



Project No. Coll – Ct - 2003 - 500291

ESECMaSE

**Enhanced Safety and Efficient Construction of Masonry Structures
in Europe**

Horizontal Research Activities Involving SMEs

Collective Research

Work Package N°: 10
Deliverable 10.1-2

Project Presentation

Start date of project: 10.June 2004
month

Duration: 36

Project co-funded by the European Commission within the Sixth Dissemination Level		
PU	Public	PU
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

This is the project-presentation of the Collective-Research Project „ESECMaSE“ – *Enhanced Safety and Efficient Construction of Masonry Structures in Europe* – carried out by 26 project partners in total, of which 8 European SME's, 7 IAG's and 11 RTD partners. The project is generously supported and granted by the European Commission in its 6. Framework-Programme, Horizontal Research Activities Involving SME's of the European Research Area, (ERA). The project started on 10. June 2004 and has a duration of 36 months. So it is supposed to be terminated by 9. June 2007. The estimated total sum of the project is Euro 3.011.009,-. The requested funding of the commission is Euro 2.174.026,-. See list of the participants on page 4 of this presentation.

Key issues and Main Goal of the project

Socio-economic relevance

Many houses in northern Europe are built using masonry construction – essentially self-supporting structures that use products such as bricks and mortar. But this centuries-old way of building has been put under threat after research showed that lateral loads caused by earthquakes and storm winds on masonry walls were much higher than previously thought. New building codes – called Euro Codes – reflect these findings and call for masonry constructed houses to be built with more precisely defined lateral load tolerances. The ESECMaSE collective research project intends to provide designers and builders with a better understanding of lateral loading issues and help them to meet the requirements of the new regulations.

Strategic objectives

House builders that specialise in masonry construction have traditionally never had to think much about lateral loads, or about the potential damage caused to their walls by earthquakes or wind. As far as earthquakes are concerned, the prevailing view has been that they do not occur frequently and do not cause much damage. For many years builders tended only to think about vertical loading to make sure a building could support its own weight. But the new Euro Codes for construction design, recently introduced by the European Union, have changed all that. Now the requirements presented in EURO Code No.8 – the code that most related to earthquake loads – could potentially see an end to masonry-built houses because EURO Code No.6 - the one for masonry construction does not give sufficient answers on the sharpened requirements yet. The problem is that architects, builders and engineers do not know how to accurately design and measure the resistance capacities of masonry construction against lateral loading. It would be easier for them to change to building houses using other methods and materials. Brick and mortar could easily be replaced with wood or concrete. Such a move would have a profound effect on the construction industry. SMEs that make products for masonry buildings – for example, clay brick makers – would be hardest hit, and many could go out of business. The aim is to improve understanding of the lateral design of masonry and to create a harmonised approach to design standards. The project seeks to improve building products so that masonry structures can better withstand lateral loads. ESECMaSE will also create test methods that can be used by architects and engineers so they can design buildings that match the requirements of the new codes. The project will carry out the most extensive investigation ever of lateral loading in masonry.

Technical approach

The work started with theoretical investigations on the types of stress faced by masonry that is subject to lateral loads and the different relating characteristics as the shear strength of the mortar-unit-relation in the joints. This information will be used to produce a battery of tests on the ability of masonry members and walls to withstand different stresses. This should refine testing methods that could eventually be used by the construction industry. The project will also seek to improve the properties of masonry materials that are produced by SMEs. Hopefully these firms will be able to incorporate such enhancements in their construction processes and thereby improve the ability of masonry products to withstand greater lateral loads. Research will cover recent developments in the building industry such as the use of more and more lightweight materials, for example many lighter mortars and more highly perforated masonry units have never been tested for their lateral load bearing potential.

During the second half of the project, results will be tested and verified at engineering institutes in Greece and Italy that are expert in assessing earthquake damage in buildings. These institutes can examine the behaviour of buildings and construction products on shaking tables that mimic the effect of an earthquake. ESECMASE's research performers will carry out the lateral loading tests and, with the help of the project's SME partners, will help to improve the material properties of building products. Meanwhile the solutions they come up with will be disseminated to Europe's construction sector by the industrial associations that have signed up to the project.

