The International Colloquium on Stability and Ductility of Steel Structures

Organized by

Sponsors:
BSE, but, sadly, after the sudden death of Professor Beer. This is the basic idea was to organize several series of travelling colloquia, with sessions located in different areas of the world. The first series was organized in 1976-1977, with sessions in Tokyo, Liege and Washington, and, further on, the world wide circuit continued.

In October 1982 the Department of Steel Structures and Structural Mechanics of the Politehnica University of Timisoara organized one of the East-European Sessions of the 3rd International Colloquium on Stability of Steel Structures; it was followed by other two sessions, organised in 1983 in Tokyo and Paris.

In July 1997 at the Asian Session of the 6th Colloquium, the name of the events was changed into International Colloquium on Stability and Ductility of Steel Structures. Next, the European Session was organised in September 1999, again in Timisoara and it was followed by those in Budapest (2002), Lisbon (2006) and Rio de Janeiro (2010). The 2016 edition of SDSS is jointly organized by the Politehnica University of Timisoara, Department of Steel Structures and Structural Mechanics in co-operation with the Romanian Academy - Timisoara Branch, with the support of the European Convention of Constructional Steelwork (ECCS), through the Structural Stability Technical Committee (TC8), and the Structural Stability Research Council (SSRC).

270 authors from 26 countries on 5 continents are contributing with 115 scientific papers and 4 Keynote Lectures, covering 9 topics.

Since the revision of structural Eurocodes has been already started in Europe, and both stability and ductility of steel structures issues are on the desk of the drafters, this event enables the exchange of knowledge and experience in the field and the debate around the best solutions offered, and is therefore a useful opportunity for all the participants.

On behalf of the SDSS’2016 Organizing Committee, we express our gratitude to Keynote Speakers and authors, to the members of the International Scientific Committee and to all the participants in this international scientific event.

We also appreciate the support of the Technical Committee 8 within the European Convention of Constructional Steelwork (ECCS) and of the Structural Stability Research Council (SSRC).

We are warmly welcoming you!

Acad. Dan Dubina
Chairman of SDSS’2016

Prof. Viorel Ungureanu
Scientific Secretary of SDSS’2016
Timisoara, May 2016
### GENERAL PROGRAMME

#### Sunday, 29.05.2016
- **Arrival of participants**
  - 17:00 – 19:00 Registration (Central Library main hall)

#### Monday, 30.05.2016
- **08:00 – 09:30** Registration (Central Library main hall)
- **09:00 – 10:00** Opening Session (Alexandru Rogojan room)
- **09:15 – 10:00** Keynote Session 1 (Alexandru Rogojan room)
- **10:00 – 10:30** Coffee Break
- **10:30 – 13:00** Parallel sessions
  - **Session 1: Advanced structural design** (K1 room)
  - **Session 7.1: Seismic-resistant structures** (K2 room)
- **13:00 – 14:00** Lunch
- **14:00 – 15:00** Keynote Session 2 (Poli room)
- **15:00 – 16:15** Parallel sessions
  - **Session 3.1: Lightweight steel constructions** (K1 room)
  - **Session 7.2: Seismic-resistant structures** (K2 room)
- **16:00 – 16:30** Coffee Break
- **16:30 – 18:00** Parallel sessions
  - **Session 3.2: Lightweight steel constructions** (K1 room)
  - **Session 5.1: Plate, shell and space structures** (K2 room)
- **20:00 – 22:00** Welcome Reception (Casa Poli 2)

#### Tuesday, 31.05.2016
- **08:00 – 09:00** Registration (Central Library main hall)
- **09:00 – 09:30** Keynote Session 3 (K1 room)
- **09:15 – 10:00** Parallel sessions
  - **Session 3.3: Lightweight steel constructions** (K1 room)
  - **Session 9.1: Tubular constructions** (K2 room)
- **10:00 – 11:00** Coffee Break
- **11:00 – 13:00** Parallel sessions
  - **Session 2.1: Connections** (K1 room)
  - **Session 5.2: Plate, shell and space structures** (K2 room)
- **13:00 – 14:00** Lunch
- **14:00 – 15:00** Keynote Session 4 (K1 room)

#### Wednesday, 01.06.2016
- **09:00 – 10:00** Parallel sessions
  - **Session 6: Robustness** (K1 room)
  - **Session 4.1: ECCS TC8 Stability** (K2 room)
- **10:00 – 11:00** Coffee Break
- **11:00 – 12:15** Parallel sessions
  - **Session 3.5: Lightweight steel constructions** (K1 room)
  - **Session 4.2: ECCS TC8 Stability** (K2 room)
- **13:00 – 13:45** Closing session
- **13:45 – 14:00** Lunch

