ALOK JOSHI
DESIGN PORTFOLIO

MOTORCYCLE SAFETY
JAN 2016 – MAY 2016

FORMULA SAE
AUG 2013 – SEPT 2014

COMMUNITY COMPOST
AUG 2016 – OCT 2016

APOIDEA PODIUM
AUG 2016 – OCT 2016

PACKAGE DESIGN
OCT 2016 – DEC 2016

TOASTER REDESIGN
AUG 2016 – OCT 2016

MODULAR FOOD TRAY
JULY 2015 – SEPT 2015

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MOTORCYCLE SAFETY

Product Opportunity Gap
The only safety equipment standing in between life and death of an average Indian motorcyclist is the helmet. The major drawback of the helmet is that it is a user-dependent safety feature, which means that it only protects the rider when he/she chooses to wear it. Cars on the other hand have an user-dependent feature (seatbelt) and an user-independent (airbags) safety feature. There is therefore an urgent need to design a user-independent safety feature which is integral to the motorcycle.

My Work & Utilized Skills

Leadership
» Project Manager

Ideation
» Brainstorming
» Concept Generation & Sketching
» Concept Screening

Research
» Online Market Survey

Design
» CAD Model on SOLIDWORKS

Analysis
» Computation of Lean Angle
» Free Body Diagram - Force Analysis
» Static Structural Analysis on ANSYS

Manufacturing
» Concept Prototype Fabrication and Assembly

Components

Anti-Skid Leg Guard Design

Working Stages

RETRACTED STAGE
- Lean angle – 0°
- Actuator Pins – Released
- Spring – Compressed
- Emergency wheels – Secured

TRANSITION STAGE
- Lean angle – < 40°
- Actuator Pins – Retracted
- Spring – Released
- Emergency wheels – In-Transit

ACTIVATED STAGE
- Lean angle – 40°
- Actuator Pins – Released
- Spring – Free Length
- Emergency wheels – Deployed

Alok Joshi | Faiz Khan | Milan Patel
Product Opportunity Gap
The concept behind Formula SAE is that a fictional manufacturing company has contracted a design team to develop a small Formula-style race car. The prototype race car is to be evaluated for its potential as a production item. The target marketing group for the race car is the non-professional weekend autocross racer. Each student team designs, builds and tests a prototype based on a series of rules whose purpose is both to ensure on-site event operations and promote clever problem solving.

My Work & Utilized Skills
Leadership
» Technical Head of a 40 member team
Research
» Material Selection
» Geometric Dimension & Tolerance
» Feasible Manufacturing Processes
CAD Design
» Front Wheel Assembly
» Chassis
» Surface Modeling of Body Panels
Analysis
» Wheel Assembly Force Analysis
» Static Structural Analysis of Wheel Assembly
» Structural & Torsion Analysis of Chassis
Manufacturing
» Chassis profile laser cutting and MiG Welding
» Assembly of Hub + Brake Disc + Brake Caliper
» Mounting of Wheel Assembly on Chassis

Wheel Assembly CAD

Wheel Assembly Manufactured

FORMULA SAE

ALOK JOSHI | TEAM OJAS

CAR
<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Front</th>
<th>Rear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheelbase</td>
<td>1550 mm</td>
<td></td>
</tr>
<tr>
<td>Track Width</td>
<td>1280 mm</td>
<td>1180 mm</td>
</tr>
<tr>
<td>Mass with 68kg driver seated</td>
<td>174.6 kg</td>
<td>213.4 kg</td>
</tr>
</tbody>
</table>

CHASSIS
| Construction | Space frame tube steel |
| Material | AISI 1020 |
| Joining method and material | MiG welding with electrode E6013 |
| Torsional stiffness | 3265 N·m |
| Bare frame mass | 60 kg |

FSAE Design Spec Sheet
Product Opportunity Gap

On a global scale, we waste more than half of the world’s annual cereal crops worth of food. Despite all of this food being wasted, many people go hungry every day. Millennials are becoming more socially conscious and environmentally friendly, yet baby boomers outperform them in almost every aspect of the recycling and reusing process.

A product offering that remedies this disconnect is necessary to aid millennials to become more sustainable.

