



**49, RUE DE LA BIENFAISANCE - 94300 VINCENNES - FRANCE**

SA. AU CAPITAL DE 152 449 € – RCS CRETEIL B 316 719 855  
SIRET 316 719 855 00025 – CODE APE 7112B - TVA : FR54 316719855  
TÉL. : 33 - (0)1.43.28.10.43 – FAX : 33 – (0)1.43.65.43.37

### **EMC + LPS Training and Consultancy Combo**

Any Industrial Plant has its electronic operation disturbed by Lightning and/or Electromagnetic Interference.

How often it happens depends:

- on a risk evaluation addressing these phenomena and the protective measures so implemented;
- and on a proper skilled staff to deal with it in a day-by-day basis as modifications are always been introduced in the Plant.

**SEFTIM** answers for this modern situation presenting pioneer proposal named **EMC + LPS Training and Consultancy Combo**, which is carried out through a 3 days days service at the Plant addressing **Staff Training on LPS** – Lightning Protection System and **EMC** – Electromagnetic Compatibility, for one hand, and the actual **Risk Evaluation of the Plant** regarding these aspects, on the other hand.

**Days 1 and 2 are devoted to the seminar according to the attached brochure.**

**Days 3 is for consultancy**

For a more dedicated seminar, it is possible to perform consultancy first and then the 2 days training will take your site as an example.



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## Days 1 and 2 : lightning and EMC seminar



### **EMC AND LIGHTNING PROTECTION SEMINAR A TWO DAYS SEMINAR TO SOLVE YOUR PROBLEMS**

#### **WHY EMC AND LIGHTNING PROTECTION (LP) IN A SINGLE SEMINAR?**

Facilities may be endangered by lightning, surges and interference of any type (EMC). In addition, lightning can cause a hazard for people and environment. Lightning and EMC are in fact interconnected because the magnetic disturbances due to lightning are one cause of damages considered by EMC and more generally a minimum EMC background is requested for implementing an efficient lightning protection scheme (as indicated in IEC 62305-4 "The design of SPM should be carried out by experts in lightning and surge protection who possess a broad knowledge of EMC and installation practices." Furthermore, earthing and grounding is a critical topic for both LP and EMC. SEFTIM has then decided to propose this new 2 days seminar, problem solving oriented, that includes lightning and EMC (1 day for each).

#### **OBJECTIVES FOR EMC PART: "EMC AND THE GROUNDING/EARTHING SYSTEM FOR THE CONTROL OF INTERFERENCES IN FACILITIES"**

A significant reduction of the risks and costs, associated with problems of damage and/or interference in electrical/electronic installations, is ensured with the improvement of the level of electromagnetic protection of premises, justifying a systematic treatment in this area.

The preservation of equipment and signals is characterized by the term Electromagnetic Compatibility (EMC) applied to a specific installation, and the essence of this electromagnetic compatibility will be translated in its own Grounding/Earthing System. In this seminar they are presented the **EMC techniques**, through concepts and practical examples, aiming at the phases of:

- **Project** – with the purpose to predict and resolve potential situations for the occurrence of interference problems;
- **Maintenance** – with the purpose to ensure the EMC performance over time, including the identification and solution of situations of risk that may be present.

#### **OBJECTIVES FOR LP PART: "EMC AND THE GROUNDING/EARTHING SYSTEM FOR THE CONTROL OF INTERFERENCES IN FACILITIES"**

New lightning protection standards published by IEC in 2006 for Edition 1 and in 2010 for Edition 2 are significantly different from previous ones.



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The main relevant IEC standards are mainly:

- 62305-1: generalities
- 62305-2: risk assessment
- 62305-3: lightning protection of structures
- 62305-4: lightning electromagnetic influence (shielding, bonding, surge protection devices) on equipment

But these standards also refer to others standards such as IEC 61643 series for surge protective devices.

Purpose of the seminar is to present the new standards and in particular the main points and the things which are completely new (such as protection of the edge of buildings, protection of buildings above 60 m, high frequency earthing measurement, new risk method, SPDs Type 1 and Type 2 ...).

The seminar presents only the key items in order to deal with specific examples and keep enough time for the questions/answers.

This seminar is designed to allow the attendees whatever their job to know the various elements of the lightning protection chain: risk study, technical study, installation, initial verification. Thus, a contractor will know what led to the design of the protection means that he is installing and the technician in charge of design will know the difficulties that meet the contractor in practice. The attendee will master the basic rules of their profession to minimize the risk of errors and will know the main elements of the standards of the domain governing their activity.

#### **AUDIENCE. WHO SHOULD ATTEND?**

This seminar is intended for engineers and technicians who work directly or indirectly with electric/electronic facilities of automation, instrumentation, telecommunications or computer science and any type of industrial facilities such as oil&gas, chemistry, power generation, renewable energy etc.

#### **ORGANIZING COMMITTEE, INFORMATION:**

You have questions?