#### Thursday, 02.06.2016
- **08:15 – 18:00** Post-conference tour
# DETAILED PROGRAMME OF SESSIONS

## Monday, 30.05.2016

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Registration (Central Library main hall)</td>
<td></td>
</tr>
<tr>
<td>09:30</td>
<td>Opening Session (Alexandru Rogojan room)</td>
<td></td>
</tr>
</tbody>
</table>

### Keynote Session 1 (Alexandru Rogojan room)

**Chairman:** D. Grecea

- 10:30 – 10:45 Coffee Break
- 10:45 – 12:45 Parallel sessions
  
#### Session 1: Advanced structural design (K1 room)

- **Chairmen:** R.D. Ziemen & C. Chiorean
- 1. R.D. Ziemen, J.C.B. Abreu: Benchmark problems for design by advanced analysis - Members subject to major and minor-axis flexure
- 2. J. Brodiansky: Elastic critical buckling mode as imperfection on frame with non-uniform cross-section along the members with imperfection according EN 1993-1-1 clause 5.3.2 (11)
- 4. L. Schueremans, L. Driesens, J. Meylenmans, J. De Cock: Using advanced numerical models to estimate the fire safety of truss frame structures made out of cold-formed steel
- 5. R. Chacón, R. Zorrilla, N. Uribe, C. Duñó: Steel bridge launching analysis using advanced numerical simulations
- 6. F. Blaga, P. Alexa: Statics and kinematics in structural dynamic response to wind action
- 7. G. Di Lorenzo, A. Formisano, R. Landolfo: Structural efficiency assessment of hot-rolled steel profiles

#### Session 7.1: Seismic-resistant structures (K2 room)

- **Chairman:** M. Iwata & L. Tirca
- 1. J.P. Judd: Spectral-matched ground motions for seismic performance assessment
- 2. J.P. Judd: Seismic collapse risk of steel-concrete composite moment-frame buildings
- 7. L. Tirca, M. Bosco, N. Lin, L. Lin: Modelling strategy for the seismic response of a moment resisting steel frame building
- 8. M. Stoian, H. Köber: Eccentrically braced frames equipped with vertical truss elements

### Keynote Session 2 (Poli room)

**Chairman:** D. Dan

- 14:00 – 15:00 S.-L. Chan, Y.P. Liu, S.W. Liu: Research, theory and practice of second order direct analysis for design of steel and composite structures

### Lunch

### Parallel sessions

#### Session 3.1: Lightweight steel constructions (K1 room)

- **Chairman:** M. Iwata & L. Tirca
- 1. P. Keerthan, M. Mahendran, S. Wanniarachchi: Shear tests of rivet fastened rectangular hollow flange channel beams with web openings
- 2. Zs. Nagy, R. Ballok: Local and global stability analysis of CFS structural members with particular shapes using spot welding technology
- 4. T. Misiek, G. Huck, S. Käpplein: The “combined approach” for the design of shear diaphragms made of trapezoidal sheeting
- 5. A. Lendvai, A.L. Joó: Test based finite element development for diaphragm action

#### Session 7.2: Seismic-resistant structures (K2 room)

- **Chairman:** Y. Kimura & P. Alexa
- 4. H. Köber, M. Stoian: The use of reduced cross-sections in asismatic structures
- 5. P. Alexa, A. Mathe: Energy state of multi-story structures equipped with passive protection

- 16:15 – 16:45 Coffee Break
### Parallel sessions

**Session 3.2: Lightweight steel constructions**
(K1 room)
Chairmen: C.D. Moen & M. Georgescu

1. B.H. Smith, A. Chatterjee, S.R. Arwade, C.D. Moen, B.W. Schafer: Benefits of load redistribution to the reliability of a cold-formed steel joist-supported floor system
2. E. Steau, M. Mahendran, P. Keerthan: Web crippling tests of rivet fastened rectangular hollow flange channel beams under two-flange load cases
3. R. Ároch, J. Brodniansky: Comparison of different Eurocode verifications of a thin-walled member portal frame
4. F. Meza, S. Cheng, J. Becque, I. Hajirasouliha: Experimental investigation of the cross-sectional stability of cold-formed steel built-up columns
5. E.L. Ayrumyan, N.I. Kamenshchikov, M.A. Liplenko: Stability and load-bearing capacity of the light gauge cold-formed purlins at the slope roofs

