DESIGN FOR our future

TU Delft

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

family name: van den Berg 4056
initials: S given name: Stan
student number: 4458842
country: Netherlands

Your master programme (only select the options that apply to you):

IDE master(s): ( ) IPD ( ) DfI (★) SPD
2nd non-IDE master:
individual programme: - - (give date of approval)
honours programme: ( ) Honours Programme Master
specialisation / annotation: ( ) Medisign
( ) Tech. in Sustainable Design
( ) Entrepeneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair: Wilfred van der Vegte dept. / section: SDE
** mentor: Viki Pavlic dept. / section: DOS
2nd mentor: Jan Arts
organisation: Allshoes
city: Alkmaar country: Netherlands

comments (optional)

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

Second mentor only applies in case the assignment is hosted by an external organisation.

Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Wilfred van der Vegte date 06 - 04 - 2020 signature

Digitally signed by member: E10DCCBD-8297-4FB6-B409-08B00EE6EC15 BE13621E-7C9A-4501-BEF1-2842E47E4D79 Date: 2020.04.14 10:49:32 +02'00'

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair. The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 30 EC

Of which, taking the conditional requirements into account, can be part of the exam programme 30 EC

List of electives obtained before the third semester without approval of the BoE

○ YES all 1st year master courses passed

★ NO missing 1st year master courses are:

ID4315-16

name Colinda van der Bunt date 06 - 04 - 2020 signature

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: ★ APPROVED ○ NOT APPROVED

Procedure: ★ APPROVED ○ NOT APPROVED

- with new planning approved
- course 4315-16 has been passed and is now on Osiris

comments

name Monique von Morgen date 14 - 04 - 2020 signature

Digitally signed by member: E10DCCBD-8297-4FB6-B409-08B00EE6EC15 BE13621E-7C9A-4501-BEF1-2842E47E4D79 Date: 2020.04.06 15:39:03 +02'00'

Initials & Name S van den Berg 4056

Title of Project The next step in safety shoes: Accident prevention using technology

The next step in safety shoes: Accident prevention using technology — project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 20 - 03 - 2020 — 05 - 08 - 2020 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

"The Netherlands excels at logistics, construction and transport and these industries are growing fast! A huge number of people work in these sectors and working in warehouses, on construction sites and/or with heavy equipment involves risks. Since safety is crucial, we are investigating ways to minimize the risk and consequences of injury. Safety shoes are required in many workplaces and 1.5 million pairs of safety shoes are sold in the Netherlands each year, with Allshoes Benelux BV as market leader" (Arts, 2020).

The number of accidents has been increasing each year, leading up to a total of 4250 incidents in 2017 in holland alone. On the contrary, the number of fatal accidents in 2017 compared to 2016 has decreased from 70 to 50 (Pieters, 2018). This shows that although we might be getting better at damage reduction, we're not as good in preventing damaging opportuntities (accidents).

There are a lot of different causes for incidents: stress, fatigue, machinery or tools, workplace design (Abdullah, Mansor, Zakaria, 2012) and many more. Next to this there are also a lot of different people effected by incidents: casulties are in pain, employers are billable hours and risking fines, companies who sold the products involved may lose credibility and insurance companies might have to pay to cover damages. Obviously the more severe the incident, the bigger the consequences will be. However, no matter how much damage control is done, if there is an incident, there will be consequences.

As a quick analogy, another area in which a lot of accidents happen is cars. These vehicles are now equipped with all kind of technologies to help prevent casulties. Derq is a company working on smart connected systems that, with the use of sensors, prevent car crashes through information communication design (see figure 1): analysing a situation and communicating drawn conclusions to those who are in the situation (Pisa, 2020). Tesla is another company who has shown results in achieving this.

All in all this presents an opportunity for accident prediction and prevention in other areas. Possibly through the use of (smart) technology, Allshoes could be able to collect information and warn the wearer of the shoes for potential risk. Safety shoes are already required in many places and are already worn by those at risk, which makes it a good basis to build on.