My Work & Utilized Skills

**Ideation**
- Brainstorming
- Concept Generation & Sketching
- Concept Screening

**Research**
- Study the Target Market - Millennial Generation
- Social, Economic and Technological Factors
- Online Market Survey
- Stakeholder Map
- Competitor Value Opportunity Analysis
- User Interviews
- Usability Test

**Design**
- Service Design for the Community
- Compost Bin Design

**Manufacturing**
- Concept Prototype - Foam Core Model
Product Opportunity Gap

Audiovisual (AV) systems are used for a similar purpose across various industries, yet there is no widely adopted standard for AV systems. Podiums implement various highly customized AV systems with different interfaces, equipment and technologies. This increases the user’s learning effort and risk of incompatibility.

The aim is to design a user-friendly podium which is intuitive to use, quick to setup and compatible with various devices.

My Work & Utilized Skills

**Ideation**
- Brainstorming
- Concept Generation & Sketching
- Concept Screening

**Research**
- Competitor Analysis
- Observational Research
- User Interviews
- Usability Test

**Design**
- CAD Model on SOLIDWORKS
- Rendering on KeyShot

**Manufacturing**
- Concept Prototypes - 2 X Foam Core Models

Prototype 1.0

Prototype 2.0

Components

Prototype 1.0 Components
- INTERFACE
- REMOTE HOLDER
- CUP HOLDER
- MAGNETIC STRIP
- CABLE MANAGEMENT
- SLIDER

Prototype 2.0 Components
- INTERFACE
- REMOTE HOLDER
- CUP HOLDER
- MAGNETIC STRIP
- CABLE MANAGEMENT
- SLIDER
Product Opportunity Gap
As people become more aware of their effect on the planet, they search for eco-friendly practices that have minimal impact on the environment. With this awareness, brands are tasked with the search for more environmentally responsible packaging options. Packaging is the first contact of the product experience, and brands must use this medium to attract sales and interest. However, the design of innovative and environmentally friendly packaging is well below its potential.

My Work & Utilized Skills
<table>
<thead>
<tr>
<th>Ideation</th>
<th>Brainstorming</th>
<th>Concept Generation &amp; Sketching</th>
<th>Concept Screening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>Literature Review on Package Design</td>
<td>Eco-friendly packaging materials</td>
<td>Study target market - McDonald’s</td>
</tr>
<tr>
<td>Design</td>
<td>Spatial constraints to package whole meal</td>
<td>Ergonomics - Easy to snack &amp; hold in one hand</td>
<td>CAD Model on SOLIDWORKS</td>
</tr>
<tr>
<td></td>
<td>Design for Environment (DfE) - reduce number of packages used by making an all-in-one package and increase recycling capability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Concept Prototypes X 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Prototype 1.0 - Paper + String
The user has to place their hand on the base and just pull the string (attached to the side walls) to make the flat packed paper fold into a box.

Prototype 2.0 - Foam Core

Prototype 3.0 - Cardboard

Usability Test
Product Opportunity Gap

Everyday things that are found in abundance in people’s homes suffer from poor design and manufacturing choices. The lack of good design is a hassle for both the user and the environment. Therefore, it is quintessential to redesign everyday things by keeping in mind three vital features: User-Centered Design, Design for Environment (DfE) and Design for Manufacture and Assembly (DFMA).

This project focuses on redesigning the toaster.

My Work & Utilized Skills

**Ideation**
- Brainstorming
- Concept Generation & Sketching
- Concept Screening

**Research**
- DFMA & DfE principles
- Quality Function Deployment
- Material Science - Metals & Plastics
- Manufacturing Processes - Injection Molding, Sheet Metal Forming & Stamping

**Design**
- CAD Model on SOLIDWORKS
- Easy to use Wall Mounted Design
- DfE - Life Cycle Analysis on Sustainable Minds and Comparison with Original Design
- DFMA - Functional Requirements and Product Parts Analysis to reduce number of parts and assembly time

Life Cycle Analysis

Sketches

Wall Toaster
Product Opportunity Gap

With a population of 1.25 billion and growing, India faces a pressing issue of food shortage. One way to tackle the problem is by proper segregation of leftover food which can be then supplied to the needy. A simple yet effective method to achieve the stated objective is to redesign the Food Tray used at public places such as Hostel mess.

My Work & Utilized Skills

Ideation
- Brainstorming
- Concept Generation & Sketching
- Concept Screening

Research
- Food Wastage and Shortage in India
- Current Food Tray Design & Dimensions

Design
- CAD Model on SOLIDWORKS

Analysis
- Force Calculations
- Stress Analysis on ANSYS - Cantilever effect

Manufacturing
- 3D Printed Scaled Prototype using FDM