

Bridge to Schools Workshop

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Abstract: *A workshop group activity designed to introduce school children to civil engineering. Involving the assembly of a 15-metre long cable stayed bridge over which they can walk. Conference delegates will be able to join in with the workshop activity along with a team of local schoolchildren. The activity aims to make children more aware of some of things that engineers do and hopefully opens their eyes to the world of civil engineering. The activity will allow delegates to contribute to the further development of the activity and suggest how similar activities could be used to inspire the next generation of engineering in this and cognate disciplines*

Introduction



A successful project

Development

The original idea for this activity was suggested by Chris Grey of C D Gray and Associates, during his Chairmanship of Institution of Civil Engineers Wales (ICE). Funding was secured from the ICE and the first bridge "kit" was designed and fabricated in 2006.

The inaugural activity was held at Oakfield Primary school in St Mellons, near Cardiff in June 2006 when thirty, 10 year old pupils from donned fluorescent jackets and hard hats to build the 15-metre long cable stayed bridge. On completion, the pupils were able to test their work by walking across the bridge. Graduate civil engineers from local firms were in attendance to help with the erection and to provide professional engineering role models for the young children.

The popularity of the activity with both schoolchildren and teachers led to the fabrication of two additional bridges which were deployed in West and North Wales.

All three Schools Bridges were fully operative in 2008 and 2009 and the numbers of pupils who took part in the activity are shown below.

Region	Number of Pupils		Number of Schools	
	Year 2008	Year 2009	Year 2008	Year 2009
South and East Wales	3514	3713	72	83
North Wales	900	2021	30	68

Context

The decline in the numbers of schoolchildren attracted to the study of science, technology, engineering and mathematics based (STEM) curriculum has been recognised by UK government agencies, industrialists and HE institutions. Concern about this fall in numbers has led to a series of initiatives geared towards creating a strong supply of scientists, engineers and technologists. STEM curriculum is undergoing development throughout the UK. The Welsh Assembly report 21st Century Higher Education Strategy Plan for Wales "For our Future" also highlights "the importance for the Welsh economy of developing stronger high-level skills and leading-edge research in science, technology, engineering and mathematics".

The Bridge to Schools project activity therefore attempts to address the problem of raising awareness of the importance of STEM curriculum in the minds of teachers and pupils. This is achieved by a practical workshop involving the construction of a 15m span cable stayed bridge which effectively allows young and impressionable schoolchildren to learn about the application of their curriculum in the "real world". In addition, the opportunity is taken to introduce the range of functions and careers available in construction, including the professional engineering sector.

Methodology

The activity is normally undertaken by children in groups of maximum 30 with ages ranging from 9 to 14. A session takes approximately 90 minutes, with the introduction being tailored to the age range of pupils present.

The conference activity will consist of a workshop where delegates will have the opportunity to join a team of fellow delegates and construct one half of the bridge. The other half of the bridge will be constructed by a team of schoolchildren from a local primary school.

Workshop delegates will therefore have the opportunity to experience the activity from the learners' perspective and feedback on how effective they think the activity is in achieving the stated learning outcomes and inspiring the next generation of engineers. Delegates will be able to discuss with the presentation team the lessons learned in presenting this activity to schools and feedback will be sought from participants as to how similar activities could be designed for inspiration across cognate disciplines.

Workshop timetable:

1. Introduction / brief: 15 minutes
2. Erection of bridge by delegates and schoolchildren: 50 minutes
3. Open discussion, questions reflection and feedback 20 minutes

Learning outcomes

Individuals taking part in the activity will have the opportunity to:

Appreciate the differing roles within the construction industry including the concept of the professional civil engineer, the contractor and the consultant.

Construct a substantial structure using simple “hands on” methods

Develop an understanding about Health & Safety issues

Take responsibility for their actions

Develop team interaction skills.

Grow in confidence and self esteem by taking part.

Understand the action of forces on a simple structure

Enhance their learning in a range of National Curriculum subjects, including

Maths: counting, calculating, estimating

Design & Technology: planning, manual dexterity

Science: properties of materials



The activity has great flexibility, limited only by the imagination of the presenters. Learning outcomes for older pupils aligned to developing analytical skills associated with science and maths at AS and A level stages could also be addressed.

Feedback from schools

Feedback from teachers and pupils has been very positive with high scores for achievement of the objectives and the understanding of the importance of civil engineering to everyday life. Some of the comments received are listed below:

‘A very positive experience for all our pupils of whatever ability. (Glenboi Primary)

‘The session is fabulous at developing communication and team building skills. It also provides an opportunity for pupils to understand what jobs are involved in engineering. A very worthwhile activity.’ (St Gwladys)

‘An excellent opportunity for the pupils at Abercerdin. Lots of skills used and developed throughout the session. All staff excellent with the pupils.’ (Abercerdin Primary)

‘It was such a worthwhile workshop it gave pupils a great insight into the world of work – they developed their ‘working together’ skills and it was great to see less academic pupils fully involved and making valued contributions. Thanks!’ (Nottage Primary)

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