Steel Construction Excellence Center

Steel structures
Sheet Metal products
Mechanical engineering

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Background of SCEC

Steel industry has been one of the main employers in Hämeenlinna region for several decades

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1998</td>
<td>Sheet Metal Centre (SMC) was founded in co-operation between Häme University of Applied Sciences (HAMK) and Ruukki</td>
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<td>2007</td>
<td>City of Hämeenlinna, Ruukki and HAMK established a regional development program</td>
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<td></td>
<td>Tampere University of Technology (TUT) joined later</td>
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<td>2014</td>
<td>Steel Construction Excellence Centre (SCEC) was founded</td>
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Steel Construction Excellence Center (SCEC) - idea

Steel Construction Excellence Center (SCEC) is a dynamic operating platform where technical universities, regional colleges, R&D institutes and enterprises collaborate to the following:

- Highly skilled workers provided to enterprises
- Top research and development to be commercialized faster
- Enhanced integration between big and small enterprises
- New enterprises and business
SCEC network, 2017

Steel Construction Excellence Center (SCEC) is a network between

• Steel intensive companies
  • Ruukki Construction
  • SSAB Europe
  • New companies to be involved

• Three level educational institutes
  • Tavastia Vocational College (Tavastia)
  • Häme University of Applied Sciences (HAMK) incl. Sheet Metal Center (SMC)
  • Tampere University of Technology (TUT)
  • New universities to be involved

• The City of Hämeenlinna
• Linna Business Development Ltd (a development company)
Sheet Metal Centre research unit

Focus areas

Sheet Metal Products
- Design and development
- Forming, joining
- Long term durability and coatings

Steel structures
- Manufacturing ("welding")
- Analysis and design methods

Shop fabrication
- 3D-technologies
- Robotics

Future construction
- Innovative implementation
- Energy efficiency
- Distributed energy production

Groups

Materials (4)
- A. Saastamoinen, J. Hiljanen, T. Väisänen, J. Varrio

Long term durability (4)
- K. Jyrkäs, T. Vuorio, P. Fabrin, J. Tapiola, N.N.

Steel structures (7)
- Z. Ma, B. Greicevci, J. Havula, (O. Ilveskoski), K. Mannila, S. Jänes, C. Tirteu

3D-technologies (5)
- T. Kärppä, S. Gebrehiwot, T. Roiha, J. Vasko, T. Syrjäaho

Manufacturing robotics
- N.N

Energy efficiency (7)
Operation area

- **Research driven tasks**
- **Industry driven tasks**

<table>
<thead>
<tr>
<th>Operation area</th>
<th>Time to possible application, year</th>
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<tbody>
<tr>
<td>Novel Business</td>
<td>1-0</td>
</tr>
<tr>
<td>Industry Driven Projects</td>
<td>1-3</td>
</tr>
<tr>
<td>R&amp;D Services</td>
<td>3-10</td>
</tr>
<tr>
<td>Applied Research</td>
<td>&gt;10</td>
</tr>
<tr>
<td>Fundamental Research</td>
<td>&gt;10</td>
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</tbody>
</table>

Business risk, %

- Big
- Small
Research funding

- Finnish Academy
- Foundations
- EU-programs
- RFCS
- Business Finland / Tekes etc.
- Companies R&D work
- Local EU funding: EAKR etc.

Time to possible application, year:
- >10
- 3-10
- 1-3
- 1-0

Business risk, %:
- Big
- Small

Operation area

Novel Business

Fundamental research
Applied research
Industry driven projects
Progress to date

Multiple research projects have been completed

Examples:

• For Ruukki Construction this co-operation has significantly shortened R&D project lead-times

• Joint project to develop a new microprofiled load bearing sheet T130

• Sandwich panel and fastener capacity determination

• Etc.
Example of a case study

Fabrication and response of high strength steel structures focused on welded tubular T-joints
Example of a case study

Fabrication and response of high strength steel structures focused on welded tubular T-joints:

1. Cutting tubes using different techniques – **Ruukki Construction**
2. Welding and welding time measurements – **Tavastia (+HAMK)**
3. Determining experimentally the initial stiffness and the moment resistances – **HAMK**
4. Welding cost estimation and mechanical response – **HAMK & TUT**.

In phases 2, 3 and 4 both students and staff members were involved.
Example of a case study

Results were presented in the International Institute of Welding (IIW) conference in Helsinki, July 2015, research article will be published 2018
SCEC co-operation & events

Forms of co-operation
- Staff exchange
- Online courses
- Events: workshops, excursions, annual seminar

Next seminar 29-20.1.2019
• Topics:
  • Sheet metal technology
  • Robotics / automation in light manufacturing
• Excursion to SSAB factory
• International academic workshop => topic proposals?

Welcome to join the SCEC seminar in Hämeenlinna in January 2019!