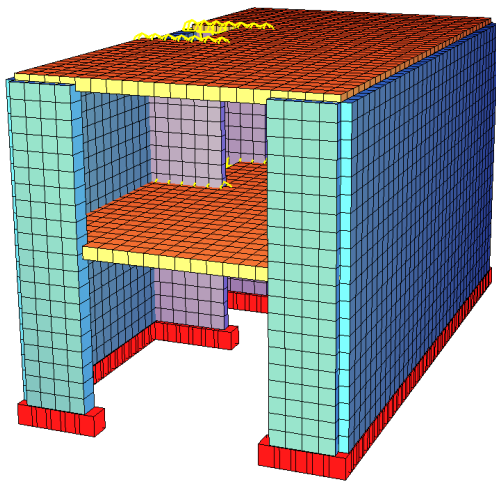


figure 1: finite-elements-model of a terraced house figure 2: four point bending test arrangement of TNO

Expected achievements/impact

The improvement of knowledge in the lateral (shear) design of masonry will lead to improved harmonized European design standards.

The intended improvement of existing design codes and product standards as well as the drafting of test standards for material properties will be endorsed by the project team members, who are delegates to the competent standardisation sub-committees of CEN/TC 250 and TC/125. This will support a fast dissemination and application of

The aimed improvement of product quality with regard to the lateral (shear) resistance will result in a higher competitiveness of load bearing masonry with other types of constructions, which is of vital importance for the sustainable existence of numerous SMEs in the participating European countries. The participation of SMEs from different European countries with different seismic risks assures a well-directed research for their specific problems and endorses spread of results within the European Community.

Coordinator contact details

Mr. Joachim Kieker

c/o DGfM, Participant 1 (DE), Deutsche Gesellschaft für Mauerwerksbau e.V., Berlin Kochstraße 6-7

D-10969 Berlin

e-mail: kieker@dgfm.de;

Web presentation ESECMaSE: www.esecmase.org

List of Participants

N°	Short Name	Name of entity	Type	Nation
1	DGfM	Deutsche Gesellschaft für Mauerwerksbau e.V.	IAG	DE
2	BVKSI	Bundesverband Kalksandsteinindustrie e.V.	IAG	DE
3	AMz	Arbeitsgemeinschaft Mauerziegel im BVZ e.V.	IAG	DE
4	VÖB	Verband Österreichischer Beton und Fertigteilwerke	IAG	AT
5	VÖZ	Verband Österreichischer Ziegelwerke	IAG	AT
6	ANDIL	ANDIL Assolaterizi	IAG	IT
7	Peter	Peter GmbH Kalksandsteinwerk KG	SME	DE
8	Zapf	Zapfwerke GMBH & CO. KG	SME	DE
9	Cirkel	Cirkel GMBH & CO. KG	SME	DE
10	Wiest	Ziegelwerk Bellenberg Wiest GMBH & CO. KG	SME	DE
11	Pexider	Herbert Pexider GmbH	SME	AT
12	RIL	Ril Rondi Industria Laterizi S.P.A.	SME	IT
13	Lias	Lias Vinitrov, Lehky Stavební Material K.S.	SME	CZ
14	SEPA	SEPA SARL	SME	FR
15	UNIK	University of Kassel	RTD	DE
16	U.Pavia	Università degli di Pavia - Meccanica Strutturale	RTD	IT
17	LEE-NTUA	National Technical University of Athens	RTD	GR
18	TNO Bouw	Netherlands Organisation for Applied Scientific Research	RTD	NL
19	TUD	Technische Universität Darmstadt - Lehrstuhl Massivbau	RTD	DE
20	TU Dresden	Dresden University of Technology	RTD	DE
21	TUM	Technische Universität München - Lehrstuhl Massivbau	RTD	DE
22	Pech	Dr.-Ing. A. Pech Ingenieurkonsulent für Bauwesen	RTD	AT
23	JRC	Commission Of The European Communities - Directorate General Joint Research Centre	RTD	IT
24	FVKS	Forschungsvereinigung Kalk-Sand e.V.	RTD	DE
25	IZF	Institut Für Ziegelforschung Essen e.V.	RTD	DE
26	E.A.A.C.A	European Autoclaved Aerated Concrete Association	IAG	EU