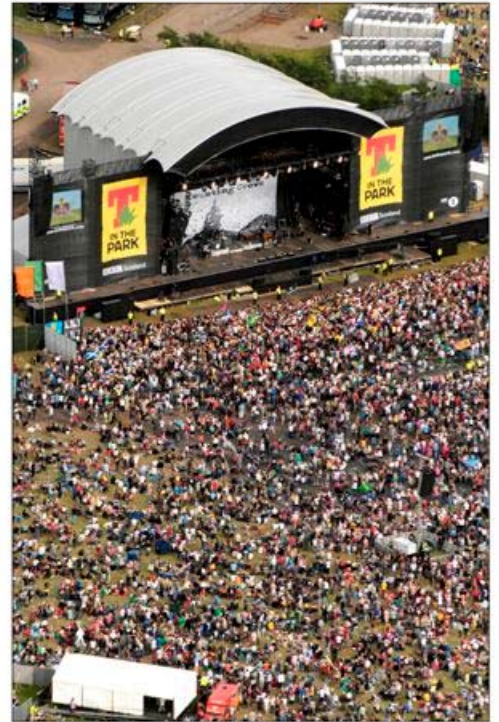


Flushed with success of competition

Background

For 3.5 days in mid-July, a field near Balado in Perth & Kinross hosts the "T in the Park" festival and in doing so becomes the 6th largest urban conurbation in Scotland, with an estimated population of 90,000 in 2009. This naturally presents some logistical challenges, not least for those tasked with providing temporary toilet facilities. Portakabin supplies ~1300 individual toilets to the festival site, each having a storage capacity of between 30 and 50 gallons. Every 2-3 hours between 8am and 2am the following day, every one of these ~1300 toilets is emptied. This is done by lifting the toilet on its hinge to reveal the storage tank. A 2 inch bore hose is then inserted into the tank and the contents are drawn out by vacuum pumping into a 1200 gallon capacity tanker before ultimately transferring to a sewerage treatment works. If the waste was only 'biological' in nature, the process above would run very smoothly. However, the toilets are used as part toilet / part rubbish bin. Despite notices and appeals to the contrary, waste actually found to have been thrown into the toilet includes baby wipes & nappies, sanitary products, clothing, dropped mobile phones, glasses, cotton towels, paper towels – even a used portable BBQ tray! The waste that cannot be sucked out by the powerful vacuum pump is manually screened and lifted at the point of emptying. The rest (including much of this non-biological waste) is sucked up the pipe and into the tanker.



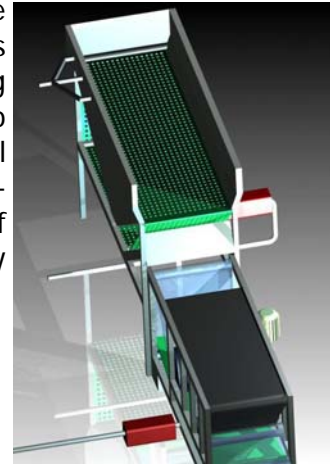
This presents a problem at the point of disposal in the Scottish Water treatment works. Most toilet waste from households travels down the main sewerage system and spends sufficient time on this journey that by the time it reaches the sewerage works, only 2% of it is classified as 'heavy' or 'solid' waste. This is easily screened and treated. The waste presented to the treatment works from T in the Park within hours of it being deposited into the waste system is closer to 4% heavy waste (and will include the T-shirts, nappies etc originally thrown in). This is too high a percentage figure for a treatment works to manage effectively. The treatment works can (at a push) handle heavy biological waste up to 10mm in diameter but ideally, it should be no more than 6mm in diameter. Delivering all waste to the treatment works at 6mm or even 10mm granularity isn't feasible using the current process, because much of this 'non-biological' waste remains behind. What is needed can best be described as a 'mobile waste separation, screening and treatment plant' which remained stubbornly elusive as an 'off the shelf' purchase.