Sources:
Abdullah, Z., Mansor, N., & Huda Zakaria, N. (2012). Workplace Accident in Malaysia: Most Common Causes and Solutions.
Arts, J. (2020). Develop the Smart Safety Shoe of the future!, Allshoes.
Pieters, J. (2018, April 17). Workplace accidents up 12 pct in Netherlands. Retrieved from https://nltimes.nl/2018/04/17/workplace-accidents-12-pct-netherlands
Pisa, K. (2020, February 7). Can smart sensor systems anticipate and avoid danger? Retrieved from https://edition.cnn.com/2020/01/21/middleeast/technology-reduce-traffic-accidents-intl/index.html

space available for images / figures on next page

introduction (continued): space for images

image / figure 1: Illustration of a connected system through smart technology, able to prevent accidents

image / figure 2: Allshoes banner, to illustrate their product and style

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

Although a lot of products have been developed to make the workplace a safer place, there are still a lot of casualties. Products like safety shoes or helmets are purely passive: only good at reducing an incidents damage. There needs to be something more proactive: preventing accidents from happening in the first place.
Causes of these injuries are already mentioned in the introduction of this document (even though there are a lot more). For this project however, context research will lead to target group specific causes that will need to be addressed.

There does however come a challenge with the need to solve this problem: customer price. Implementing technology will increase the price and if the solution of this project will cost the employers more than it would save (on prevented accidents), then the solution won't be adopted. Therefore either the price should be low enough, or the need high enough.
I will scope my project by focusing on how to handle these problems in a prechosen target group: (indoor) construction and warehousing. This decision was made together with the company as this is their biggest Market, and thus it will have the biggest impact. Also I will scope down the project by not aiming for a working prototype but a developed concept, which is feasible (within context), viable (strengthening Allshoe's (future) market position even more) and desirable (by all stakeholders).

An important aspect for Allshoes is that the solution must comply with circular economy standards. Therefore this will be taken into account throughout the project.
Last, a goal of this project is to maintain Allshoe's market leader position by creating a lasting strategy. If they could expand on their fashionable shoe, there will be a whole new territory to explore and exploit the coming years/decades.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

I'm going to look at how proactive intervention through footwear can help prevent casualties besides damage control through passive protection. Along with this product might come another system or service, for functions that would be impractical to implement in the shoe itself.

The goal of this solution is, as mentioned in the problem definition section, to help prevent accidents from happening. Technology is capable of doing this as it can analyse complex systems, recognize patterns and predict possible futures. Therefore, the solution would ideally make use of (smart) technology, possibly in combination with a connected system. This would allow for an information communication design between product, user and environment, which all play an important role in preventing accidents.

This product will be an illustrative product of a potential growth direction for Allshoes. Therefore, I will start off by validating the need for such a product, followed by developing a strategy and roadmap (for the solution) for the company, supported by a concept of the above mentioned solution. Because this project includes the before mentioned potential growth directions for allshoes, next the these deliverables, a report will be made including what new (smart) technology and proactive intervention means for Allshoes in terms of for example value opportunities and potential difficulties. The deliverables will be: Strategy and roadmap for the concept, the concept shoe itself and a report for the company on technology and proactive accident prevention.

An important aspect for Allshoes is that the solution must comply with circular economy standards. Therefore this will be taken into account throughout the project.

Initials & Name S van den Berg 4056 [redacted]

Title of Project The next step in safety shoes: Accident prevention using technology

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 20 - 3 - 2020 5 - 8 - 2020 end date

My kick-off meeting will take place on the 20th of March 2020. I won't take any extra days off, as I think the weekends will suffice. However, I will take 1 week off in May, to replenish energy and come back with a fresh mind. As I had difficulties arranging everything for my graduation project, my project will extend throughout the summer holiday period. This means that unfortunately previously booked holidays will interrupt my graduation project. I plan to graduate on the 5th of September 2020.

My approach to this project will be iterative, therefore I tried to already include a bit of the expected moments where this will happen (f.e. research won't just be conducted at the start of the project). However, the project planning right now is more of a guide than an exact planning, as I'm sure things will change due to findings during the project.

I added the project planning at the end of this document.

