Concrete in the Arabian Peninsula Today - Using the Benefits of Modern Technology while Avoiding the Problems

INTRODUCTION

This program examines the many advances in concrete materials and practices technology that have occurred over recent years, together with how they can provide considerable benefit and ensure the construction of long-lasting, durable structures. Additionally, the programme uses some of the presenter's experiences as a concrete materials consultant to identify failures, defects or deterioration that can often be caused by incorrect concrete practices and/or inappropriate selection of materials - particularly those developed using modern technology. Also examined will be some of the confusions that often exist regarding the use of modern materials - and how they can sometimes lead to conflict and controversy.

PRESENTER

Mr. Paul Jeffs
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Based in Ontario, Canada, Paul Jeffs is an independent consultant who for the last 12 years has specialized technical advice and services for the design, construction, restoration and protection of concrete and masonry structures. Prior to forming PJ Materials Consultants Limited he was employed for over 25 years within the construction industry around the world. In 1976 he transferred from England to Bahrain, living there for three years. During this time he was involved in many construction projects throughout the Arabian Peninsula, including the UAE, Saudi Arabia, Kuwait and Qatar. In 1978 he moved to Japan and established a regional basefrom where he became involved in projects throughout South East Asia, including the Philippines, the Republic of Korea, Hong Kong, Taiwan, Indonesia, Singapore and Malaysia.

PROGRAM

Modern Concrete - is it really more durable?

- In this opening topic the evolution of concrete through the ages is reviewed and some of the many and various changes in materials and practices that may help to provide the answer are evaluated.

What is High Performance Concrete and can anyone produce or achieve it?

- Confusion often exists regarding the true meaning of High Performance Concrete and particularly regarding whether or not it can be satisfactorily produced using locally available materials and skilled workforce. In this topic, the technology is demystified, the benefits explained and the dangers highlighted.

How important is curing and how does it affect durability?

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Cracking - is it a growing phenomenon?

- The primary causes of cracking are generally well known and they have been thoroughly researched. This topic reviews the primary causes of cracking, but also examines reasons why this phenomenon may be on the increase.

Why micro silica can be beneficial - but sometimes disastrous

- This topic will highlight these benefits, but also explain some concerns that could cause failures if not well understood and considered during construction and repair.

Self Compacting Concrete - A New Revolution?

- Highly flowable concrete has been available for several decades. However, it is only recently that advances in technology have permitted the development of concrete that requires no vibration at all and does not provide any significant segregation or separation problems.

Is there a realistic chloride threshold level for corrosion initiation?

- This topic will explain the relevance of a threshold figure that actually initiates corrosion of reinforcing steel and reviews the important parameters that need to be considered. It also highlights some of the dangers to be avoided when using chloride content data to develop restoration strategies.

Do we need to measure and monitor corrosion activity?

- Decisions are often taken to repair deteriorated concrete without fully evaluating the effects of hidden corrosion activity. This topic reviews the current investigation techniques that are used for measuring and monitoring corrosion activity and examines whether or not the information provided is meaningful and useful - or whether it is just a waste of money!

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Reinforcement for Concrete - What are the Options?

- In an aggressive environment traditional uncoated steel has long been known to be susceptible to early corrosion and epoxy coated steel has increasingly been favoured for many projects. However, doubts regarding the latter's performance have been expressed by many authorities who are now considering alternatives, such as frp, stainless, galvanised and special steels.

How clean should rebar be before concrete placement - are we missing the point?

- Although most specifications require reinforcement to be free of deleterious materials at the time of concrete placement, many experts claim that bond between concrete and steel is improved by some surface rust. This topic reviews whether this claim can be justified - but it also introduces other concerns that are often over-looked and are more important.

The Concrete Finishing Process

- Finishing freshly placed concrete to produce a dense, attractive surface is a process that requires great skill. However, the use of modern materials and equipment for placement has significantly affected the finishing processes and today's tools and practices have evolved based on several influencing factors. This topic looks at the various factors and reviews good and bad practices.

Fibre reinforcement - does it really stop cracking?

- A variety of claims are often made by proponents of fibre reinforcement for concrete and mortars - particularly that they permit the reduction or elimination of reinforcing steel, reduce or eliminate shrinkage, and/or permit reductions in concrete thickness. This topic reviews where some claims have proven to be accurate, while others have not been justified.

Non-shrink grouts, mortars and concrete - do they exist?

- This topic examines misconceptions and facts regarding the properties provided by so-called "non-shrink" materials. The way in which different materials provide their shrinkage-reducing properties is reviewed, together with the cautions that should be considered concerning their use.

Shake-on hardeners - learning from past mistakes

- There is no doubt that the use of shake-on surface hardeners most often improves durability of floor surfaces - particularly wear and abrasion resistance. However, this topic will review case studies to illustrate how they can sometimes fail to perform well - and how inadequate application and materials can require expensive remedies.

Decorative Concrete

- This final topic will review the latest techniques for producing decorative concrete – including the use of patterns, imprints, acid staining dyes, exposed aggregate and more.