Case Study: Digital Data Securing on Construction Sites
ROAD REPAIR: 6 TO 4 WEEKS
ROAD LIFE: 12 TO 18 YEARS

SPACE 4.0 CITIES
Tax loss from incomes, loss of wages or lost profit, higher fuel costs and increased car wear, damages caused by delays, e.g. expenses of companies when goods arrive late or when somebody misses their ride or plane. This also includes health and psychological problems (Source: The Prague Technical University study)

ROAD CLOSURE SAVING

ROAD REPAIR 30% FASTER

ROAD LIFE 50% LONGER

10% FROM

$6 BILLIONS / YEAR / CZ

$750 BILLIONS / YEAR / D
CASE STUDY: TENDER „4.0“, BLOCKCHAIN and LEGAL RESPONSIBILITY

Topic:
Digital Data Securing on Construction Sites

Project:
"Verification of a New Technology for the Complete Data Chain, from Designing to Machine Control during Roads Repairs"

Term of the Realization:
21. 7. 2016 - 30. 4. 2019
Exact Control System is a member of the Exact group of companies, provider of comprehensive surveying services to the mining and construction sectors.
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DATA CHAIN IN THE USE OF TENDER DATA AND AUTOMATIZATION

The coordinator supervises the operation of the data chain technology

Data Chain New Entities:

1. **Blockchain** – standardized format for blockchain and timestamps, web application

2. **Supplier of the Reprofiling and data chain technology** - a company that creates project documentation and secures tender data
   - OBS – certified procedure for 3D scanning
   - Land Surveyor – performs geodetic work by certified OBS procedure
   - Processing Team – process data from OBS and new design (reprofiling)

3. **Coordinator** – responsible for meeting the standards of the reprofiling.
PROCESS MANAGEMENT USING DATA CHAIN CERTIFICATION TECHNOLOGY

1) **Contract formation**

2) Establishing of the contract – „E-Issue Slip“ creation by Coordinator

3) The construction / area is **scanned** by the surveyor using the OBS certified procedure. The output from OBS is one **encrypted** file. This file is renamed according to standards (nomenclature/ISO) by Supplier of the Reprofiling.

4) The encrypted file is uploaded via the web by Supplier of the Reprofiling **saved to blockchain** and automatically sent to the **private cloud** (E-Issue Slip) after the scanning process. The file contains a **file hash and a timestamp**.

5) The Supplier of the Reprofiling passes the data from the OBS on to the **processing team**.

6) The Coordinator verifies that the **data is correctly** written to blockchain and stores the acknowledgment into the E-Issue Slip.

7) The Supplier of the Reprofiling processing team creates **reality model** and **construction model** (reprofiling) from data received.

8) The processed data are exported to **tender formats** (digital models for milling machines - tender data). **Project documentation** by Supplier of the Reprofiling.

9) The Supplier of the Reprofiling processing team uploads the tender data and also receives the files with information about the hash and timestamp (**saved to blockchain**). The data is renamed according to the standard (nomenclature/ISO) and uploaded into the E-Issue Slip.

10) The Coordinator verifies that the **data is written in blockchain** and the received confirmation, which is renamed according to the standard, loads into the E-issue.

11) Tender data is passed on to the **Contract Owner**.

12) The **Contract Owner** can simply verify that the **data is written in blockchain** via web application.

13) Verified tender data is provided to a third party - **Contractor** (to reprofiling terminal devices for work with certified tender data)
E-ISSUE SLIP - RECORDED FILES AFTER LATER BLOCKCHAIN DATA VERIFICATION

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<thead>
<tr>
<th>KSUS</th>
<th>Novinky</th>
<th>Nastavení</th>
<th>Projekty</th>
<th>Uživatelé</th>
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**Dokumenty**

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Why Blockchain, Absolute Data and Database for Construction 4.0?

- Increases efficiency and productivity
- Sustainable mobility
- Transparency
- Welcomed by sophisticated Stakeholders
- Verifiable digital infrastructure and data chain certification technology
- Decrease disputes (legal responsibility for ISO DATA 4.0)

Challenges

- Construction business-related
- Human-related – SOLVED
- Technical – continual development (Applications are endless!!!)

What’s next?

- Pilot projects (OBS-B partnership business model)
- Patents EU, USA, Canada
- Technology & business development