

COST

Domain Committee “Transport and Urban Development”

COST Action (TU0901)

Start Date (03/11/2009)

*Integrating and Harmonizing Sound Insulation
Aspects in Sustainable Urban Housing Constructions*

MONITORING PROGRESS REPORT

Reporting Period: from 01/06/2011 – 31/05/2012

This Report is presented to the relevant Domain Committee.
It contains three parts:

- I. Management Report prepared by the COST Office/Grant Holder***
- II. Scientific Report prepared by the Chair of the Management Committee of the Action***
- III. Previous versions of the Scientific Report; i.e., part II of past reporting periods***

The report is a “cumulative” report, i.e. it is updated annually and covers the entire period of the Action.

Confidentiality: the documents will be made available to the public via the COST Action web page except for chapter *II.D. Self evaluation*.

Based on the monitoring results, the COST Office will decide on the following year’s budget allocation.

Executive summary (max.250 words):

The main objective of the Action is to harmonise the descriptors for airborne and impact sound insulation between dwellings and for airborne sound insulation of facades as well as to prepare a European classification scheme with a number of quality classes. In Europe, regulatory requirements concerning acoustic performance of buildings differ widely in performance descriptors and limit values. The diversity (indicators, steps between classes, grade of quietness achieved, etc.) found in the nine existing national schemes and proposals in three more countries is an obstacle for exchange of experience, development and trade. The harmonization of such descriptors and performance levels of sound insulation classes is important to make progress and would be well received by the building industry, governments and research sectors. The Action will stimulate innovation, support sustainability through simplified research and development objectives, reduce trade barriers between Member States and facilitate marketing. Coordination of research activity, knowledge transfer, psychoacoustic evaluation, collection of data of typical and high performance acoustic solutions is necessary to make progress.

I. Management Report

I.A. COST Action Fact Sheet

CSO Approval: (26/05/2009)
Entry into force: (23/06/2009)

End date: (02/11/2013)
Extension:

Objectives

Main objectives

- Propose harmonized descriptors for airborne and impact sound insulation.
- Propose a European acoustic classification scheme for dwellings.

Secondary objectives

- Include low frequency range adequately
- Prepare a uniform questionnaire on annoyance by neighbour noise
- Deduce a correlation between sound insulation and annoyance
- Establish a catalogue of sound insulation data for construction solutions found in the different participating countries
- Produce an on-line compendium on good workmanship practice

Parties

Austria (09/07/2009)	Greece (10/03/2010)	Romania (10/05/2010)
Belgium (31/07/2009)	Hungary (25/01/2010)	Serbia (23/06/2009)
Croatia (16/10/2009)	Iceland (10/02/2010)	Slovakia (02/03/2010)
Czech Rep. (07/12/2010)	Italy (23/06/2009)	Slovenia (31/07/2009)
Denmark (23/06/2009)	Lithuania (25/11/2009)	Spain (11/07/2009)
Estonia (28/10/2009)	Malta (07/12/2010)	Sweden (16/10/2009)
Finland (10/09/2009)	Netherlands (08/09/2009)	Switzerland (31/07/2009)
FYR of Macedonia (31/07/2009)	Norway (15/12/2009)	Turkey (31/01/2011)
France (10/08/2009)	Poland (23/06/2009)	United Kingdom (23/06/2009)
Germany (26/06/2009)	Portugal (30/09/2009)	

Intentions to accept: None

Other participants (Non-COST countries)

- RMIT University, Australia
- University of Canterbury, New Zealand
- Acoustics Group, Indoor Environment Research Program, Institute for Research in Construction, National Research Council Canada, Canada

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Working Groups**WG1: Harmonized sound insulation descriptors and classification schemes in Europe****WG2: Subjective evaluation of sound insulation - Laboratory tests and harmonized field surveys****WG3: Design and acoustic performance of building constructions for multi-storey housing**

