

DESIGN INNOVATION IN PLASTICS 2005

student plastics design award

Details of prize winners and summaries of their designs

FIRST PRIZE: DEREK MUIR, University of Huddersfield
Stingray Toilet Seat - A noise-reducing toilet seat and lid



The Stingray Toilet Seat, reaction injection moulded from Bayer Bayflex 20® and Baydur GS®, reduces the harsh noise of a toilet flush while also offering a unique design and a warmer, more comfortable feel.

Flushing the toilet late at night, or while young children are sleeping, can easily wake people up, resulting in the toilet being left un-flushed until morning, which is very unhygienic. Flushing sound escapes from the bowl through gaps between the toilet rim, seat and lid, but the Stingray Toilet Seat solves this problem by closing off these gaps so that the least amount of noise can escape, whilst also being manufactured from an insulating material.

Toilet seats have hardly changed since the first wooden ones were in use. Even when thermoset plastic seats were introduced, they merely replicated wooden seats, not taking full advantage of the design and function possibilities. The Stingray Toilet Seat utilises the unique properties and complex moulding capabilities of Bayflex and Baydur to radically improve a common product while solving the previously unchallenged problem of noise pollution at night.

Key features:

- Underside of seat gives a complete seal around rim.
- Lid constantly contacts seat.
- These features trap the sound inside the toilet.

- Seat manufactured from Bayers Bayflex 20® and lid from Baydur GS®, which have insulating properties.
- Reduces the harsh noise of a toilet flush when seat and lid are down.
- Bayflex 20® is a soft foam, so seat is comfortable to sit on.
- Warmer than most seats.
- Splash guard prevents spray from front.
- Unique, distinctive design.
- Designed to BS 1254.

Benefits of using Bayflex 20®:

- Insulating material.
- Comfortable to sit on.
- Water repellent, easy-clean outer skin.
- Chemically resistant.
- Recyclable, unlike thermosetting plastics.
- Structural, needing no inner frame.
- Flexible and will not break even if toilet surface is un-even.
- Good adhesion with in-moulded metal parts.

**SECOND PRIZE: HUW ROBERTS, University of Glamorgan
Life Buoy System - An alert alarm system designed to increase assistance when someone is in trouble in water**



The Life Buoy System is designed to improve waterside safety by providing a proactive response when the unit is activated by removing the life buoy from its housing.

The system alerts people in the vicinity of the waters' edge to the fact that a life buoy station has been deployed in an emergency. The activated station sounds a siren and also inflates a visual indicator to attract the attention of passers-by in the area.

Meanwhile, automatically invoked communication between the activated station and other stations around the water's perimeter causes the other life buoy stations to act as additional information stations. These serve to alert others in the vicinity of the water that an incident has occurred and advises them of the shortest route to the activated station where they could offer assistance.

Improvements in waterside safety would be achieved as the system attracts a Greater number of potential rescuers to the location of an incident where they could collaborate to perform a rescue. The loudly announced activation of a life station also makes the system less prone to vandal attack, as following an activation there is a greater chance of the culprit being identified.

The unit would be made from Baydur STR and would be produced by reaction injection moulding.

THIRD PRIZE: ADAM EAGER, Northumbria University

Sight + Sound Speakers - Public address speakers that are easily recognised due to their individual forms and colours, thus making the broadcast information more intelligible in busy, resonant buildings such as railway stations.



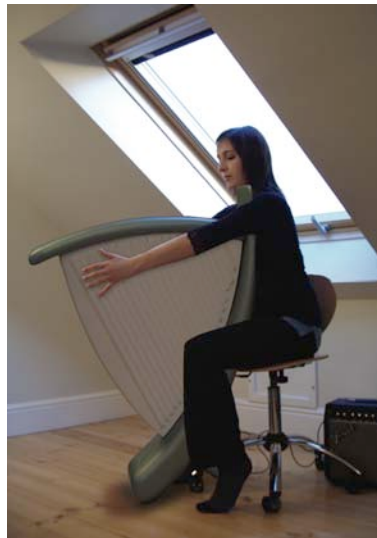
The experience of sound that is most familiar in a railway station is the utter confusion as announcements are made in enormous, echoing, cavernous spaces as trains start their engines, only slightly worsened by the mumbling drone wobbled out by the announcer. At best you might hear a couple of words and possibly a platform number.

The Sight + Sound announcement system allows travellers to recognise the sound and to appreciate where it is coming from. The visual language of the speaker forms displays a clear visual link to their function, giving the listener a recognisable character on which to focus their attention while awaiting information.

The speaker bodies utilise a sandwich structure of Baydur 60 reaction injection moulded polyurethane, which is lightweight and with high rigidity, and incorporate an internally moulded aluminium skeleton. The system combines flat speaker technology with the high acoustic qualities of Baydur 60 absorbent foam sandwiched between reflective, tough outer skins.

FOURTH PRIZE: MIKE PATTON, Northumbria University

The DigiHarp - A low-cost, accessible digital instrument in which traditional strings are replaced by the technology found in drum machines



The Bayer DigiHarp makes owning a classical instrument more accessible to everyone. The design has stayed as true as possible to the nature of traditional folk harps whilst creating a completely new aesthetic.

