Ihku
Infrastructure Cost Management System
Alliance Project
**Contract Models in FTA – all in use**

- **D-B-B** = Design Bid Build, all the phases under separate agreements, traditional method used all around the world

- **D-B** = Design-Build, Design and Build phases are combined to the same agreement, coming more popular method

- **CM** = Construction Management, provides Owner with a central focal point for managing and administering all phases of project construction. Treats planning, design, construction as integrated tasks

- **DBOM / DBFO** = Design-Build-Operate-Maintain phases are combined to the same long term agreement / private financing is combined to the DBOM-agreement, also known as **PPP**

- **Alliance, Integrated Project Team (IPT)** = Owner and one or more service providers (designer, constructor, supplier etc.) are working as an integrated project team
Applicability of Procurement Methods
Railways, contract models (number and €)
Roads, contract models (number and €)
Which Ihku?

- New Cost Management System producing open and real time cost management data to infra sector
- Target: to fulfill future needs and challenges
- Organization Model: Alliance Project
- Planning Phase 08/2018-01/2019, Implementation Phases 02/2019
  - Target: Support Services 2021
Project Goals

- Collaboration across infra sector
- High quality calculation
- Support process developing (*planning, tendering, construction, ..*)
- User-friendly software and helpdesk
- Accumulating database (*e.g. pattern recognition and machine learning*)
- Transparent and flexible view for all the calculation data (*e.g. cost and risk estimations*), open data
- Utilizing new innovations (*e.g. InfraBIM data integration*) and implementing new technologies (*Open API*)
- Long term functionality, easy to develop for future needs
Vision
Ihku supporting project processes and enriching the data

- **PURCHASE**: Open data supporting purchase
- **CONSTRUCTION**: Data supporting work during construction
- **PLANNING**: Data structure based on standards
- **MAINTENANCE**: Support of life cycle and property management

The new services and innovations with open data
Alliance Partners

- Client organization formed by The Finnish Transport Infrastructure Agency and cities of Helsinki, Espoo, Vantaa, Tampere, Turku and Jyväskylä

- Service provider formed by CivilPoint Oy, Mittaviiva Oy, Ramboll Finland Oy and Solita Oy
Competitive bidding

- Market information: 01/2018
- Invitation for tenders: 03/2018
- Preliminary tenders: 04/2018
- Workshops: 05/2018
  - Two workshops with all tenderers
- Final tenders: 06/2018
- Contract: 06/2018
Evaluation and points

- Project team 10%
  - References, know how etc.

- Project competence and co-operation ability 20%
  - Working in bigroom, project leading, team performance ...

- Preliminary project plan 20%
  - One hour after 2. workshop

- The logic of cost calculation 20%
  - How the system would work, no unit price based

- Price (fee) 30%

Kuva: Isah Seefronth, Unsplash
Compensation model

Kompensaatiomalli
1. Korvattavat kustannukset (open books)
2. Palkkio
3. Kannustinjärjestelmä

Kannustinjärjestelmä
1. Kustannusbonus / -sanktio
2. Tulosbonus / -sanktio

Max sanktio = palkkio
More reliable cost management for decision-making processes
Transparent and reliable cost management for infrastructure projects
Infrastructure Cost Management for Individual Structural Elements

- Cost Management System and Price Database content based on the Finnish Infra Classification System

- Use case: Detailed and technical design for construction

- Suitable for different infrastructure projects (e.g. roads, rail systems, bridges and tunnels)
### Example: Construction Part (by Infra classification)