WG1		WG2		WG3	
AT	Judith Lang	AT	Herbert Müllner	AT	Judith Lang
BE	Bart Ingelaere	BE	Monika Rychtarikova	BE	Bart Ingelaere
BE	Gerrit Vermeir	HR	Ivan Djurek	DK	Dan Hoffmeyer
CZ	Jiri Novacek	DK	Søren Vase Legarth	EE	Marko Ründva
DK	Birgit Rasmussen	DK	Torben Holm Pedersen	FI	Heikki Helimäki
DK	Dan Hoffmeyer	DK	Jonas Brunskog	MK	Emilija Atanasovska
EE	Linda Madalik	FI	Jukka Keränen	MK	Todorka Samardzioska
EE	Marko Ründva	FI	Valtteri Hongisto	MK	Violeta Nushi
FI	Ari Saarinen	MK	Gordana Ristovska	FR	Catherine Guigou-Carter
FI	Heikki Helimäki	FR	Etienne Parizet	FR	Jean Baptiste
FI	Jukka Keränen	FR	Remy Foret	DE	Christian Burkhart
FI	Mikko Kylliäinen	DE	Brigitte Schulte-Fortkamp	DE	Heinz-Martin Fischer
MK	Sonja Cerepnalkovska	DE	Michael Vorländer	HU	Frigyes Reis
MK	Viktor Gavriloski	DE	Werner Scholl	IT	Patrizio Fausti
FR	Catherine Guigou-Carter	GR	Konstantinos Vogiatzis	IT	Simone Secchi
FR	Jean Baptiste	NL	Sabine Janssen	LT	Kestutis Miskinis
DE	Christian Burkhart	NO	Clas Ola Høvsøien	LT	Vidmantas Dikavicius
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DE	Werner Scholl	PL	Elzbieta Nowicka	RO	Florin Mirel Delia
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IT	Chiara Martina Pontarollo	SK	Andrea Vargova	ES	Teresa Carrascal García
IT	Fabio Scamoni	SK	Vojtech Chmelik	ES	Felipe Merino Reues
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MT	Vincent Buhagiar	ES	Marta Herraes Sanchez	SE	Krister Larsson
NL	Eddy Gerretsen	SE	Delphine Bard	CH	Victor Desarnaulds
NL	Susanne Bron	CH	Lubos Krajci	UK	Ed Clarke
NO	Clas Ola Høvsøien	CH	Rudolf Buetikofer	UK	Sean Smith
NO	Iiris Turunen-Rindel	UK	Ian Critchley	CA	Dave Quirt
NO	Kari-Anne Simenstad	UK	Jian Kang		
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PT	Jorge Patricio	CA	John Bradley		
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ES	Maria Machimbarrena				
ES	Belén Casla Herguedas				
SE	Klas Hagberg				
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CH	Lubos Krajci				
CH	Victor Desarnaulds				
TR	Selma Kurra				
UK	Carl Hopkins				
UK	Phil Dunbavin				
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I.C. Overview activities and expenditure

Budget 01.06.2011 – 31.05.2012

Meetings

Meeting Type	Date	Place	Cost	Total
Steering Group Meeting	09.05-11.05.2011	Lisbon, Portugal		5.580,26
MC and Working Group Meetings	10.05.2011	Lisbon, Portugal		18.228,31
Core Group Meeting	29.08-30.08.2011	Leuven, Belgium		1.388,34
MC and Working Group Meetings	29.11-30.11.2011	Dübendorf, Switzerland		38.243,47
Task Group Meetnig	31.01-01.02.2012	Edinburgh, United Kingdom		9.216,13
Other COST relevant meeting	06.05-08.05.2012	Hamburg, Germany		630,90
				73.287,41

STSMs

Beneficiary	Date	Place	Cost	Total
Mr Marko Horvat	22.01.2012	Aachen, Germany		1.480,00
Ms Sonia Antunes	05.02.2012	Hørsholm, Denmark		1.260,00
Mr Vojtech Chmelík	05.02.2012	Leuven, Belgium		800,00
Ms Carolina Rodrigues Alves Monteiro	12.02.2012	Edinburgh, United Kingdom		950,00
Mr Cristian Mondaca	12.02.2012	Edinburgh, United Kingdom		950,00
Dr Elisa Nannipieri	12.02.2012	Edinburgh, United Kingdom		950,00
Ms Francesca Maria Torchia	12.02.2012	Edinburgh, United Kingdom		950,00
				7.340,00

