PROJACS ACADEMY
by egis

Advanced Materials for Construction and Repair of Concrete Structures

مواد التشييد الحديثة وإصلاح الهياكل الخرسانية

28 August – 01 September 2023

Dubai / U.A.E.

Introduction

The most astounding challenge facing engineers and scientists to-date has been in the development of new, advanced construction and repair materials. The new technology of polymer composites, initially used by the aircraft industry, has now found its way to the construction industry and is bound to have a huge impact on the way structures are built and repaired.

Advanced materials with superior qualities require the collective efforts of engineers, chemists, physicists together with economists and aestheticians. If this can be done in a really imaginative way, then the future opportunities are enormous. The concept of recycled buildings is already attracting attention and the idea is probably not mere fiction.

Objectives

By the end of this course practitioners shall learn to:

- Specify the resources of distress of concrete Skelton.
- Specify the methodology for repair and restoration.
- Specify the advanced material which he will use for repair.
- Knowing the properties, advantages, and disadvantages for using the advanced materials in construction.

Who Should Attend?

- Construction engineers and construction consultants who study the structural safety of concrete buildings.
- Materials specialists.
- Quality control and quality assurance experts.
- Construction engineers, supervision and contractors.
- Architects who seek to expand their knowledge of the methods of repair and materials used in modern construction.
- Engineers involved in design, supervision, construction or planning.

Course Outline

Day One

Concrete as an old and new material

- Concrete as an old material
- Properties of concrete
- types of concrete
- Properties of steel
- The development of reinforced concrete structure
- Concrete with admixture
    - Types of admixtures
    - Advantages of admixtures
    - Disadvantages of admixtures.
    - Situations you should use admixtures.
    - Situations you should avoid using admixtures.
- Concrete with polymers
    - Types of polymers
    - Advantages of polymers
    - Disadvantages of polymers.
    - Situations you should use polymers.
    - Situations you should avoid using polymers.

Day Two

Engineering Analysis of Structural Defects and Failures

- Causes of deterioration of structures
    - Global reasons
    - Local reasons
    - Case studies
- Shape of distress
    - Skelton type
    - Wall bearing type
- Analysis of the cracks and defects
    - Visual inspection
    - Field tests
    - Laboratory tests
- Solved examples of defects

Day Three

Repair of structural element

- Testing of the deteriorate structure
- Propping of the defected elements
- Repair of columns using traditional material and advanced material.
- Repair of beams using traditional material and advanced material.
- Repair of slabs using traditional material and advanced material.
- Repair of cracks using traditional material and advanced material.

Day Four

New materials for construction

- Fibre reinforced polymers (advantages and disadvantages).
- Using FRP as a reinforcement (advantages and disadvantages)
- Using FRP as a repair material
    - Advantages
    - Disadvantages
    - Method of application for various type of structural elements
- Grancrete as a replacement of cement
    - Grancrete properties
    - Advantages and disadvantages
    - Applications
- Self-compact concrete
- High strength concrete

Day Five

New systems for construction

- Sandwich panel structures
- Coffour system
- M2 system
- Composite construction
- How to make a structural report for structural safety problems?

Training Method

- Pre-assessment
- Live group instruction
- Use of real-world examples, case studies and exercises
- Interactive participation and discussion
- Power point presentation, LCD and flip chart
- Group activities and tests
- Each participant receives a 7” Tablet containing a copy of the presentation, slides and handouts.
- Post-assessment

Program Support

This program is supported by interactive discussions, role-play, case studies and highlight the techniques available to the participants.

Schedule

The course agenda will be as follows:

- Technical Session 08.30-10.00 am
- Coffee Break 10.00-10.15 am
- Technical Session 10.15-12.15 noon
- Coffee Break 12.15-12.45 pm
- Technical Session 12.45-02.30 pm
- Course Ends 02.30 pm

Course Fees*

- **3,200 USD**
  **VAT is Excluded If Applicable*

المقدمة

كان التحدي الأكثر إثارة للدهشة الذي يواجه المهندسين والعلماء حتى الآن هو تطوير مواد بناء وإصلاح جديدة ومتقدمة. التكنولوجيا الجديدة لمركبات البوليمر، التي استخدمتها صناعة الطائرات في البداية، وجدت الآن طريقها إلى صناعة البناء ولا بد أن يكون لها تأثير كبير على طريقة بناء الهياكل وإصلاحها.

تتطلب المواد المتقدمة ذات الصفات المتفوقة جهودا جماعية للمهندسين والكيميائيين والفيزيائيين جنبا إلى جنب مع الاقتصاديين وعلماء الترميم. إذا كان من الممكن القيام بذلك بطريقة خيالية حقا، فإن الفرص المستقبلية هائلة. يجذب مفهوم المباني المعاد تدويرها الانتباه بالفعل وربما لا تكون الفكرة مجرد خيال.

الاهداف

في نهاية هذه الدورة سوف يتمكن المتدربون من:

- تحديد مصادر العطب والتدهور في الهياكل الخرسانية.
- تحديد منهجية الإصلاح والترميم.
- تحديد المواد المتقدمة التي سيستخدمها للإصلاح.
- معرفة خصائص ومزايا وعيوب استخدام المواد المتقدمة في البناء.

الحضور

- مهندسي الإنشاءات واستشاريو الاعمال الانشائية ودراسة السلامة الانشائية للمباني الخرسانية.
- أخصائيي المواد.
- خبراء مراقبة الجودة وضمان الجودة.
- مهندسي الإنشاء والإشراف والمقاولين.
- المهندسين المعماريين الذين يسعون إلى توسيع معرفتهم بطرق الإصلاح والمواد المستخدمة في الانشاء الحديثة.
- المهندسون المشاركون في التصميم أو الإشراف أو البناء أو التخطيط.