

# 2017-2020 PROGRESS

PROVISIONS FOR GREATER REUSE OF STEEL STRUCTURES

## Circular economy of the steel construction products

Construction and demolition industry generates the largest waste stream in Europe. The needed effort to decrease its amount or even to keep it at the same level is likely going to grow in the future. Recycling and material separation will become more expensive. This is partly because of the complex multi-material building components that are integrated in the current buildings and partly due to the stricter control of the recycling process.



Photo credits: Paul Kamrath

### The PROGRESS solution

Although, most of the building materials are already being recycled, there is a large potential to establish a closed loop of building components and to increase environmental benefits and value of the deconstructed building. Reuse will become gradually easier and cheaper option, and therefore the PROGRESS project strives to support the construction and demolition industry to adapt to this change.

### A multidisciplinary expert group

Our group offers to:

- Help you recognize the environmental potential and end-of-life value of your products or buildings
- Guide you through the difficult decision-making process prior to building deconstruction
- Provide recommendations on the design for deconstruction of new buildings and for the design from second-hand components

We have the expertise in

- Building and material codes
- Materials testing and certification
- Life-cycle assessment of buildings and products
- Building information modelling

### We aim to ...

- Extend the service life of building elements
- Reduce the raw material and energy consumption
- Develop the design guidance
- Establish the material quality verification process
- Improve the overall building performance
- Demonstrate the reuse process/technologies
- Involve all actors in the product supply chain

### New business through research, development and innovation

Our consortium aims to improve the valorisation potential of the components of existing buildings by improving

- Testing and material certifications
- Pre-demolition audits (e.g. involving drones)
- Online trading tools

At the same time we want to encourage the designers to consider reclaimed elements as the potential source for their new buildings' design by

- Design guidelines
- Case studies
- Building information modelling

**Are you a building material/products manufacturer, facility owner, construction or demolition contractor, or do you provide design and consultation services for building sector? If so, contact us to discover how your organisation can be engaged in the development of Circular Economy business in construction.**  
Project coordinator: petr.hradil@vtt.fi



Paul  
Kamrath

## Project brief overview

The consortium of seven partners from Belgium, Finland, Germany and Romania carries out the research project called PROGRESS coordinated by VTT Technical Research Centre of Finland and financed by European Commission's Research Fund for Coal and Steel. The project aims to provide solutions for reusing components of single-storey steel buildings that would be easily scalable for other building types and materials.

### PROGRESS goals

The PROGRESS project provides methodologies, tools and recommendations on reusing steel-based components from existing and planned buildings. The project targets the design for deconstruction and reuse of envelopes, load-bearing frames, trusses and secondary elements of single-storey buildings framed in steel. This building type has broad applicability as industrial, commercial, sports, exhibition, warehouse facilities, and shows most potential in suitability for reuse and viability for circular economy business models. The whole life benefits of reusable single-storey steel buildings will be quantified from environmental and economic viewpoints. The outcomes will be extensively disseminated in particular among manufacturers, designers, contractors and researchers.

### Consortium

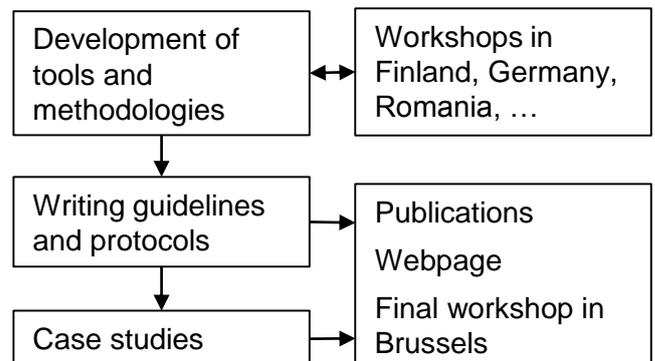
VTT Technical Research Centre of Finland  
Steel Construction Institute, UK  
Ruukki Construction, Finland  
RWTH Aachen University, Germany  
Universitatea Politehnica Timișoara, Romania  
ECCS, European Convention for Constructional Steelwork, Belgium  
Paul Kamrath Ingenieurrückbau, Germany

### Contacts

Petr Hradil  
Tel. +358 400 209 593  
petr.hradil@vtt.fi

### Project plan

Duration: 1.6.2017 – 31.5.2020



### Main outcomes

Material quality verification protocol  
Legal documents overview  
Design guidelines published in ECCS series  
New hybrid energy-efficient and reusable envelope  
Environmental and economic assessment (methodology and case studies)  
Recommendations on BIM use  
Prototype of information-sharing internet portal

# 2017-2020 PROGRESS

## PROVISIONS FOR GREATER REUSE OF STEEL STRUCTURES

## Afterlife of metal products in the construction sector

Metals in buildings are highly recyclable. However, their re-production for every single building's life creates a large environmental burden and is reflected in the final product's carbon footprint and embodied energy. Besides, the modern composite building products are difficult and costly to separate and more likely end up in the mixed waste after building demolition.



All you need to know about the material is hidden in such a small sample.

### The PROGRESS solution

The building components made of steel and other metals are highly durable and resistant to mechanical damage. Their bolted connections are typically easy to be disassembled and tightened again. Therefore, it is very easy and practical to reuse such components and extend their life beyond one building's life cycle.