Dissemination

Title	Date	Cost	Total
Administration of website	09.12.2011		1.500,00
			1.500,00

II. Scientific Report

II.A. Innovative networking

During the period June 2011 to May 2012, there has been an MC+WG meeting in Zurich (30 November 2012) plus a workshop together with COST Action FP0702, see Section II.B. Furthermore, a task/steering group meeting has taken place 31 January to 1 February in Edinburgh and a strategic meeting in May 2012 in Hamburg. A summary of the achievements during this period is presented below.

Short report WG1 – Summary

The main focus in this period has been the preparation of the proposed descriptors. A task group meeting was held in Edinburgh in February, one of the tasks being to consider how best to analyse the 4500 test data sets from the Robust Details database and calculate results expressed by other ISO 717 descriptors referred to in building regulations in Europe. This was the subject of four STSMs at Napier University in February and was a very intensive exercise for all those participating. The STSMs are listed in Annex III. The results of the STSMs will be presented at EuroNoise 2012 in the COST TU0901 session and the outcomes will probably lead to additional STSMs to consider further aspects that there were simply insufficient time to explore. The follow-up of the STSMs will be discussed at the next meeting in Prague and will include an examination of the impact of the proposed ISO/NWIP 16717 on new descriptors which will include both 'Living Noise' and the 'inversion' of the impact sound insulation curve..

The cooperation with ISO/TC 43/SC 2/WG18, responsible of updating ISO 717 and prepare thoroughly revised rating standards (ISO/NWIP 16717), has been intensified, and the WG18 leader has become a TU0901 member.

Further discussions and studies have taken place on classification schemes, and WG1 will begin work on a draft proposal for a single classification scheme towards the end 2012.

Due to the potential impact on all building regulations in Europe, when changing sound insulation descriptors, it has been found important to start a communication with building authorities, and this issue was addressed at the task group meeting in Edinburgh, and a three member task group was established, one of the members being from a ministry. A draft procedure on how to get authorities involved has been developed and will be one of the key issues during the third year of the Action.

Short report WG2 – Summary

During the last part of 2011 and beginning of 2012, WG2 has accomplished the following tasks, according to the work plan of WG2.

Questionnaire

The draft Harmonized Questionnaire has been refined, translated and tested within various countries. The degree of participation of citizenship varies and the most favourable way to perform a survey is different, depending on the country. There are not yet enough data to come to definitive conclusions. The questionnaire has been translated/converted into nine languages, and surveys have been carried out or are under planning or consideration.

In one of the studies, correlations to measured impact sound insulations have been successful, but the correlation to airborne sound insulation was less obvious. The reasons for poor correlation have not yet been found.

Efforts have been made to get funded the development of a completely graphical version of the questionnaire with questions and response scale illustrated in an "IKEA-style" rather than by verbal descriptions. The purpose is to facilitate surveys in multi-cultural areas, where several translations are impossible to accomplish. Funding was declined for 2012. A new try might be made in 2013.

Auralization

Tests on auralization have so far been in slow progress due to lack of research funding and research time, but research activities have been initiated in 2012.

In the first quarter of 2012, some new work has been conducted through STSMs, which allows us to describe some novel experiences, e.g. of web based questionnaires. The following topics were investigated through the three WG2 STSM stays:

- Evaluation of Suitability of 3D Sound Reproduction for Subjective Assessment of Sound Insulation
- Online assessments of indoor noise annoyance (listening tests on sound insulation of walls).
- Perceptual comparison of sound insulation for heavy and light-weight walls with same rating R_{living}

Efforts into developing guidelines for performing auralization of sound insulation in dwellings have until now led to little results – due to several methodologies having different strengths. Knowledge of reliability and comparability of different methods are needed. WG2 expects to write brief practical guidelines on auralization in 2012-Q4 focusing on useful and safe types of auralizations as well as describe some risks and give a few examples on less feasible cases.