Baydur 60 polyurethane is used to create a contemporary main body as well as dramatically reduce costs. The strings of a traditional harp have been replaced with a ridged urethane surface that uses sensors from existing load cell technology to create the sound.

The DigiHarp works by plugging a standard jack lead into the base and connecting to an amplifier. The player 'plucks' the corrugated surface by moving their fingers across the ridges to create the notes as they would on a stringed harp. Soft touch paint to stop slippage due to perspiration would be applied to this area.

FINALISTS

MATTHEW BLACKMORE, University of Wolverhampton

Digi-Stand Music Stand - A music stand with a digital screen that allows networking in an orchestra without conventional sheet music.



The appearance of the stand was developed out of the shape and form of musical notes and is intended to create a link between the product and its environment. The monitor is attached via standard VESA monitor mounting points and a custom-made paddle bracket which enables the LCD screen to be rotated through 180 degrees to suit musicians of all heights.

Karaoke music systems use a very simple technique to help hearing-impaired performers keep in time with the music by highlighting the words as they need to be sung. This format can be developed for sheet music so that musicians who struggle with their hearing will be able to follow the music timing easily.

A separate sub-assembly of the product comprises an entirely wireless network that can link many stands together to allow group performances. The Digi-Stand is intended for use in established concert halls hosting orchestral performances, and all cable work can be concealed underneath a stage with power points accessible through individual spurs located next to the stands, resulting in very little visible cable.

THOMAS COLEY, University of Wolverhampton

Swimming Aid - A unit that enables the blind or partially-sighted to participate in competitive swimming by helping them to keep in lane and by alerting them as they approach the end of the pool.



The Swimming Aid is an electronic device fitted to a swimmer which uses sound to alert a blind or partially sighted competitive swimmer to their position in a swimming pool lane. It detects signals produced by an ultrasonic speaker located at each end of the pool, and by measuring the strength of these signals, the Swimming Aid can accurately calculate the distance to either end of the pool. The Swimming Aid relays this information through waterproof earphones, and the tone heightens in pitch as the swimmer reaches the end of the pool.

The Swimming Aid is housed in a reaction injection moulded Bayflex® Integral casing with internal sensors, electronics and power supply. Bayflex® Integral was chosen for its low cost aluminium moulds, which keep production costs to a minimum. The electronics inside the casing are coated after assembly with an extra thick layer of lacquer which means they will continue to work in the event of a leak to the main casing.

The Swimming Aid is an innovative solution to a problem in a sport that is not normally considered for product development. By combining acoustic technology with Bayflex® Integral polyurethane, the Swimming Aid answers the brief in a novel way.

TIM HUNTER, Northumbria University

Easy Float - A float containing a speaker through which a swimming instructor can communicate.



The design I have produced is a float for use at local leisure centres to aid children whilst being taught to swim. After talking to several children's swimming instructors, I discovered that they have a serious problem when they need to be heard above the noise of the pool. I thought that this would be a good area to investigate for my project.

There is a speaker in the upper section of the float. The swimming instructor talks through a microphone which transmits his voice to the child through the speaker. This enables the instructor to talk to the child when they are either in the middle or at the far end of the pool where it could be difficult to contact them and give them instructions above the noise level in the bath.

If a child lacks confidence in swimming, an instructor could give encouragement and help boost the child's self-confidence. Similarly, if the child appears to be struggling or in danger, the instructor could immediately communicate with them and tell them what to do. The use of the Easy Float could also encourage children to venture further into the pool without worrying about losing contact if they get into difficulties.

I feel that this product would make learning to swim more fun and more enjoyable. I also feel that it would enable children to learn faster and to rapidly build up confidence when swimming, thus making learning to swim a better all-round experience.

OLIVER POYNTZ, Northumbria University

Sonar Lifeguard - A system that detects any potential drowning situation in swimming pools and directs pool attendants to its location.



The Sonar Lifeguard use high frequency sound waves to save lives. It is a system that employs ultrasound technology to detect if anybody is in danger of drowning in swimming pools. It scans the bottom of pools by sending out bursts of ultrasound waves into the water which bounce off anything in the way. These waves then bounce back to the Sonar Lifeguard which passes the information on to a computer. This data is then used to build a virtual 3D image of the bottom of the pool. The computer can detect if anybody has been on the bottom of the pool for over a minute and then alerts the lifeguards by pagers. The lifeguards can then take necessary action.

The Sonar Lifeguard is made from Bayer Baydur® 60 and is manufactured by reaction injection moulding, as this is perfect for relatively low production runs. Baydur® 60 is also very durable and can withstand rough treatment such as swimmers kicking the units. It is also resistant to chlorine.

The key selling point of the Sonar Lifeguard is that it is much cheaper than any other drowning alarm system on the market due to the use of ultrasound technology and to the fact that it costs virtually nothing to install, unlike similar systems that need to be built into swimming pool walls.

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