**Session 5.1: Plate, shell and space structures**
(K2 room)
Chairmen: H. Unterweger & I.J. Balaz
1. H. Unterweger, A. Taras: Transversal load introduction into unstiffened girder webs - Proposal for a simplified Eurocode-compatible design check
2. D. Abdelkarim, L.G. Vigh, P. Hegyi, B. Kövesdi: Experimental analysis of monotonic and cyclic behaviour of longitudinally stiffened girders
3. R. Abspoel: Plate girders under bending
4. I.J. Baláž, Y.P. Koleková: Distortion and torsion of experimental box-girder calculated using analogy with bending
5. J. Ndogmo, M. Mensinger, I. Both: Buckling behavior of stiffened plate under biaxial compression

**Session 5.2: Plate, shell and space structures**
(K2 room)
Chairmen: J.M. Rotter & F. Guarracino
3. M. Vathi, S.A. Karamanos: Elephant's foot buckling and imperfection sensitivity of internally pressurized thin-walled metal cylinders subjected to bending
4. Ö. Zeybek, C. Topkaya, J.M. Rotter: Design requirements for intermediate ring stiffeners on discretely supported cylindrical steel shells
5. E. Brunesi, R. Nascimbene, J.M. Rotter: Influence of structural openings on the buckling strength of cylindrical shells under axial compression

### Keynote Session 3 (K1 room)
Chairman: V. Ungureanu

**Welcome Reception**

**Tuesday, 31.05.2016**

**Registration**

08:00 – 09:00

**Parallel sessions**

**Session 3.3: Lightweight steel constructions**
(K1 room)
Chairman: S. Ádány & M. Kotelko

**Session 9.1: Tubular constructions**
(K2 room)
Chairman: L. Gardner & A.M. Gresnigt
1. S.H.J. van Es, A.M. Gresnigt, D. Vasilikis, S.A. Karamanos: Experimental and numerical investigation of the bending capacity of spiral-welded steel tubes
2. A.M. Gresnigt, S.H.J. van Es, D. Vasilikis, S.A. Karamanos: Strain-based design procedures for spiral-welded steel tubes in combined walls
3. M. Pavlović, M. Veljković: Initial imperfections for FEA of tubular beams based on validated experiment results
4. Y. Huang, B. Young: Experimental investigation of cold-formed ferritic stainless steel tubular X-joints

09:30 – 10:45

09:45 – 11:15 **Coffee Break**

11:15 – 13:00 **Parallel sessions**

**Session 2.1: Connections**
(K1 room)
Chairman: L.S. da Silva & A. Stratan
1. L. Gödrich, F. Wald, L. Šabatka, M. Kurejková, J. Kabelčák: To prediction of the connection deformation capacity by component based finite element method
2. C. Zhu and K.J.R. Rasmussen: Column web buckling component analysis
3. C. Vulcu, K. Lee, A. Stratan, C. Maris, D. Dubina: Bolted beam to column joints with haunches: Experimental and numerical investigations
shear resistance of bolted connections for tubular racking structures
6. T. Misiek: Assessment of locking devices for bolted connections – experimental study and evaluation for practical application
7. M. Botlić, J. Brodniansky: Simplified methodology of stress calculation in slip-joint connections

Chairman: (K1 room)

Session 3.4: Lightweight steel constructions
Chairman: L. Dunai & V. Stoian
2. C.G. Chiorean, S.M. Buru: Nonlinear inelastic analysis of 3D composite steel-concrete frameworks with partial shear connection
4. A. Gliszczyński, T. Kubik: Layer arrangements influence on buckling, post-buckling and collapse of channel section composite profile
5. P. Keo, H. Somja, Q.H. Nguyen, M. Hijaj: Buckling resistance of hybrid steel-concrete column
7. I. Vayas: Models for stability analysis and design of steel and composite plate girders

Chairman: F. Dinu

Parallel sessions
Session 3.4: Lightweight steel constructions (K1 room)
Chairman: J. Machacek & M. Nedelcu
1. P. Hegyi, L.P. Kollár, L. Dunai: Critical stresses of steel plate elements on elastic foundation subjected to compression
2. A. Sato, S. Ito, T. Ono: Buckling mode and elastic buckling strength estimation of corrugated light-gauge panel under shear loading
4. J. Ye, I. Hajirasouliha, J. Becque, J. Lim: Optimisation of cold-formed steel sections for maximum energy dissipation capacity and strength
5. Z. Kolakowski, T. Kubik: Influence of the distortional-lateral buckling mode on the interactive buckling of short channels
6. T. Misiek: Assessment of locking devices for bolted connections – experimental study and evaluation for practical application
7. M. Botlić, J. Brodniansky: Simplified methodology of stress calculation in slip-joint connections