Short report WG3 – Summary

The main activity carried out in the last year by WG3 focused on completing the sub-data related to the various tasks of the Mosaic Project, the aim being to create a European database of robust solutions for new buildings and for the acoustical improvement of the existing ones.

At the Zürich meeting in November 2011, 17 countries gave a short presentation on typical workmanship error factors on the construction for separating walls and floors. This led to good discussions and questions on key issues, and the WG identified a number of common construction site errors taking place across countries – particularly isolating of screeds, flanking edge strips, services penetrations in floors and walls. The information obtained was uploaded to the TU0901 website. In relation to New Build Attached Homes (NBAH3), all WG members were asked to provide data for WG1 relative to sound insulation performance of typical constructions of separating walls and floors in each country: 50Hz to 5000Hz mean L1, Mean L2, Background, Mean RT, Room Volumes, Test Wall / Floor area and description of separating wall or floor. This is going well and key information on number of new homes/apartments built per year in each country was also collated. Importantly, WG3 assisted with the 4 STSMs and a young researcher at the host Institution of Edinburgh Napier University, where - during an intense week with a world first data analysis - a series of important datasets and analysis, from 4,500 field measurements, was undertaken. This work will importantly assist WG1 and also the ISO 717 committee and discussions on harmonizing descriptors in regulations.

Concerning Task EAH: Existing Attached housing, a spreadsheet has been developed and sent to all members to collect information about key construction types in existing buildings and its acoustic performance. The aim is to complete tasks EAH2 and EAH3 at the same time. The spreadsheet is divided into periods, each one corresponding to a different construction technique, it can be submitted only a single insulation value or the spectrum. In a later stage, a collection of examples of “working solutions” in retrofitting in different countries will be addressed.

Other innovative networking

On 31 January to 1 February 2012, a task/steering group meeting took place in Edinburgh, and the participants were invited to attend the launching of Robust Details in Scotland. The President of and other representatives from the Consortium of European Building Control (CEBC) also took part in the launch, and cooperation between TU0901 and CEBC was born thanks to this event. Subsequently the TU0901 Chair was invited to give a presentation at the forthcoming CEBC meeting in May 2012, see Section II.B. Decisions have not yet been made concerning specific future activities.

II.B. Inter-disciplinary networking

Thanks to the scientific networking developed within TU0901, the following achievements have been possible over the period June 2011 to May 2012:

- The ERACO research project STAR (Sustainable Thermal Acoustic Retrofit) has been approved in the ERACOBUILD Sustainable Renovation Program Call 2011. It is an international collaboration project between Scotland (UK), Flanders (BE) and Sweden (SE) and can be seen as a spin-off of the contacts made during the COST Action. This three-country project focuses on technical compatibility of retrofit of dwellings between energy efficiency improvements and other technical standards such as sound insulation and material synergies.
- A Finnish Research Project (2011-2014) has been approved. (USER-ORIENTED DEVELOPMENT OF SOUND INSULATION IN BUILDINGS – ÄKK) .The aim is to produce scientific basis to improve and harmonize the single number quantities used to describe sound insulation of buildings. In this case the research idea was originated directly from COST TU0901. The research will be carried out both in laboratory and buildings and combines building acoustics and environmental psychology.
- The collaboration with FP0702 has led to organizing a joint workshop meeting at EMPA in November 2011, with presentations from experts from both Actions and on subjects of common interest. The full programme can be found in ANNEX I. The presentations have been uploaded to the TU0901 website www.costtu0901.eu (login needed). - As during the first year of TU0901, the cooperation between TU0901 and COST TD0804 is taken care of through common members. There has been very little contact to TU0701 during the last year, because TU0901 has had other urgent priorities. TU0701 is now finished, but brief information about the TU0701 publications and any results relevant to TU0901 will be obtained from a joint member at the TU0901 meeting later in 2012.
- Contact has been established to CEBC (Consortium of European Building Control) during the Scottish Robust Details Launch in Edinburgh. The TU0901 Chair was invited to make a presentation “Sound insulation – latest research issues” at their bi-annual meeting in Hamburg (May 6th-8th). The main purposes were to create awareness on the sound insulation issues and to strengthen contact to building authorities all around Europe. Approx. 40 representatives from ministries and building control authorities in about 20 countries participated in the meeting.
- Concerning international and European technical committees related to standardization in acoustics, ISO/TC43/SC2 and CEN/TC126, the cooperation is covered by about 20 TU0901 members (including non-COST TU0901 members), who are members of one or more Standardization groups. In addition, several members are active members of National Standardization Boards, who are thus duly informed about the development of COST Action TU0901.

