

# LARGE VALORISATION ON SUSTAINABILITY OF STEEL STRUCTURES



## LVS3 project

The objective of this project is to disseminate the knowledge acquired in the recent years about the environmental impact assessment of steel and composite buildings.

During the last decade, a lot of research projects have been funded to develop methodologies, systems and products aiming at improving the thermal efficiency as well as the global environmental footprint of steel buildings.

The new standard EN15978 intended for environmental calculation of buildings takes into account the fact that steel is a recyclable material.

Therefore, this project summarises all this acquired knowledge into different documents (Background, Design guide, Case Studies, User-friendly Software based on EN15978), to translate all these training and teaching support into different European languages and finally to disseminate all over Europe by the organisation of workshops.

#### Project partnership

- ArcelorMittal Belval & Differdange SA (Luxembourg)
- bauforumstahl e.V. (Germany)
  University de Ljubljana (Slovenia)
- Ceske Vysoke Uceni Technike V Praze (Czech Republic)
- University of Athens (Greece)
- University of Timisoara (Romania)
- University of Naples Federico II (Italy)
- University of Vilnius (Lithuania)
- University of Warsaw (Poland)
- Tecnalia (Spain)
- University of Miskolc (Hungary)
- University of Coimbra (Portugal)
- University of Tallinn (Estonia)
- CTICM (France)
- University of Liège (Belgium)
- Bouwen met Staal (Netherlands)
- Stalbyggnadsinstitutet Stiftelser (Sweden)
- AC&CS CRM Group (Belgium)
- Club Asturiano de la Innovación Asociación (Spain)

#### **USER-FRIENDLY SOFTWARE**

## AMECO 3 Software for PC

SAMECO		And in case of the local division of the loc	- 0 <b>- X</b>
File Edit Display Options ?			
🗋 🤌 🔒 🔳			ArcelorMittal
Project Building Floors	Structure Transp	oort Results	
	Floor	slabs	
	Steel e	ements	
Floor type	Composite slab 👻		
Steel deck	Cofraplus 60 👻		
Thickness of the deck	0,750 -	mm	
Mass of sheeting per m2 of floor	8,53	kg/m2	
Mass of sheeting for the building	12,3	t	
	Concrete	elements	
Cement content	350	kg/m3	
Default concrete density	2420	kg/m3	
Concrete density	2420 -	kg/m3	
Total depth of the floor	120.0	mm	
Total mass of the floor concrete	296.2	t	
Steel reinforcement	0.0	t	
Side removement	0,0	L.	
Total mass of the floor slabs	308,5	t	
<u> </u>			

#### **REFERENCE DOCUMENTS**

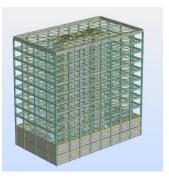
## Background document

This document aims at providing in-depth information on the development and validation of life cycle methodologies focussing on the life cycle assessment of steel structures and in particular on two complementary methodologies:

- the macro-components approach, addressing the life cycle assessment of buildings and/or building components but excluding the quantification of energy in the use stage of a building;
- an approach focussing on the use stage of a building and enabling the quantification of the operational energy of buildings.

#### **CASE STUDIES**

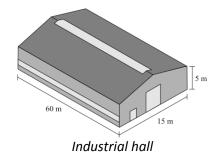
Comparative examples are made on three case studies using the proposed methodology and tools



Office building



Residential building



# IPad/Iphone application

oc Proximus 👻		15-02			* 95 %
			Ľ Z 🚥	loulate Confi	Help
I or H Sections	IPE A	160			
IPE European I-baams			Length	(m)	0
• IPE A 100	T TT	- angene -	Lifespan	(bears)	0
• IPE 100					3235
• IPE A 120		y	Quality		JØ
• IPE 120	ف المحالية ا			Hot n	boild
• IPE A 140	4 ž	1	Scope of the Analysis		
• IPE 140		elor Witto	Cradle-to-gate		
• IPE A 160			Country Street		
• IPE 160	Designation		GWP ka	GO2 Eq. 0.00E	100
• IPE A 180	12.7	G [kg/m]	ODP kg CFC	G-11 Eq. 0.00E	100
• IPE 180	and the second second		POCP kg C	2H4 Eq. 0.000	+00
• IPE O 180	Dimensions	himmi			
• IPE A 200	82.0	b [mm]	Primary Energy Domand	MU 0.00E	+00
• IPE 200	4.0	t.w (mm)	Total demand (n.c.v.)	MJ 0.00E	
• IPE O 200	5,9	ts (mm)	Ren. Resources (q.c.v.)	MJ 0.00E	
• IPE A 220	9,0	r (mm)	Ren. Resources (n.c.v.)	MJ 0.00E	
• IPE 220	0.0	r [m]	Non ren. Resources (g.c.v		
• IPE O 220	Area		Numment, Hesobarces (g.c.)	4	

# Design guide

This document aims at providing information on the different steps to be crossed for the environmental assessment of steel and composite buildings using AMECO 3 software. In particular, the design guide focuses on:

- The description of the calculation process
- A guidance on how to use AMECO 3 tool
- Application of AMECO 3 on case studies