Chairman: F. Wald & H. Kober

Session 2.2: Connections
1. D. Ayhan, B.W. Schafer: The effect of M/V ratio on ledger-framing performance of cold-formed steel buildings
2. C.D. Moen, F. Tao, R. Cole: Monotonic and cyclic backbone response of single shear cold-formed steel screw-fastened connections
3. M.A. El Aghoury, E.A. Amoush, A.M. El Hady: Strength of cold-formed steel frame base connections
4. G. Sarracco, G. Della Corte and R. Landolfo: Finite element model vs. Experimental test results for compound columns and their exposed base plate connections
5. A. Florio, V. Ungureanu, A. Ciutina: Behaviour of over-roofing structures with semi-rigid column-base connections

Coffee Break

1615 – 1815 Parallel sessions

Session 8: Steel-concrete composite members and structures
Chairman: L. Dunai & V. Stoian
2. C.G. Chiorean, S.M. Buru: Nonlinear inelastic analysis of 3D composite steel-concrete frameworks with partial shear connection
4. A. Gliszczyński, T. Kubik: Layer arrangements influence on buckling, post-buckling and collapse of channel section composite profile
5. P. Keo, H. Somja, Q.H. Nguyen, M. Hijaj: Buckling resistance of hybrid steel-concrete column
7. I. Vayas: Models for stability analysis and design of steel and composite plate girders

Conference Banquet
Wednesday, 01.06.2016

09:00 – 10:45  Parallel sessions

Session 6: Robustness (K1 room)
Chairman: R.G. Driver & A. Ciutina

1. A. Jamshidi, R.G. Driver: Experimental assessment of connection response in composite floor construction following a column loss
2. F. Dinu, I. Mărginean, D. Dubina, C. Neagu: Experimental evaluation of progressive collapse resistance of steel moment frame connections
3. F. Dinu, I. Mărginean, D. Dubina, I. Petran, M. Pastrav, A. Sigauan, A. Ciutina: Experimental testing of 3D steel frame with composite beams under column loss
4. F. Dinu, I. Mărginean, A. Sigauan, A. Kovacs, E. Ghicoiu, D. Vasilescu: Effects of close range blasts on steel frames. Experimental testing and numerical validation
6. I. Both, R. Zaharia, I. Mărginean, C. Neagu, F. Dinu and D. Dubina: T-stubs response to extreme loading

Session 4.1: ECCS TC8 stability (K2 room)
Chairman: H. Snijder & R. Stroetmann

2. P.B. Dinis, D. Camotim, V. Preto: Behaviour and design of short-to-intermediate hot-rolled steel angle columns
3. M. Kucukler, L. Gardner, L. Macorini: Stiffness reduction method for the in-plane design of steel frames
4. R. Chacón, E. Mirambell, E. Real: Analysis of steel members using FEM and Big data
6. M. Kása, M. Ebel, M. Kraus, M. Kucukler: Flexural buckling behaviour considering different residual stress approaches
7. J. Lindner, A. Just, U. Kuhlmann: Bow imperfections for flexural buckling according to Eurocode 3 Part 1-1

10:45 – 11:15  Coffee Break

11:15 – 12:45  Parallel sessions

Session 3.5: Lightweight steel constructions (K1 room)
Chairman: M. Casafont & R. Zaharia

1. F. Roure, T. Peköz, J. Bonada, M.R. Somalo, M.M. Pastor, M. Casafont:...

Session 4.2: ECCS TC8 stability (K2 room)
Chairman: A. Bureau & M. Knobloch

1. H.H. Snijder, R.P. van der Aa, H. Hofmeyer, B.W.E.M. van Hove:...

13:00 – 13:15  Closing session

13:15 – 14:15  Lunch

Stiffness of welded brace to lipped channel column joints: An experimental and numerical approach
2. Zs. Nagy, V. Ungureanu, D. Dubina, R. Ballik: Experimental investigations of cold-formed steel trapezoidal beams of screwed corrugated webs
3. M. Nedecul: Adaptation of the Ayrton-Perry formula for the global-distortional-local buckling of thin-walled members
4. V. Ungureanu, M. KoteIlko, J. Grudziecki, A. Floricel, D. Dubina: Plastic behaviour of thin-walled cold-formed steel members under eccentric compression
5. O. Svoboda, J. Machacek: Slender steel arch stabilized by a textile membrane
6. M. Georgescu, V. Ungureanu: Optimization of trapezoidal sheet geometry by improving stiffeners distortional behavior
7. S. de Miranda, D. Melchionda, V. Ungureanu, D. Dubina: Buckling analysis of steel rack-section members by the GBT-based ECBL approach