In the first months of 2012, it became increasingly evident that training, re-training and especially interdisciplinary training could be of utmost importance to upgrade TU0901 research methodologies and thus the outcome of STSMs and other research activities, and TU0901 was granted the possibility to transfer remaining budget from 2011 to the following budget year starting March 2012 aiming at organizing a TRAINING SCHOOL. A preliminary plan was made and approved by the COST Office, see below.

Title: Psychoacoustic Methodologies in Building Acoustic Research

- ◆ Objective/subjective sound insulation
- ◆ Building acoustics and design methods
- ◆ Buildings acoustic descriptors, requirements (legislation) and classification schemes
- ◆ Psychoacoustics, including listening tests
- ◆ ISO standards in building acoustics
- ◆ ISO standards in psychoacoustics
- ◆ Questionnaires
- ◆ Construction solutions in different countries and performance
- ◆ Workshops with interdisciplinary tasks

The Training School is planned to take place in November in Denmark, alternatively at BBRI in Belgium.

II.C. New networking

No new countries have joined the Action since May 2011, but the number of WG members has increased. The summary figures are:

29 COST countries, 3 non-COST countries and approximately 95 MC& WG members. The gender balance is approx. 35% female and 65% male. It is estimated that about 15 members are ESRs.

FORUM ACUSTICUM 2011 (FA2011): A structured TU0901 session "Integrating and Harmonizing Sound Insulation Aspects in Sustainable Urban Housing Constructions (COST TU0901)" with 14 papers, including papers from the three TU0901 members from Non-COST countries, was organized. For more information, see the FA2011 Technical Program and abstracts (Acta Acustica, 2011, Vol. 97 Supplement 1) at the links: http://www.fa2011.org/downloads/FA2011_ProgramBook.pdf http://www.acta-acustica-united-with-acustica.com/fileadmin/Dateien/Download/ActaAcusticaunitedwithAcustica_TOC_Suppl1_V97.pdf and proceedings (CD). ANNEX II includes a list of the papers presented at FA 2011.

Note: A similar structured TU0901 session has been organized at the upcoming EURONOISE 2012 Conference, which will take place in June 2012 in Prague, CZ. The full session will consist of 17 papers, of these four presenting results from STSMs.

Between March 2011 and Feb 2012 there have been 7 STSMs. See ANNEX III for overview information about STSMs. Reports are available at <http://www.costtu0901.eu/stsm>.

Besides the scientific results, each of the STSMs has led to new networking between researchers in different countries. Especially the multi-STSM at Napier University with four STSM people from two countries created opportunities for networking across Europe, and one of the Spanish participants are now applying for funding to make a PhD study at Napier University.

ANNEX IV shows the most relevant on-going/pending research projects related to the scope of TU0901 being developed in different participating countries. Not to mention other applications which unfortunately have not been funded.

Several ACTION members have made presentations at national conferences to inform about and disseminate the contents and preliminary outputs of the Action.

In Spain there has been a COST TU0901 marketing campaign including a radio interview for international Spanish radio, national newspapers and economy/science newspapers:

<http://www.rtve.es/alacarta/audios/europa-abierta/europa-abierta-17-02-12/1325089>

(Min. 30 to 42) (Radio Program called "Open Europe")

http://issuu.com/mercados21/docs/m21_num_08 page 46

(Magazine on Business and Markets)

<http://www.elmundo.es/elmundo/2012/02/06/valladolid/1328557936.html>

(National Newspaper – under University- Engineering news))

<http://www.cost.eu/library/newsroom/el-mundo>

(Description and link to the above article)

II.D. Self evaluation

General

Main successes

- Seven interesting STSMs with scientific output and knowledge transfer between receiving and sending Institution.
- Having access to work with enormous and reliable building construction acoustics database thanks to the team working attitude and networking possibilities found in the Action.
- Gathering data for New Build Attach Housing (NBAH) and Existing Attach Housing (EAH) all over Europe.
- Two important new funded research projects directly related to scope of Action, as mentioned in section II B (and included in the list in Annex IV).
- Several new people have shown interest in the Action and have become members or are considering membership.