Business Need

How CeeD helped

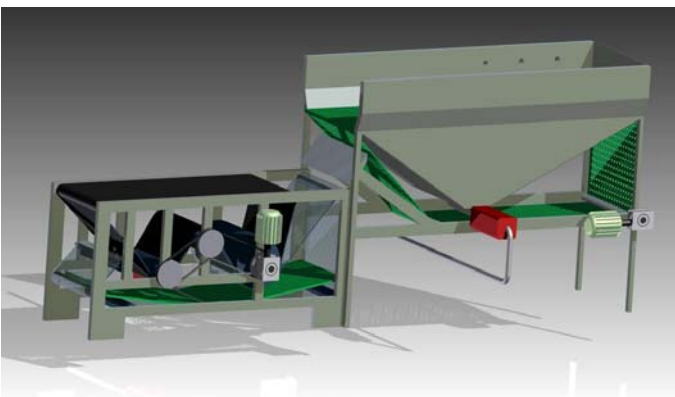
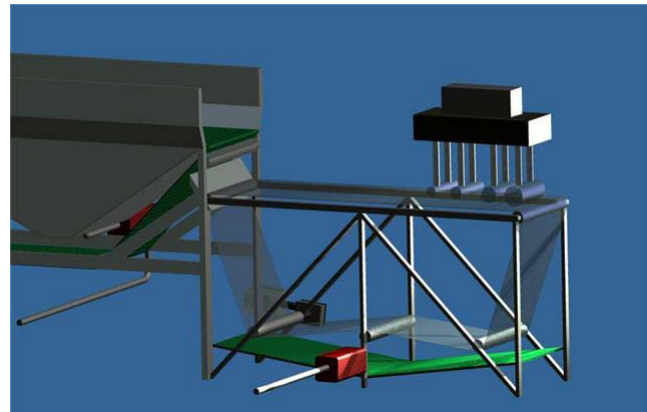
CeeD's key role is to help and support companies to solve the operational challenges

they face. Since this particular problem was unique and required some new thinking, an engineering design competition was proposed which would challenge some of the brightest engineering undergraduates at the CeeD member Universities (Glasgow, Glasgow Caledonian, Strathclyde and UWS) as well as those studying through our further education colleges (James Watt, Reid Kerr and Stow) to devise and deliver a real world solution to a real world problem. So CeeD's "Real Engineering" Competition was born, sponsored by Portakabin in 2009. Over a 9-month period, competition entries were devised and reviewed by a panel of judges including representatives from Portakabin, CeeD, Strathclyde University and Glasgow School of Art's Product Design course.

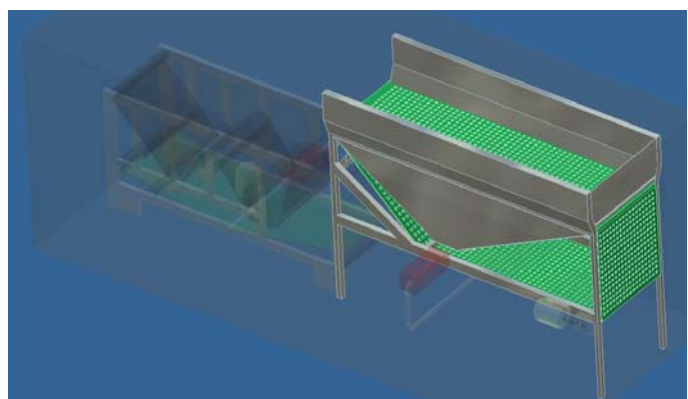


Results

In February 2010 following final design submissions and presentations by the shortlisted entries, two students from Strathclyde University triumphed. Andrew Smith and Stuart Davidson (aka "Team Strathy") 4th year chemical and mechanical engineering undergraduates respectively picked up a cheque for £1000 and a driving experience day for each at Knockhill. The judges were particularly impressed by the innovation shown by Team Strathy's solution while keeping the overall solution simple by using off the shelf components wherever possible, ensuring that the 'real world' application had been given sufficient consideration. The business case for the solution is currently being assessed by Portakabin.



CAD generated images show the winning design of a 2-stage filtration process contained in a 20ft container.



Portakabin's View

Commenting on the competition, Portakabin's Managing Director George Finlayson said,

"CeeD's idea of an engineering design competition for students really appealed to Portakabin. The combination of T in the Park and the obvious toilet humour meant it would really appeal to the students too! The judges were extremely impressed by the standard of all the entries, which clearly showed the application of engineering knowledge to a real world problem. We're delighted to have been able to support this."

