Introduction
Robust Design Workshop – ISoRD14
within the Robust Design Special Interest Group

Robust Design Special Interest Group

to network, share ideas, experience and knowledge, collaborate, learn and open new research topics
• to standardise terminology and frameworks
• to test out robust design tools, methods and theory on real case studies in a workshop format
• …

Robust Design Workshops

2013

ICED13

2014

DESIGN 2014

2015

ISoRD
The Workshop objective

- raising actual and future questions in Robust Design research
- learning from each others’ techniques and approaches to Robust Design.
- You are given an active role in a hands on, dialogue and exercise based discussion on current Robust Design challenges in industry.
GM Ignition Switch Recall
After several severe accidents, GM launches one of the most infamous recalls of automotive history in the first half of 2014 (fine of $35 million, recall of 2.6 million vehicles and the death of at least 13 people).

Crash Scene Investigators findings:
Initial inspections had shown that the key had slipped out of the ON/RUN position leading to an unintentional shut down of the engine during use, also affecting airbag inflation, power steering and power brake systems.
The GM Ignition Switch and Assembly

The accidents could therefore be traced back to the ignition switch, provided by Delphi:

- Coupled through the car’s steering column, the ignition switch is connected to the lock cylinder and consequently to the key
- It’s main purpose is to convert the rotational movement of the key into a signal, which is sent to the Body Control Module defining the actual mode of car.
The CAD models and dimensions are taken from measurements of an actual ignition switch and therefore may vary from the nominal.
Your Task

You are a team of forensic engineers investigating of the recall. Provided with the design and specification documents, you are to:

1. Identify the problem(s) that have led to the failure of the ignition switch.
2. How to solve the actual problem? Think of possible solutions.
   - for a short term fix for the recall
   - for models developed in the future GM car models
3. Prepare a presentation of 5 slides to illustrate your findings and solutions

Note: We expect you to do the analysis and strive for answers and proof not just discuss suitable approaches and methods.
Your team
During the workshop you are grouped into 10 different teams. The number of your team is indicated on the upper right corner of your name tag.

Available material for the forensic analysis
The central document of the workshop, summarizing the relevant information for the forensic analysis, is the Workbook. In addition, every team is provided with an example switch and you can download the CAD model on the conference website (see http://www.robustdesign.org/ISoRD/downloads).
Workshop room

The workshop takes place in:

Building 101 (you are in it)
room S09 (ground-floor)

Presentation of results

Before the concluding plenary discussion in room M1, you will have the chance to discuss the results of your forensic analysis with another group.

After this presentation in the Foyer please also choose a team member who will represent the two teams in the panel.
## Structure of the Workshop

The workshop activities are divided as follows:

<table>
<thead>
<tr>
<th>Time</th>
<th>Workshop Activity</th>
<th>Room</th>
<th>Hints</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:00</td>
<td>Workshop Introduction</td>
<td>M1</td>
<td></td>
</tr>
<tr>
<td>13:15</td>
<td>Group Work</td>
<td>S9</td>
<td>Think also of robuster solutions for an optimized ignition switch for the recall as well as in the future</td>
</tr>
<tr>
<td>15:00</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15:30</td>
<td>Group Work</td>
<td>S9</td>
<td>Plan also for the necessary time to summarize your results in the 4 slide template</td>
</tr>
<tr>
<td>16:15</td>
<td>Presentation of results</td>
<td>Foyer</td>
<td>Decide on one teammember who represents your groups in the panel during the plenary discussion</td>
</tr>
<tr>
<td>16:40</td>
<td>Concluding plenary discussion</td>
<td>M1</td>
<td></td>
</tr>
<tr>
<td>17:00</td>
<td>End of Workshop</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Please make sure to summarize your findings along the way, to mark the procedure and to mention the applied method that you saw as necessary to solve the problem
So, down to work. We hope that you enjoy the workshop and look forward to your results and interesting discussions.