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

I love new technology and am a big fan of the IoT, smart products and optimization within this. I've thought about smart shoes before and have seen some attempts on the internet come by (Nike adapt BB and Digitsole). I see this project as an opportunity to make smart shoes that can actually have an impact, instead of just being a cool gadget.

There are many different courses that I've followed over the past 4 and a half years that will be useful for this project. For example SPD research project for discovering context and desires. The build your startup elective will also help in this area, as it gave me the tools and experience to be able to validate ideas, discovering needs and building the right thing. Another elective that will come in handy is computer sketching. One of the USPs of Allshoes is the aesthetics of their products. Therefore, being able to design the right style of shoe will be valuable.

General skills that I've developed over the year like 3D modelling, graphic design, storytelling, photography will help me in terms of communicating, documenting and presenting. General skills that SPD has taught me is to think strategically, set up road maps and being able to make ideas viable, desirable and feasible.

Even though I acquired a big skillset over the years, there are still things to learn within this project. The company has a budget and the resources to prototype, which is something I have not done as often. I left prototyping out of the scope, as it won't be the focus within this project, however it would be something worth exploring if there is time for it. Next to this there are knowledge fields to dive into, like: smart technology and connected systems, manufacturing, ergonomics and human information communication design.

Furthermore, this project will offer me a chance to see whether this is something I would want to do once I graduate (working for a bigger firm, possibly as an external designer).

FINAL COMMENTS

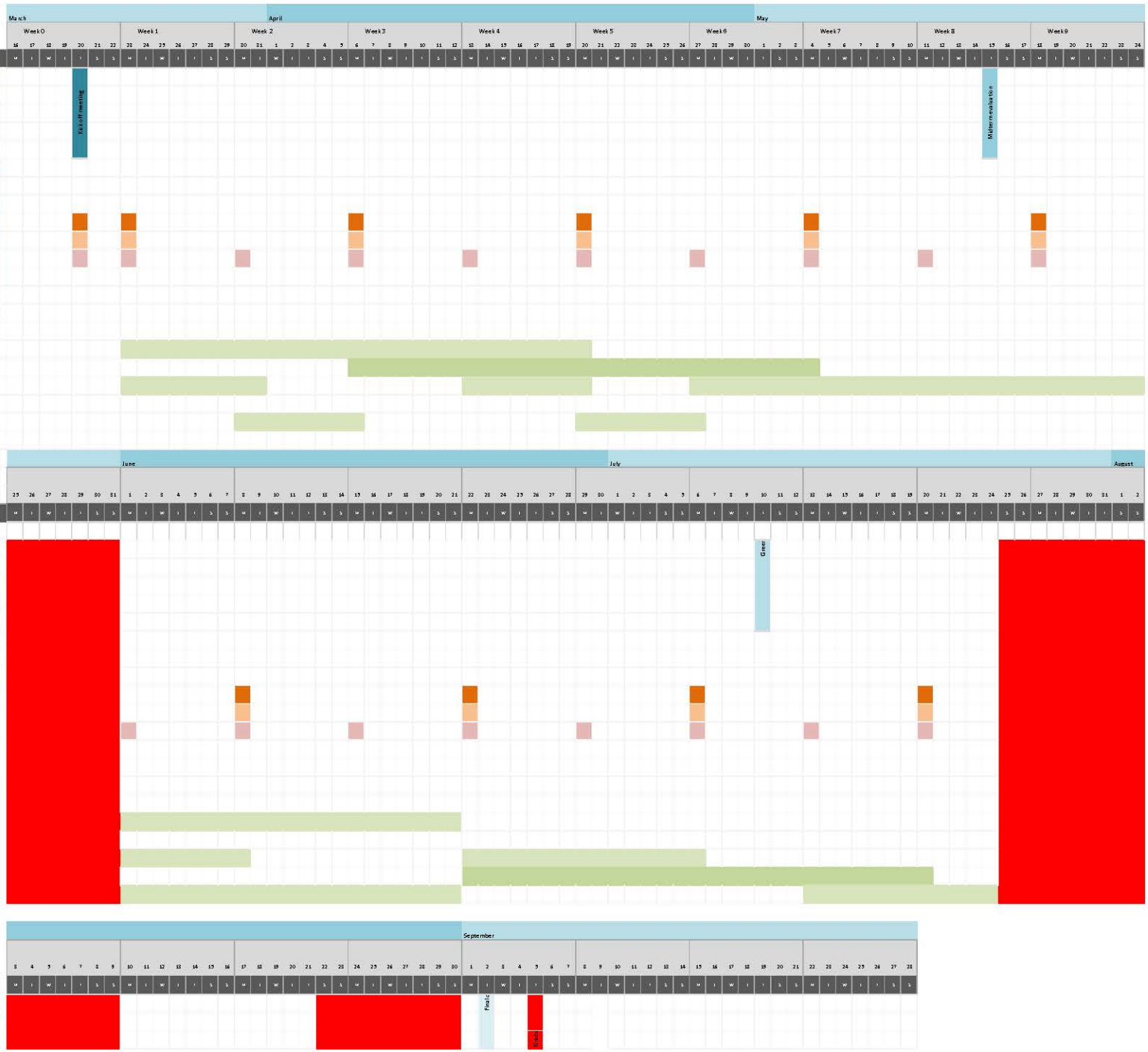
In case your project brief needs final comments, please add any information you think is relevant.