Drawbacks

- Sometimes it is difficult to keep WG members involved and active in spite of the general interest on the subject. All participants are far too busy in their own working agendas and taking free time for COST Project becomes more and more difficult.
- Some COST rules have been difficult to interpret, mainly considering experts reimbursement
- Lack of time of steering group members. Difficult to justify in front of corresponding Institutions the amount of time devoted to a “non funded” project (from the Institution’s point of view)
- Personal circumstances have led to change in leadership of all WGs, slowing down the impulse achieved during past MC meetings.
- Service and several reminders often necessary to make things happen, including STSMs.

Challenges

- The main challenge is to organize a Special Edition on COST TU0901 in a relevant acoustics journal
- Listening tests guidelines seem not feasible within the time of the Action. Supporting research is necessary, before it’s possible.
- Administration and reporting.
- Keep member lists updated. It would be of great help, if member roles were clearly registered in the e-cost system, and it could possible any time to make an updated list of e.g. members of a specific working group – similar to now, where it’s possible to get a document with all MC and MC substitute members and to get all the e-mail addresses easily.
- To influence research programs and succeed in preparing joint applications for research funds.

ANNEX I: Details about FP0702&TU0901 Workshop



COST FP0702 & TU0901 Workshop and MC/WG meetings 28th – 30th November 2011 at EMPA Dübendorf/Zürich

Monday November 28th FP0702 MC & WG meetings

See separate agendas.

Tuesday November 29th Common FP0702 & TU0901 Workshop

Place: EMPA Akademie

- 9:00 - 9:15 **Welcome** and introduction to EMPA activities – **Peter Richner**, Head of Department
- 9:15 - 9:30 FP0702 introduction and status – **Michel Villot**, Chair of FP0702
- 9:30 - 9:45 TU0901 introduction and status – **Birgit Rasmussen**, Chair of TU0901

Session: Comfort assessment

- 9:45 - 10:05 AcuWood – progress and initial results – **Klas Hagberg**
- 10:05 - 10:25 Recent results on impact noise research – **David Quirt**
- 10:25 - 10:45 ISO 16717: proposals and background – **Werner Scholl**
- 10:45 - 11:00 discussion
- 11:00 - 11:30 coffee break

Session: Measurement and prediction of performance

- 11:30 - 11:50 Revision of ISO Standards on field sound insulation testing – **Carl Hopkins**
- 11:50 - 12:10 Predictions for lightweight constructions and low frequencies – **Catherine Guigou, Michel Villot**
- 12:10 - 12:30 Modelling sound transmission across heavyweight- lightweight floors – **Carl Hopkins, Lubos Krajci**
- 12:30 - 12:45 discussion
- 12:45 - 13:45 **lunch**

Session: Constructions for performance

- 13:45 - 14:05 Typical building constructions in the EU and their acoustic performance – **Sean Smith**
- 14:05 - 14:25 Performance requirements and corresponding light weight construction designs – **Bart Ingelaere**
- 14:25 - 14:40 discussion
- 14:40 - 15:10 tea break

Session: Discussion groups and plenary summary

- 15:10 - 16:40 Explaining further group discussion, creating three groups around the three themes with presenters and relevant WG leaders
group discussions
- 16:40 – 17:30 Presenting results (3x 10 min) + plenary discussion

Wednesday November 30th TU0901 MC & WG meetings

See separate agendas.

