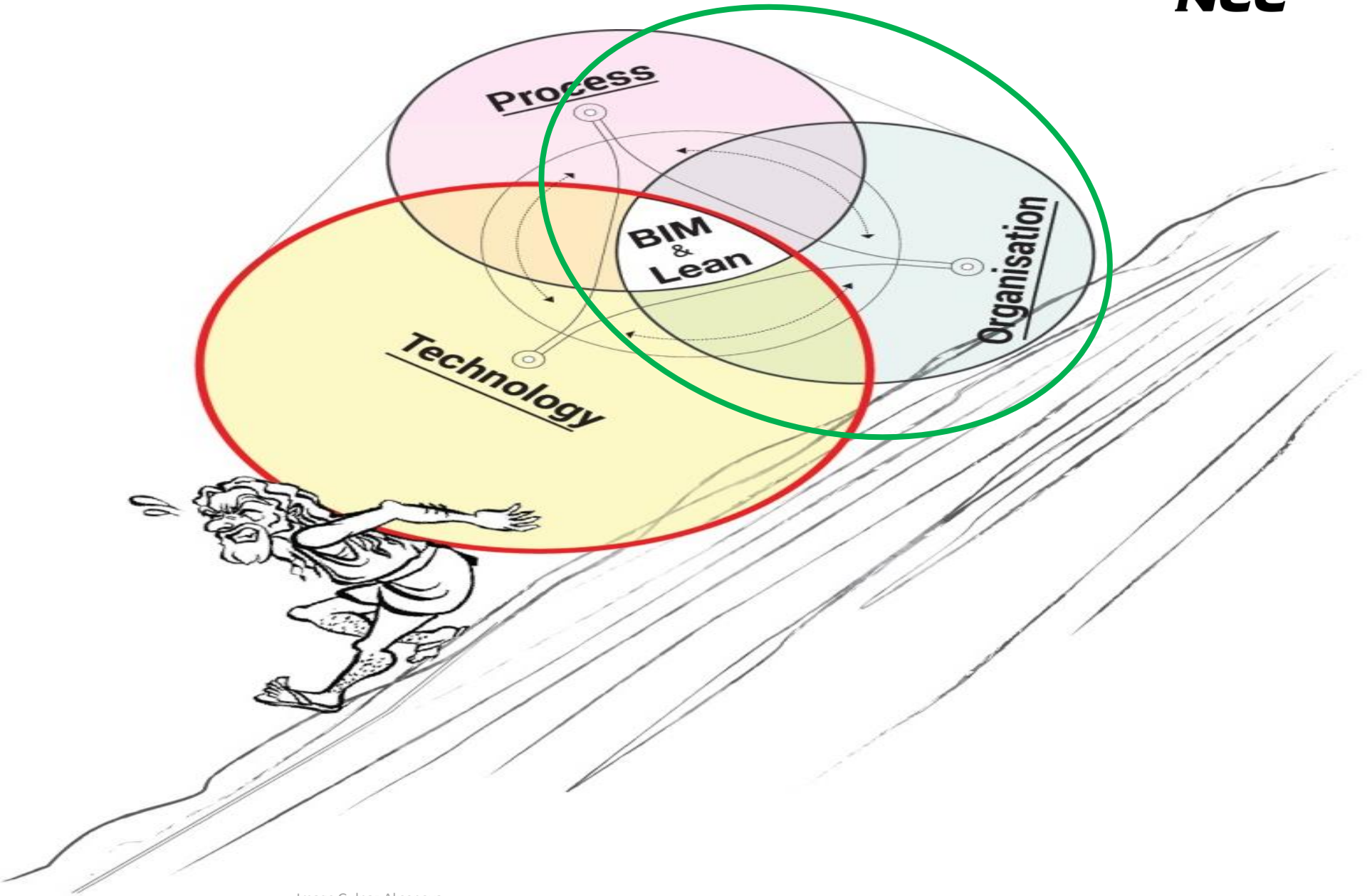
DESIGN

CONSTRUCTION

OPERATIONS

— IMMERSION →





# FOR MORE INFORMATION



<http://www.youtube.com/watch?v=VzQiHibuPYo&list=UUCMxcNWzbemWcZigf1Sm9JA&index=2>



<http://www.youtube.com/watch?v=CBAXmFLlyOo>



[http://www.youtube.com/watch?v=luto\\_l2luRk](http://www.youtube.com/watch?v=luto_l2luRk)

<http://www.infrabim.fi/>

<http://rymreport.com/pre/work-packages/infra-finbim/>

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