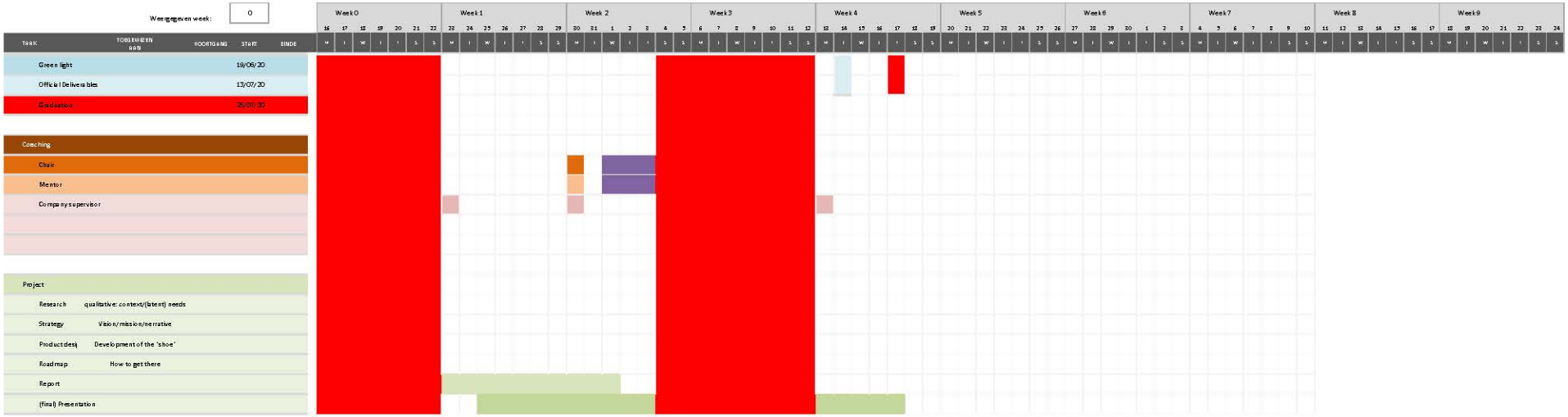
Graduation project

Allshoes
Stan van den Berg

Begin project: Friday 20/3/2020
Weergegeven week: 0

TAAK	TOEGEWEZEN AAN	VOORTGANG	START	EINDE
Deadlines				
Kick-off meeting			20/02/20	
Midterm evaluation			24/04/20	
Green light			19/06/20	
Official Deliverables			13/07/20	
Graduation			25/07/20	
Coaching				
Chair				
Mentor				
Company supervisor				
Project				
Research	qualitative: context/(latent) needs			
Strategy	Vision/mission/narrative			
Product desi	Development of the 'shoe'			
Roadmap	How to get there			
Report				
(final) Presentation				




Weergegeven week:
0
Week 0
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
TAAK
TOEGEWEZEN AAN
VOORTGANG
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