The Zürich presentations have been uploaded to www.costtu0901.eu (login needed)

ANNEX II: Details about TU0901 session at Forum Acusticum 2011

Forum Acusticum 2011 structured session: "Integrating and Harmonizing Sound Insulation Aspects in Sustainable Urban Housing Constructions (COST TU0901)

www.fa2011.org

000573	B. Rasmussen	Sound insulation between dwellings – Overview of the variety of descriptors and requirements in Europe
000605	J. Mahn et al.	The acoustic requirements of dwellings in New Zealand
000518	K. Hagberg et al.	New ideas for Swedish building regulations
000088	C. Guigou-Carter et al.	Acoustic performance of a standard French building with respect to different European countries regulations
000424	K. Miskinis et al.	Heavyweight floor constructions for sound insulation in new buildings in Lithuania
000538	J. Novacek	Design benefits from the use of EN 12354-1 prediction models for residential buildings in the Czech Republic
000588	S. Gudmundsson	A new acoustics classification standard, and revised acoustic demands in a new building code in Iceland
000534	B. Rasmussen	Sound classification of dwellings – A diversity of national schemes in Europe
000546	J. Lang	Considerations on an appropriate classification standard in Austria
000414	C. Simmons et al.	A questionnaire for correlation of subjective evaluation of dwellings with their objective building acoustic parameters
000483	R. Neubauer et al.	What describes the airborne sound insulation in technical and subjective regard?
000446	B. Gover et al.	Subjective ranking of footstep and low-frequency impact sounds on lightweight wood-framed floor assemblies
000562	P. Thorsson	Subjective evaluation of footstep noise on lightweight structures - design of laboratory experiments
000470	W. Scholl	Revision of ISO 717: Future single-number quantities for sound insulation in buildings

Papers are published in Proceedings of Forum Acusticum 2011, European Acoustics Association EAA ISBN (electronic) 978-84-694-1520-7. Program book: www.fa2011.org/downloads/FA2011_ProgramBook.pdf. Abstracts: Journal Acustica United with Acta Acustica, 2011 Volume 97, Supplement 1, ISSN 2221-3767

ANNEX III: List of TU0901 STSMs May 2011 to May 2012

STSM reports are available at <http://www.costtu0901.eu/stsm>.

1. **STSM Purpose:** Evaluation of Suitability of 3D Sound Reproduction for Subjective Assessment of Sound Insulation
Beneficiary: Marko Horvat, University of Zagreb, Faculty of Electrical Engineering and Computing, Unska 3, HR-10000 Zagreb, Croatia
Host: Dr Michael Voerlander, Institut für Technische Akustik der RWTH Aachen, Neustraße 50, 52066 Aachen, Germany
Period: from 22/01/2012 to 17/02/2012
Place: Aachen, Germany
COST STSM Reference Number : COST-STSM-TU0901-9707
STSM type: Regular (from Croatia to Germany)
2. **STSM Purpose:** Perceptual comparison of sound insulation for heavy and light-weight walls with same rating R_{living}
Beneficiary: Vojtech Chmelik, KKPS, Stavebná fakulta, STU Bratislava, Slovakia
Host: Monika Rychtarikova, Katholieke Universiteit Leuven, Laboratory of Acoustics and Thermal Physics, Leuven, Belgium
Period: from 05/02/2012 to 11/02/2012
Place: Leuven, Belgium
COST STSM Reference Number: COST-STSM-TU0901-9967
STSM type: Regular (Slovakia to Belgium)
3. **STSM Purpose:** Online assessments of indoor noise annoyance
Beneficiary: Sonia Antunes, Laboratório Nacional de Engenharia Civil Laboratório Nacional de Engenharia Civil, Lisbon, Portugal
Host: Søren Legarth, Delta, Hørsholm, Denmark
Period: from 05/02/2012 to 18/02/2012
Place: Hørsholm, Denmark
COST STSM Reference Number: COST-STSM-TU0901-9857
STSM type: Regular (from Portugal to Denmark)

The below four STSMs, No. 4-7 in the list, are all related to Multi Factor Analysis of ISO 717 sound insulation descriptors and have the same host, Prof. Sean Smith, Building Performance Centre Institute for Sustainable Construction (ISC), Edinburgh Napier University (Edinburgh, Scotland). All four STSMs took place in the period 12/02/2012 to 18/02/2012.