### From grave to cradle

The particular focus of the PROGRESS project is to establish the procedure to re-introduce the building materials in the new construction project including the material traceability, testing protocol, regulatory requirements, environmental and economic impact and possibilities to apply for the voluntary certifications. The innovative material testing methods (e.g. based on miniature sample shown in the figure) are demonstrated in the project.

### We aim to ...

Extend the service life of building components  
Reduce the raw material and energy consumption  
Develop the design guidance  
Establish the material quality verification process  
Improve the overall building performance  
Demonstrate the reuse process/technologies  
Involve all actors in the product supply chain

### A multidisciplinary expert group

Our group offers to:

- Help you recognize the environmental potential and end-of-life value of the building materials
- Provide recommendations on the material suitability for reuse in a new project

We have the expertise in

- Building and material codes
- Materials testing and certification
- Life-cycle assessment of buildings and products
- Building information modelling

**Are you a building material/products manufacturer, facility owner, construction or demolition contractor, or do you provide design and consultation services for building sector? If so, contact us to discover how your organisation can be engaged in the development of Circular Economy business in construction.**  
 Project coordinator: petr.hradil@vtt.fi



Paul  
Kamrath

## Project brief overview

The consortium of seven partners from Belgium, Finland, Germany and Romania carries out the research project called PROGRESS coordinated by VTT Technical Research Centre of Finland and financed by European Commission's Research Fund for Coal and Steel. The project aims to provide solutions for reusing components of single-storey steel buildings that would be easily scalable for other building types and materials.

### PROGRESS goals

The PROGRESS project provides methodologies, tools and recommendations on reusing steel-based components from existing and planned buildings. The project targets the design for deconstruction and reuse of envelopes, load-bearing frames, trusses and secondary elements of single-storey buildings framed in steel. This building type has broad applicability as industrial, commercial, sports, exhibition, warehouse facilities, and shows most potential in suitability for reuse and viability for circular economy business models. The whole life benefits of reusable single-storey steel buildings will be quantified from environmental and economic viewpoints. The outcomes will be extensively disseminated in particular among manufacturers, designers, contractors and researchers.

### Consortium

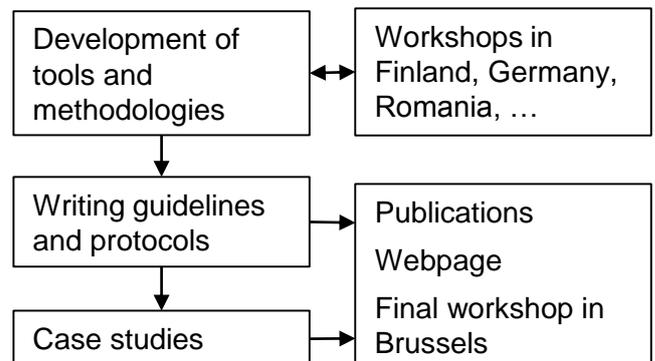
VTT Technical Research Centre of Finland  
Steel Construction Institute, UK  
Ruukki Construction, Finland  
RWTH Aachen University, Germany  
Universitatea Politehnica Timișoara, Romania  
ECCS, European Convention for Constructional Steelwork, Belgium  
Paul Kamrath Ingenieurrückbau, Germany

### Contacts

Petr Hradil  
Tel. +358 400 209 593  
petr.hradil@vtt.fi

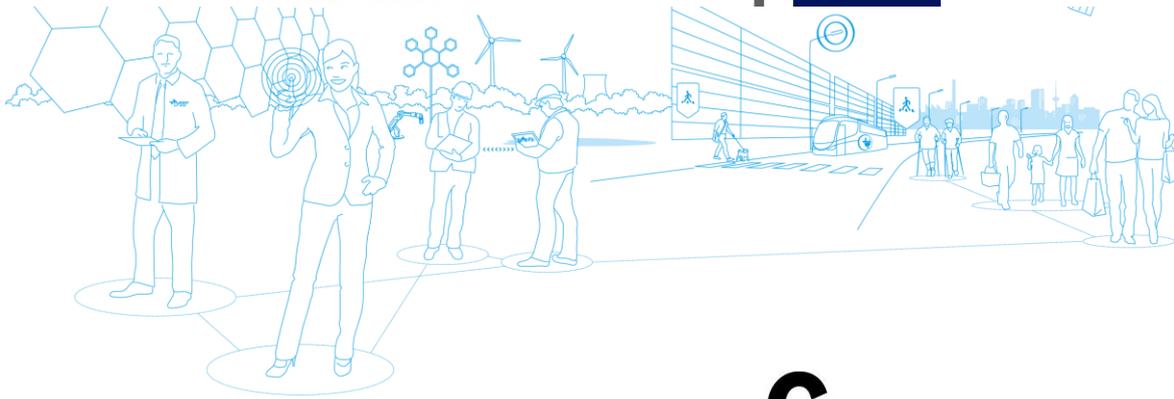
### Project plan

Duration: 1.6.2017 – 31.5.2020



### Main outcomes

Material quality verification protocol  
Legal documents overview  
Design guidelines published in ECCS series  
New hybrid energy-efficient and reusable envelope  
Environmental and economic assessment (methodology and case studies)  
Recommendations on BIM use  
Prototype of information-sharing internet portal



**A S C E M**

— 20 Aniversario —

## **Asociación Española para la Construcción de Estructuras Metálicas**

ECCS full members, as a national  
association of steel contractors

ECCS (European Convention for  
Constructional Steelwork)

Barcelona, 15 de Mayo 2019