

Meaningful Learning Experiences

Strategic Commitment	✓	Part of a regional, ESF-funded 'Careers Local' programme
Curriculum Provision	✓	Support for learning in a 'difficult' KS3 maths topic
Employer Partnerships	✓	Developing an existing school/employer link
Reflective Young People		
Informed Career Choices	✓	Presenting a range of roles in Civil Engineering

KS3 students challenged with calculations for major civil engineering project

East Leake Academy is located on the Loughborough side of Nottingham and is part of the Diverse Academies Learning Partnership. The head of Key Stage 3 maths provided a brief for year 8 about Space, Shape and Measures, '*... in particular anything that can bring to life any of the following that students find difficult: Scale drawings and bearings, area and perimeter, estimating measures, volume and surface area ... So that students are confident with the above skills, can link them to real-life applications and see the differences as well as the links between topics e.g. the difference between area and perimeter and the links between them.*'

CR Civil Engineering is located just down the road from the school. The firm had won a contract to build the car part at Market Harborough train station. Students were challenged to calculate the minimum number of trucks required to transport waste and construction materials to and from the construction site, to reduce local disruption and demonstrate the firm's commitment to the 'Considerate Constructors' programme and standards.

Students were sent the architect's plans and dimensions and the specification for building up the car park surface. Their work was recorded in a logbook prepared by the maths team and then sent across to the firm. CR Civil Engineering provided feedback at an assembly for the whole year group, involving their training manager, quantity surveyor and the managing director. They described the range of roles at his growing firm, as well as showing the completed car park, and announced the students who would be invited for a JCB experience day at their head office and training site.

Benefits for the Students

- *'It showed us how we could use maths in reality ... I didn't know you could use it in Engineering'*
- *'It was different. So, whether it was easier or harder, it was still more fun than a normal maths lesson ... We were learning not just about maths, but about careers and Engineering'*
- *'I enjoyed learning how to be in a group and not arguing with everyone and we've learned different skills ... how to communicate without having a go at each other'*
- *'... more of a reason to get more work done'*

Benefits for the School

- The project helped to develop the school's existing relationship with a local employer, showing how they could have an impact on a whole year group of students
- This was one of five curriculum projects that were set up to provide exemplars for subsequent CPD activity aimed at engaging other teachers and subject areas
- Resources created for this project enable sharing with other schools in the MAT
- *'I am really chuffed! I have tried to whittle them down but still have 20!'*

Benefits for the Employer

- *'They all put a lot of effort into it. They took it quite seriously, which is nice to see'*
- *'It's a real-world project. It's putting theoretical maths they've been learning over past years and putting into something that is real and tangible'*
- *'It promotes CR Civil Engineering on its own merit and it also gives back to the community'*
- The groups selected for the quality of their work were invited on site for a 'JCB experience', creating a PR opportunity, as well as a fun reward for the students

CR Civil Engineering - Engineering Challenge

Given:
The car park is 827m² and we need to lay 500mm down to use that area to transfer 500mm into meters:
 $827 \times 1000 = 0.827$ and then we do $827 \times 0.05 = 41.35$ so we need to remove 41.35 x 36m³ of waste for the turning circle we do the same so:
 $570 \times 0.1000 = 0.57 \times 874 = 498.18$ m³ of waste
a truck can carry 8.5 m³ of waste so we do:
 $41.35 + 498.18 = 539.53$ then divide that by 8.5 to get 63.47 trucks needed to remove waste.

Volume of each material:

Material	Area of surface	Depth in m	Volume
Surface asphalt	874m ²	0.04	34.96m ³
Binder Asphalt	874m ²	0.10	87.4m ³
Aggregate	874m ²	0.37	323.38m ³

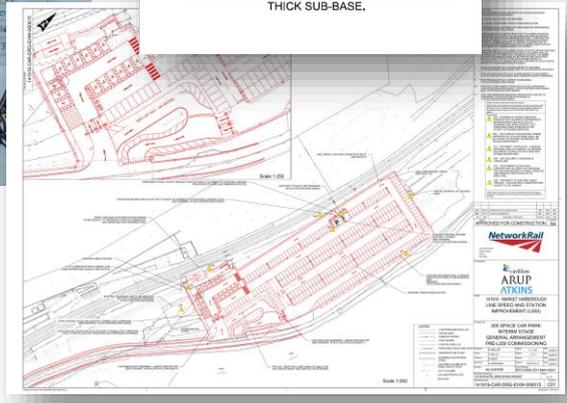
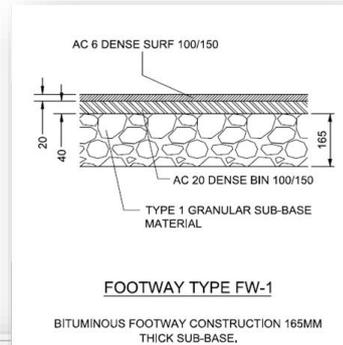
Bus turning circle material:

Material	In. mm	In. cm	In. m
Surface Asphalt	20mm	20	0.02
Binder Asphalt	100mm	100	0.10
Aggregate	370mm	370	0.37

Volume of each material:

Material	Volume (m ³)	Weight (tonnes)
Surface asphalt	34.96	124
Binder Asphalt	87.4	293.5
Aggregate	323.38	1079.0

CR Civil Engineering LIMITED



Year 8 students were challenged by a local civil engineering firm to apply learning in maths about 'space, shape and measures'. The company had recently won a contract to build a train station car park and students had to calculate the minimum number of trucks needed to remove waste and bring in construction materials – helping to minimise disruption on the community and demonstrate the firm's commitment to the 'Considerate Constructors' scheme.