Design imperfections for steel beam lateral torsional buckling
2. R. Stroetmann: Stabilizing of I-beams with discrete intermediate torsional restraints
3. N. Schillo, M. Feldmann: Experiments on the rotational capacity of beams made of high strength steel
4. B. Launert, M. Rhode, H. Pasternak, T. Kannengießer: Welding residual stresses in high-strength steel. Experimental results
5. R. Ebel, C. Scandella, M. Fontana, M. Knobloch: Member buckling behaviour of high-strength steel in fire
Tuesday, 31.05.2016  
(Poli room)

**Session 10: SAFEBRICTILE (RFSR-CT-2013-00023)**  
Standardization of Safety Assessment Procedures across Brittle to Ductile Failure Modes

<table>
<thead>
<tr>
<th>Time</th>
<th>Duration</th>
<th>Topic</th>
<th>Presenter/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:00</td>
<td>20 min</td>
<td>SAFEBRICTILE project: Overview</td>
<td>Luís Simões da Silva, University of Coimbra, Portugal</td>
</tr>
<tr>
<td>15:20</td>
<td>25 min</td>
<td>Semi-probabilistic safety assessment procedure and Safety assessment procedure for $\gamma_M$</td>
<td>Andreas Taras, ECCS</td>
</tr>
<tr>
<td>15:50</td>
<td>25 min</td>
<td>Conceptual development of a platform for the collection and maintenance of a European Database</td>
<td>ArcelorMittal</td>
</tr>
<tr>
<td>16:20</td>
<td>30 min</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>16:50</td>
<td>30 min</td>
<td>International perspective on safety and coding outside Europe</td>
<td>Richard Liew</td>
</tr>
<tr>
<td>17:30</td>
<td>25 min</td>
<td>New design methods 1 – Modes driven by plasticity</td>
<td>Eindhoven University of Technology, The Netherlands</td>
</tr>
<tr>
<td>18:00</td>
<td>25 min</td>
<td>New design methods 2 – Modes driven by stability</td>
<td>University of Coimbra, Portugal</td>
</tr>
<tr>
<td>18:30</td>
<td>25 min</td>
<td>New design methods 3 – Modes driven by fracture</td>
<td>University of Stuttgart, Germany</td>
</tr>
<tr>
<td>19:00</td>
<td>25 min</td>
<td>Safety assessment of the EC3 design rules</td>
<td>Luís Simões da Silva, University of Coimbra, Portugal</td>
</tr>
</tbody>
</table>
ACCOMPANYING PERSON'S PROGRAM

Date and time: Monday, May 30 | 10.00 – 15.00
**TIMISOARA SIGHTSEEING TOUR** (walking tour of the city center, the Metropolitan Orthodox Church, Catholic Dome)
The group will meet at the Registration Desk at 09.45. The group will have lunch together in the city center.
*For registered accompanying persons this program is included in the registration fee.*

Date and time: Tuesday, May 31 | 10.00 – 15.00
**Visit to the Art Museum at the Baroque Palace, Banat Village Museum, Mall Shop Area.**
The group will meet at the Registration Desk at 09.45. The group will have lunch together in the city center.
*For registered accompanying persons this program is included in the registration fee.*

**POST CONFERENCE TOUR**
Date and time: **Thursday, June 2 | 08.15 – 18.30**
The post conference tour is a full one day trip to **Alba Iulia**, a city in Transylvania, located on the Mureş River. Since the High Middle Ages, the city has been the seat of Transylvania’s Roman Catholic diocese. Between 1541 and 1690 it was the capital of the Principality of Transylvania.
The group will meet in front of the Faculty of Electrical and Power Engineering (Conference Venue) Bd. Vasile Parvan no. 2 at 08.00.
*For registered accompanying persons this program is included in the registration fee.*

**SOCIAL PROGRAMS**

*Welcome Reception*
Date and time: Monday, May 30 | 20.00 – 23.00
Venue: **Casa Poli 2** (address: Bd. Mihai Eminescu, no. 11, Timisoara)
Dress code: casual
*For registered participants and accompanying persons this program is included in the registration fee.*

*Conference Dinner*
Date and time: Tuesday, May 31 | 20.00 – 23.00
Venue: **Sky Restaurant** (address: Str. Coriolan Brediceanu, no. 10, 6th floor, City Business Centre Building, Timisoara)
Dress code: formal
*For registered participants and accompanying persons this program is included in the registration fee.*