

JCB Involvement with a Mechanical Engineering Design and Build Project

Alan Curtis, Research Engineer with JCB, July 2008

This case study describes how JCB has been involved with design and build projects at Wolfson School of Mechanical and Manufacturing Engineering, Loughborough University. Links to CS1 and CS22.

Reasons for engagement

Alan is a Loughborough graduate who studied Mechanical Engineering at Wolfson School and is keen to support the department with relevant projects for the students. "It is my way of giving something back, I have had a good experience throughout University and in my engineering career. I understand what it is that students want and hope my involvement will provide a better future for engineering." Alan has support from JCB in engineering education projects and the company actively look to support engineering in any way. "There is an ethos and culture at JCB which promotes supporting and developing engineers." JCB are also keen to identify talent, for the good of British engineering. It also allows JCB graduate engineers to develop themselves and work towards Chartership (see Willmot – CS22).

The engagement

Alan worked with a group of final year MEng students on their design project. JCB supported the group of 4 final year students, to design a test rig to measure airflow characteristics on their engine cylinder heads. JCB provided the funding for the design and build project, they had identified they needed

this work to be undertaken and could have used consultants but preferred to involve the students. "I had completed a pilot project myself a few years ago as an undergraduate, so I knew what sort of project would be suitable and so that's why I felt confident to go forward with it." Alan's expectations for the project were exceeded "what I expected at the start and what I thought the project would involve was a lot less than what the students actually did and what they produced at the end, so that was a really good outcome, the results for the project were excellent." The students gave regular feedback on their progress and delivered presentations to staff at JCB.

Issues

"I don't think the department prepares academics well for working with industrialists." Companies tend to want things done their way and unless they get this they will not get involved. Often the academic requirements are not aligned with what industry want. "When I have been involved with projects in the department I am often asked back at work, 'what's happening? what's the progress on this?' and I have had to get a response and feed that back whereas in a workplace environment that sort of

thing is a continuous thing I don't know whether that should be brought in as part of the module, making sure you are acting in a professional manner and the importance of keeping everyone informed."

Benefits

One of the reasons the project was so successful was because JCB supported it so heavily, it was something that they really wanted to do, they didn't set it just for the sake of setting the project, so the return on that was that the outcome was excellent. The group project has far exceeded expectations, if small and medium sized companies knew how much they could get from being involved with the students and their group projects they would be keen to be involved (the work JCB needed could have gone to a design consultancy but Alan feels that the consultants would have had the same results and been less thorough). "I have had a great experience working with the students and they have put a lot of hard work in to the project."

Industrialist perspective

JCB has benefited massively from this relationship. The final product has been delivered to JCB and has been commissioned and is now being used to characterise cylinder heads for prototype engine builds. The dynamic and open minded approach which has been given by the students has resulted in a first class product. The rig will allow in house testing to replace external testing which will increase product knowledge and significantly reduce costs in this area of engine development.

From a personal point of view, Alan feels that the benefits are intangible. "There is a sense of satisfaction working with able minded individuals. The projects have allowed me to demonstrate interpersonal skills through various channels with the University. I think it's great to be able to work alongside and inspire young engineers".

Reflections

"I think I would have made it clearer at the start what I expected in terms of deliverables." Alan met with the academics and agreed how things would work, he wanted additional requirements on top of the module requirements which had to be negotiated e.g. documents and reports which would have to be written by the students for the project. "I think we had quite a good hold on making sure the project was progressing but there were certain instances where we relied on the University to be developing and pushing it forward and it was evident that in those periods things weren't happening at the pace you would expect them to, that is something, which as a former student, isn't taught particularly well, I don't know if you can teach it, how to prepare yourself for industry but that is one of the key things because things do have to keep moving." Alan wonders whether modules which are going to involve industry should revisit the way in which the modules are assessed and delivered and that they should perhaps be developed with an industrial representative on board to make sure that they are satisfying both the academic and industrial requirements.

Context

Alan Curtis is currently working as a Research Engineer at JCB Power Systems. Alan Graduated from Loughborough University in 2006 with a 1st class MEng degree in Mechanical Engineering. Alan was able to secure sponsorship from JCB for his degree which included a one year industrial placement. Alan was short listed for the SET Student of the Year awards 2005 and presented work at the houses of parliament on two occasions, once winning a prestigious prize.

As a registered Engineering Ambassador with both the IMechE and STEMNET, Alan devotes time to developing young engineers. This ranges from small design

problems set to young school students, through Young Engineers clubs and the Engineering Education Scheme to University based projects. Alan represents JCB and recent graduates on the engCETL advisory board.

JCB is the world's third largest manufacturer of construction equipment by volume and has 18 plants on four continents: 11 in the UK, three in India and others in the USA, China, Germany and Brazil. The company employs more than 9,000 people worldwide. In 2007 the company enjoyed its best ever year when turnover increased to a record £2.25 billion and profits stood at an all-time high of £187 million. The success was achieved as the company sold more than 72,000 machines, another record which saw year-on-year sales increase by 30 per cent. At the same time, the company's share of the world construction equipment market rose to 12 per cent, up from 10.4 per cent in 2006. While JCB retained its position as the world's third largest construction equipment manufacturer by volume, it closed the gap on second place significantly. JCB retained its position as the world's number one backhoe loader manufacturer, producing one out of every three machines sold globally. JCB was also the world number one manufacturer of telescopic handlers in 2007.

