Case Study Reference: IEM01/2010/002	*these case studies highlight actions we are taking to reduce our carbon footprint within the Environment Agency, including benefits and lessons learnt*

Radcot Carbon Reduction Case Study

Background

The **Radcot Weir** project is one of five sites in the Paddle and Rymer package. The main construction work at Radcot involves removing the existing Paddle & Rymer structure and replacing it with a dipping radial gated weir. This will benefit operators of the weir through the removal of H&S risk, easier operation and standardisation of the weir. In addition the project will provide a new bypass channel to allow upstream and downstream movement of fish and provide recreational use for canoeists.

Reducing the Carbon Footprint

Using the EA Construction Carbon Calculator, the total carbon footprint of the Radcot weir project is ~ 600 tonnes. The most significant contributions are from concrete and steel. The project team by looking at material selection have saved around ~ 50 tonnes of CO_2 during the first phase of works.

Use of Granular Ground Blast Furnace Slag (ggbs) in concrete
50% ggbs replacement was used in the base and 70% in the rest of the structure. This saved around 40 tonnes of CO_2 (a saving of over 60% when compared to a CEM1 concrete).

Re-use of material
The old structure was demolished and then crushed onsite, this material was then used underneath the blinding instead of a primary aggregate saving both the cost and carbon of disposal of the material and the import of primary aggregate. This saved around 5.2 tonnes of CO_2, resulted in 40 less lorry movements and saved ~£10K.

Avoiding waste
The team are casting the coping stones for the structure on site by using the left over concrete from the back end of the concrete pours which would normally be wasted. The coping stones are being produced over time meaning that no extra concrete is ordered for their production saving around 1.2 tonnes of CO_2 and around £2-3K.

Additional benefits

The big win from the project was the use of ggbs as a replacement in the concrete, this also has many other benefits apart from the saving in CO_2 including lighter colour (desirable in this case), lower early thermal cracking, higher strength development over time and increased durability and increased workability. A potential disadvantage was noted as slower early strength development/ longer striking time which can increase construction programme hence only 50% replacement being used in the base, but in this case the concrete typically achieved a strength of 30N/mm^2 at seven days.

These reductions are from only half of the project, the second phase which starts next year is estimated to save at least an equivalent amount resulting in a final saving of around 100 tonnes which is almost 20% of the estimated project footprint as well as potentially £25K in costs. For future projects, the team is looking at saving further CO_2 by potentially reducing the criteria for crack control steel reinforcement.

Prepared by: Gary Haley
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Further information available from Gary Haley or Andrew Powell