#### Earth excavation (rural)

<table>
<thead>
<tr>
<th>Work phases</th>
<th>Resource</th>
<th>Amount</th>
<th>Unit price</th>
<th>Capacity</th>
<th>Price (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth excavation and loading</td>
<td>Excavator, 20 ton</td>
<td>1</td>
<td>100 €/h</td>
<td>40 m3ktr/h</td>
<td>2,50</td>
</tr>
<tr>
<td>Mass hauling, 3-6 km</td>
<td>Dumper truck</td>
<td>2</td>
<td>60 €/h</td>
<td>20 m3ktr/h</td>
<td>3,00</td>
</tr>
<tr>
<td>Spreading and levelling</td>
<td>Bulldozer</td>
<td>1</td>
<td>50 €/h</td>
<td>40 m3ktr/h</td>
<td>1,25</td>
</tr>
<tr>
<td>Compacting</td>
<td>Vibration roller</td>
<td>1</td>
<td>50 €/h</td>
<td>40 m3ktr/h</td>
<td>1,25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>8,00</strong></td>
</tr>
</tbody>
</table>

#### Earth excavation (city)

<table>
<thead>
<tr>
<th>Work phases</th>
<th>Resource</th>
<th>Amount</th>
<th>Unit price</th>
<th>Capacity</th>
<th>Price (€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earth excavation and loading</td>
<td>Excavator, 17 ton</td>
<td>1</td>
<td>80 €/h</td>
<td>20 m3ktr/h</td>
<td>4,00</td>
</tr>
<tr>
<td>Manwork</td>
<td>Worker</td>
<td>1</td>
<td>30 €/h</td>
<td></td>
<td>1,50</td>
</tr>
<tr>
<td>Mass hauling, 3-6 km</td>
<td>Truck, 20 ton</td>
<td>2</td>
<td>60 €/h</td>
<td>10 m3ktr/h</td>
<td>6,00</td>
</tr>
<tr>
<td>Spreading and levelling</td>
<td>Bulldozer</td>
<td>1</td>
<td>50 €/h</td>
<td>20 m3ktr/h</td>
<td>2,50</td>
</tr>
<tr>
<td>Compacting</td>
<td>Vibration roller</td>
<td>1</td>
<td>50 €/h</td>
<td>20 m3ktr/h</td>
<td>2,50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>16,50</strong></td>
</tr>
</tbody>
</table>

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**1612 m3ktr**

**1612 m3ktr**
What we need in Ihku

Price Database Related Needs:

▪ Construction Element Unit Prices
▪ Construction Element Resources
▪ Work Results
▪ Resource (machinery/tools, labor, material/product) Unit Prices
Scope of Work

PLANNING PHASE 08/2018–01/2019
- Creating a foundation of the Alliance project
  - Commitment and building trust (people)
  - Definition of Common goal (scope of work)
  - Common tools and processes (technology)

IMPLEMENTATION PHASES 02/2019–08/2028
- 02/2019-12/2020
  - Cost management for structural elements (Use case: Detailed and technical design for construction)
- 01/2021-12/2022
  - Cost management for project elements (Use case: Feasibility study and preliminary design)
- 01/20222-08/2028
  - Further version deliveries and integrations (TBD)

SUPPORT SERVICES 03/2021–08/2028
- Helpdesk
- Software version deliveries
- Price database accumulation
Implementation with the Alliance Model

- Alliance partners share the risks and benefits related to the project’s implementation:
  - early integration
  - mutual targets, contract and commercial model
- The operating principles of an alliance organization are working for the best for the project, building trust and continuous improvement (product, services, processes).
Alliance Organization

Executive Team | Project Manager | Management Team

Project Team:
- Communication
- Price Database
- Software Specification
- Software Development
- Support Services
Collaborative Work Space

- Big Room brings all project stakeholders, teams and work groups together under one roof so it’s easy to ask questions, seek answers and find inspiration in unexpected ways.
  - Ihku Big Room is located at the Finnish Transport Infrastructure Agency’s head office in Pasila, Helsinki

- The open Big Room is fostering lean project management and scrum framework.

- All parties are committed, involved and work together to overcome challenges when people can quickly gather to solve problems.
SCOPE OF WORK

- PLANNING PHASE
- IMPLEMENTATION PHASES
- SUPPORT SERVICES
Thank you for your attention

Connection to Infra BIM:
One of the most important BIM-conferences of the world is held in Tampere, Finland on 3-5 February 2020. There will also be a presentation of Ihku.
www.ihkuallianssi.fi