Our team is at your disposal:

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## **SEMINAR CONTENT**

### **Day 1: EMC**

#### **1 - The Grounding/Earthing System and its relationship with Electromagnetic Compatibility**

Electromagnetic Compatibility (EMC)  
Reduction of risks regarding EMC  
The purposes of the Grounding/Earthing System

#### **2 - The Grounding/Earthing System and its relationship with the Power System**

Different electrical Neutral schemes  
Earth electrode system  
Requirements for project and implementation

#### **3 - The Grounding/Earthing System and its relationship with lightning protection**

External protection {LPS}  
Internal Protection {EMC}  
Surge protection {SPD}

#### **4 – The Grounding/Earthing System and its relationship with signal transmission**

Protection against Magnetic Fields and the use of cable shield  
Protection against Electric Fields and the use of cable shield  
Protection against Common Mode Noise ("Ground Loops") and the use of cable shield

#### **5 - Complementary aspects regarding EMC in Facilities**

EMC regulatory requirements for equipment – CE Marking  
Power quality  
Architectural Shielding (rooms)

#### **6 - Engineering Procedures for EMC and the Grounding/Earthing System**

Project and Installation: Interference Control Plan  
Maintenance: EMC Procedures



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## **Day 2: LIGHTNING PROTECTION**

### **1 - Introduction to lightning:**

Generalities (IEC 62305-1)  
Lightning effects

### **2 - Introduction to Lightning Risk Analysis (IEC 62305-2):**

Why do an analysis?  
What result to expect  
Example of a simple case analysis

### **3 - Lightning protection system**

Different types of Lightning Protection System (IEC 62305-3): Isolated and non-isolated systems  
Mesh Cage, Stretched Wire, Lightning and striking rod  
Down-conductors and isolated cables  
Lightning earthing systems Type A and B, foundation earth  
People protection  
Storm detection (Thunderstorm Warning Systems and application to risk management)  
Lightning Protection Components: IEC 62561 standards  
Separation distance: how to use it  
Equipotentiality

### **4 – Surge Protective Devices**

Equipotential bonding SPD (Type 1, IEC 62305-4, IEC 61643-12 and 22)  
How to select an SPD and its protection device (disconnecter)  
Coordinated SPDs (Type 2)  
Installation rules  
SPD for telecom and data systems Type 1 SPDs (

### **5 – Maintenance of the LPS**

Testing and visual inspection  
Earthing measurements low and high frequency  
How and when to control a Lightning Protection System?  
Do and don't



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## **CONTRIBUTORS**

### **Fernanda CRUZ**

- Over 30 years of experience in lightning and surge protection
- Member of the European and International Standards Committees for lightning protection and surge
- Former chairman of the Portuguese standardization committee lightning protection and surge arresters for 20 years
- Lightning Protection Specialist from Mons University
- Level 4 Qualifoudre trainer
- Engineer Qualifoudre level 3



### **Roberto MENNA BARRETO**

- Founder and manager partner of QEMC Brazilian consultancy company in the area of EMC, including Cyber Security EM Protection of IT facilities against TEMPEST and EMP
- Founder and manager partner of QALAB, the first EMC Consultancy company in Brazil.
- EMC measurements, studies and design of protective measures for Electronic/Telecommunications systems in Portugal and Africa.
- President of CENELEC Portuguese Standardization Committees CTE 210 (EMC)
- Member of "The dB Society" (USA).



### **Alain ROUSSEAU**

- Over 30 years of experience in lightning and surge protection and standardization
- Chairman of the French standardization committee for lightning and surge protection
- Chairman of the European CENELEC standardization committee for lightning and surge protection
- Chairman of the International IEC standardization committee for surge protection
- Convener of the International IEC groups in charge of surge protective devices application rules and storm detection
- Expert Qualifoudre level 4
- Level 4 Qualifoudre trainer





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### Day 3: EMC + LPS state and site risk evaluation - CONSULTANCY

The preservation of equipment and signals is characterized by the term Electromagnetic Compatibility (EMC) applied to a specific installation, and the essence of this electromagnetic compatibility will be translated in its own Grounding/Earthing System.

Lightning and EMC are in fact interconnected because the magnetic disturbances due to lightning are one cause of damages considered by EMC and more generally a minimum EMC background is requested for implementing an efficient lightning protection scheme (as indicated in IEC 62305-4 "The design of SPM should be carried out by experts in lightning and surge protection who possess a broad knowledge of EMC and installation practices.")

#### a) EMC + LPS Site Survey – on site

To be held on site, as a Workshop in the Job, for measurements and studies of existing facility.

- **EMC + LPS System Topology**, including the study of the grounding system, the cabling layout, the protective measures which are already implemented, the historical of interference problems and/or equipment damages;
- **Power Quality Evaluation** regarding its main characteristics (voltage, frequency, voltage surges) in reference to European standard EN50160, based on a exploratory measurement;
- **Measurement of Electromagnetic Field** intensity in most representative points of the installation:

#### b) EMC + LPS Study – at the SEFTIM office

- **EMC Analysis** addressing the existing situation to identify the mechanisms involved that could cause electromagnetic interference or damage in sensitive equipment, and the protective measures for their solutions.
- **Lightning Risk Analysis** to evaluate the risks and equipment to be protected as well as the need protection levels.

#### c) Report – at the SEFTIM office

The results of the measurements and EMC + LPS Further Studies will be presented in a **Technical Report**, where it is developed an analysis of the values found regarding the possibility of causing electromagnetic interference and/or damage to equipment installed, concluding with the Settling of protective measures and procedures to be deployed for the solution of critical situations identified.