4. **STSM Participant:** Carolina Rodrigues Alves Monteiro, UNIVERSITY OF VALLADOLID, Valladolid, Spain
COST STSM Reference Number: COST-STSM-TU0901-9945
STSM type: Regular (from Spain to UK (Scotland))
5. **STSM Participant:** Cristian Mondaca, University of Valladolid, Valladolid, Spain
COST STSM Reference Number: COST-STSM-TU0901-9918
STSM type: Regular (from Spain to UK (Scotland))
6. **STSM Participant:** Dr Elisa Nannipieri, Department TAeD, University of Florence, Florence, Italy
COST STSM Reference Number: COST-STSM-TU0901-9948
STSM type: Regular (from Italy to UK (Scotland))
7. **STSM Participant:** Francesca Maria Torchia, ITC – CNR, Milan, Italy
COST STSM Reference Number: COST-STSM-TU0901-9949
STSM type: Regular (from Italy to UK (Scotland))

ANNEX IV: List of COST countries applying/applied for research funds for projects related to the scope of COST Action TU0901

Country	Title	Contact person	Status	Budget, €	Issues and WG relevance
Belgium	Belgische Akoestische Norm Criteria II (Belgian Acoustic Standardisation Criteria II- (BANC II))	Bart Ingelaere	Approved	600 000	WG1
Czech Republic	Effective Design of Sound Insulation Partitions in Buildings	Jiri Novacek	project approved/budget pending	ca. 17 400	WG1 - classification schemes, rating and prediction methods
Denmark	Sound insulation between dwellings in multi-storey housing - Mapping and opportunities of improvement	Birgit Rasmussen	Approved and running	250 000	WG1 and WG3
Finland	User-oriented development of acoustic environment	Valtteri Hongisto valtteri.hongisto@ttl.fi	Approved and running	1 000 000	The aims align with WG1 (quantities, target values) and WG2 (psychological effects)
Germany	Sustainable Buildings of the Future-Meeting Energy and Demographic Challenges	Michael Vorländer (mvo@akustik.rwth-aachen.de)	Approved and running	1 Mio	WG2: laboratory tests on subjective perception of sound insulation
Italy	Integrated system for innovation in building acoustics: DBA (Data Base Acoustic)	fabio.scamoni@itc.cnr.it	pending	300000	WG1 - WG3
	support to noise mitigation actions for buildings near an airport	fabio.scamoni@itc.cnr.it	approved and running	60000	WG1 - WG2
Serbia	Integration and harmonization of sound insulation in buildings in the context of sustainable housing	emijic@etf.rs	running	400.000	WG2, WG3
Spain	SUBJECTIVE EVALUATION OF NOISE ANOYANCE INSIDE DWELLINGS	M ^a Angeles Martín Bravo	pending	22700	WG2
	Prediction of noise transmitted through partitions and flanking paths: application to the Spanish ceramic/brick constructive solutions	María Machimbarrena	pending	108000	WG1 and WG3
Sweden	AkuLite	klas.hagberg@sp.se	Running	2 700 000	Sound, vibration and Springiness in light weight structures (development of criteria)
	SBUF Optimized sound requirements	Christian Simmons (info@simmons.se)	Running	50 000	Sound req's on residential buildings
	AcuWood	klas.hagberg@sp.se	Running	270.000	Sound, vibration and Springiness in wooden structures (development of criteria)
Turkey	INVESTIGATION OF SOUND INSULATION DESCRIPTORS FOR TURKEY BASED ON A FIELD STUDY	Selma Kurra	Running	44,000 Euros (107,845 TL)	The context of this study is directly related to COST TU0901 - however the study will be conducted for existing conditions in Turkey.
United Kingdom	ERACO "STAR" project - linked with Sweden and Belgium	se.smith@napier.ac.uk	Approved	300,000 (UK)	Links approaches in Sweden and Belgium regarding retrofit of existing housing and energy and sound insulation - products and systems and best practice - robust approaches