# 76th CEEES Meeting, online meeting
# 30th November – 1st December 2021
# Announcement and Call for Registration

**PROGRAM**

**November 30th, 2021**

***09.30 – 13.00 TAB Reliability and Environmental Stress Screening, R&ESS***
Welcome by Giulio D'Emilia, A.I.VE.LA.
TAB Chairperson Henry Grzeskowiak, ASTE
13.00 – 14.00 Lunch Break

***14.00 – 16:30 TAB Mechanical Environment, ME***
TAB Chairperson David Richard, SOE
16:30 – 17.00 Coffee Break

***14:00 – 16:30 TAB Climatic and Air Pollution Effects, C&AP***
TAB Chairperson Thomas Reichert, GUS
16.30 – 17.00 Coffee Break

***17.00 – 19.00 General Assembly***
– Chaired by Thomas Reichert, CEEES President

**December 1st, 2021**

***09.00 – 12:00 Round Table – Environmental engineering: new challenges for testing and for materials***
*Chaired by Giulio D'Emilia, A.I.VE.LA.*
With experts from CEEES, AIVELA and Department of Mechanics, Mathematics and Management,
12.00 Wrap up and end of the meeting

**Host**

A.I.VE.LA., the Italian member of CEEES, promotes this event with the aim of supporting a fruitful exchange of experiences, knowledge and research hints. People involved in topics of environmental engineering - but not only - are networking in Europe and in CEEES.
In order to reach this aim, the participation of interested people to both Technical Advisory Boards (TAB) and to the Round Table is very much appreciated.

**Registration**

To each TAB, General Assembly and Round Table a separate invitation link will be send to the registered person. Therefore, a formal registration is necessary.
The participation is free for all CEEES Members (Members of the member association of CEEES).
The organizing committee invites speakers. Impulse presentations from participants for the TABs or Round Table should be announced with the registration (short abstract).

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**76th CEEES Meeting**
**Draft agenda for R&ESS Technical Advisory Board – Online Meeting**
**30.11.2021, 9:30 – 13:00 CET**
**Chairpersons: David Delaux, Henry Grzeskowiak**

1. **Stress-Strength approach** (presentation to a paper presented at ESREL 2021)
   by Marco BONATO (VALEO, LJC), ASTE

2. **H2 (Hydrogen) problems in transportation (automobile; trucks; buses; railways; planes)**
   by Daniel LEROY president of ASTE

3. **Reliability and Functional Analysis of IMU systems under environmental stress screening**
   Lorenzo Ciani and Gabriele Patrizi; University of Florence, (A.I.VE.LA)

4. **Batteries**
   a. Test issues:
      i. Types of tests – severities / security aspects (tbc)
      ii. Means of testing; Miguel MAROUS (IMV, ASTE)
      iii. Reliability aspects: state of the art of reliability assessment: provisional-experimental-operational with a representative of FIDES France (tbc)
      iv. Requirements for vibration testing of large floor mounted batteries of Battery Electric Vehicles (BEV) Benedikt Plaumann, (Hamburg University of Applied Sciences, GUS)

5. **Round table (approximately 11:40 to 12:40):**
      i. E.g. Standards: ISO 19453-6: current vibration coupling test plan
      ii. Other topics arising

6. **CONCLUSION of the TAB (12:40)**
   Summary of:
      i. Emerging ideas
      ii. Actions retained

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**76th CEEES Meeting**
**Agenda for ME Technical Advisory Board – Online Meeting**
**30.11.2021, 14:00 – 16:30 CET**
**Chairperson: David Richards, SOE**

1. Matters Arising From Previous Meeting

2. Presentation on the proposed new IEC 60068-2-68 test procedure for multi-axis and multi-exciter vibration testing. The national bodies, which participate in IEC Technical Committee 104, agreed over a year ago to proceed with a new project to develop a new test procedure (IEC 60068-2-68) on multi-axis and multi-exciter vibration testing. For a number of reasons it has taken some time to develop the scope and intent of that procedure. A proposal is about to be made available to the IEC TC104 project team which sets out a feasible way forward. This presentation is intended to provide visibility of that proposal and allow participants to provide inputs.

   i. Background and reason for the new test procedure

   ii. Existing test procedures and common issues

   iii. The intended uses of the new procedure

   iv. The types of vibration test to be encompassed

   v. The proposed way forward.

   vi. Open discussion

3. Update on the revision of IEC 60721-2-6 Classification of environmental conditions. Environmental conditions appearing in nature. Earthquake vibration and shock.

4. Update on the new technical report IEC TR 62131-8 Environmental conditions, Vibration and shock of electro-technical equipment. Transportation by ship.

5. Any Other Business

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**76th CEEES Meeting**
**Agenda for C&AP Technical Advisory Board – Online Meeting**
**30.11.2021, 14:00 – 16:30 CET**
**Chairperson: Thomas Reichert, GUS**

## Atmospheric Corrosion

**Trend of one-year atmospheric corrosion rate of copper exposed in Europe**
Namurata Pålsson; RISE Research Institutes of Sweden, Department Corrosion (SEES)

## Solar Radiation Experiments and Standards

**Laboratory Weathering Automotive Standards**
Artur Schönlein, (GUS)
Weathering, irradiation – weather factors, testing methods of the automotive industry, outdoor weathering– reference climates, stress factors, laboratory weathering xenon technology, metal halide technology (MHG), current standardization projects (new reference sun).

**Standards on solar radiation, weathering and UV**
N.N, Jorrit Hillaert, Rycobel (PLOT)
- Difference between the tests in terms of Physics of Failure
- Test capabilities
- Experiences with the different tests

**Presentations from A.I.Ve.LA to be implemented in the TABs/Round Table**

Starting Presentation in Round Table Discussion

**Physical simulation test for the reliable design of manufacturing processes**

Maria Emanuela Palmieri, Department of Mechanics, Mathematics and Management, Polytechnic of Bari (mariaemanuela.palmieri@poliba.it)

**Abstract:** Physical simulation is a powerful tool able to reproduce a real thermo-mechanical manufacturing process at the laboratory scale.

This presentation focus on the application of physical simulation (using Gleeble 3180 system) to reproduce both rapid thermal cycles typical of laser material processing and thermo-mechanical cycles typical of hot-stamping processes. A case study of Press-Hardening process of an automotive component will be shown in detail with the aim of defining the optimal process parameters to obtain desired mechanical properties. For this purpose, different thermo-mechanical cycles have been carried out for different values of process parameters. Moreover, hardness test and tensile test combined with digital image correlation technique (using Aramis 3D provided by GOM) have been performed on samples. Such tests allowed to evaluate the mechanical properties at the end of the physical simulation tests. The proposed approach can be exploited to design a real Press-Hardening process in an efficient and reliable way.

Presentation 3 in Reliability TAB draft:

**Reliability and Functional Analysis of IMU systems under environmental stress screening**

Lorenzo Ciani and Gabriele Patrizi; University of Florence, lorenzo.ciani@unifi.it

**Abstract:** Nowadays, the Micro Electro-Mechanical Systems (MEMS) are widely employed in both consumer and industrial applications. One of the most important fields adopting MEMS device is the inertial measurement sector, where this kind of technology is employed to produce Inertial Measurement Unit (IMU), that are typically composed by a triaxial accelerometer, a triaxial gyroscope, and a triaxial magnetometer. This presentation is focused on a test procedure for Environmental Stress Screening (ESS) to determine any mechanical and electrical weakness or early degradation in a MEMS-based inertial measurement unit, when subjected to mechanical vibration and thermal cycling temperature tests.

Presentation 5 in Reliability TAB:

**Requirements for vibration testing of large floor mounted batteries of Battery Electric Vehicles (BEV)**

Benedikt Plaumann; Hamburg University of Applied Sciences, Department Automotive and Aeronautical Engineering, benedikt.plaumann@haw-hamburg.de

**Abstract:** This contribution shows an analysis of vibration measurement on large floor-mounted traction batteries of Battery Electric Vehicles (BEV) from some pre-study measurements for a larger test campaign plan. The focus lies on the requirements for a realistic replication of the mechanical environments in a testing laboratory. Especially the analysis on global bending transfer functions and local corner bending coherence indicate that neither a fully stiff fixation of the battery nor a completely independent movement on the four corners yields a realistic and conservative test scenario.

The contribution will further show what implication these findings have on future vibration & shock testing equipment for large traction batteries. Additionally, it will cover a look on the needed frequency range regarding potential fatigue damage. For this, a Fatigue Damage Spectrum (FDS) on the measured signals is used with respect to potential faults of the batteries.

Presentation in Climatic TAB:

**Trend of one-year atmospheric corrosion rate of copper exposed in Europe**

Namurata Pålsson; RISE Research Institutes of Sweden, Department Corrosion, namurata.palsson@ri.se

**Abstract:** This presentation focuses on corrosion of copper, which has been exposed for one year in 1987, 1997, 2002, 2011, 2014 and 2017 at several test sites in Europe. Atmospheric variables, including $SO_2$, $NO_2$, $O_3$, $HNO_3$, temperature, relative humidity, amount of precipitation, pH of precipitation, particle deposition and PM10, were also monitored to evaluate their effect on one-year corrosion rate of copper. The results indicate that general trend of one-year mass loss of copper lessened from 1987 to 2017, in which a drastic decrease was observed from 1987 to 1997, particularly at industrial zones. Linear regression analysis suggests that only $SO_2$, relative humidity and pH of precipitation exhibit strong effect on one-year mass loss of copper. Higher $SO_2$ and relative humidity lead to higher atmospheric corrosion of copper, while lower copper mass loss was observed when pH of precipitation increases.