



# Dräger

Project report Thibault Moussanet

Emergency breathing solution for risky environments





# FIELD TRIP

During the first day of field-trip, we've been introduced to the refinery environment by visiting the Preemraff refinery of Göteborg. A short theoretical presentation has been done before we've been allowed to walk trough this unrealistic environment made of pipes and steel. Getting the feeling the of being actual workers of the refinery by wearing the required equipment, was according to me a great and necessary experience, to really understand the problems that people are facing. During this day, we've been introduced to equipments, to emergency procedures, to different people working in the refinery as regular employee, fire fighter and so one...

The second day, after taking some time discussing around the products in the Dräger office of Göteborg, we carried them to a training center to get them in a situation. It was a really nice experience, probably even more helpful for us than visiting the refinery. At this point, we probably all get a feeling of what the job looks like, and the things that workers are facing every day.

Finally, we've been back to the Dräger office full of comments on the products. It was time for us to share our feelings and get the other people impressions. We started to brainstorm with the Dräger team, which end up with a lot of new ideas around the products. Before to all leave, we made a quick selection of ideas and area of interest.







## WORKSHOP

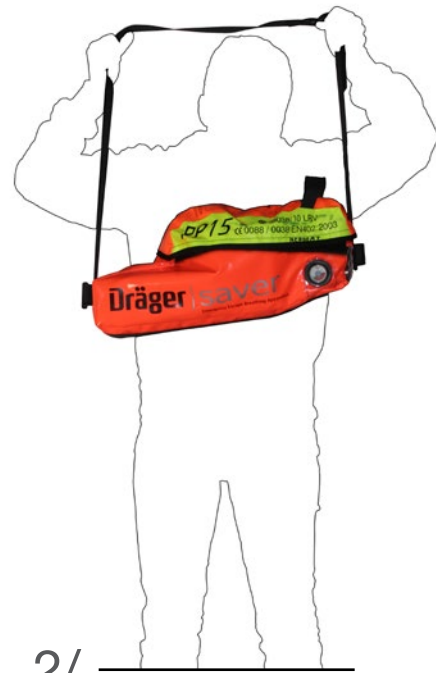
Back to Umea, we dedicated a room to collect information and push further the analysis. We shared the task and did some extra research about the brand, the users, the different products, the visual brand language and the Dräger identity. We also shared problems that we found about the existing products, building-up our knowledge about Dräger. As a team, we could explore much more and in detail anything we thought was worth to explore and make the best use of the short time we had for extra researches. We ended having a huge amount of knowledge and informations, that we had to sort individually according to our area of interest.

Then, we've been introduced to the "How might we" method. The goal was, as a team again, to generate as much ideas as possible within a short time. Each of us prepared a small introduction to the topic we were interested in, in order to give directions to our classmates, before to start to ideate on A5 Post-it. The result was an impressive number of ideas, good or bad, and a global vision of everyone focus point on the project. From the 600 hundred + post-it we could already feel the relevant answers to the problem we found through our collective research.





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## FOCUS AREA

My focus for the next weeks, will be to work with an emergency escape device. The Dräger Saver is an emergency product designed to escape dangerous areas. It is placed in hazardous areas. As soon as a risk is detected by the personal device of the worker, he is supposed to run and get one of this product, providing between 10 and 20 minutes of breathing, which is enough to escape the danger zone. The Dräger saver is made up of one compressed air cylinder, one gas mask covering eyes, nose and mouth, and on protection bag. It is reusable.

At this point, I'm thinking that this product could be improved in many ways, by working with its global architecture. It's an un-intuitive product, for which workers have to be trained twice a year. It feels very heavy and uncomfortable, especially for running while escaping a risk area. Finally, many steps are needed before to be able to breathe safely.

By choosing this product, I will spend the next weeks to design a scenario, rather than re-design an existing product.



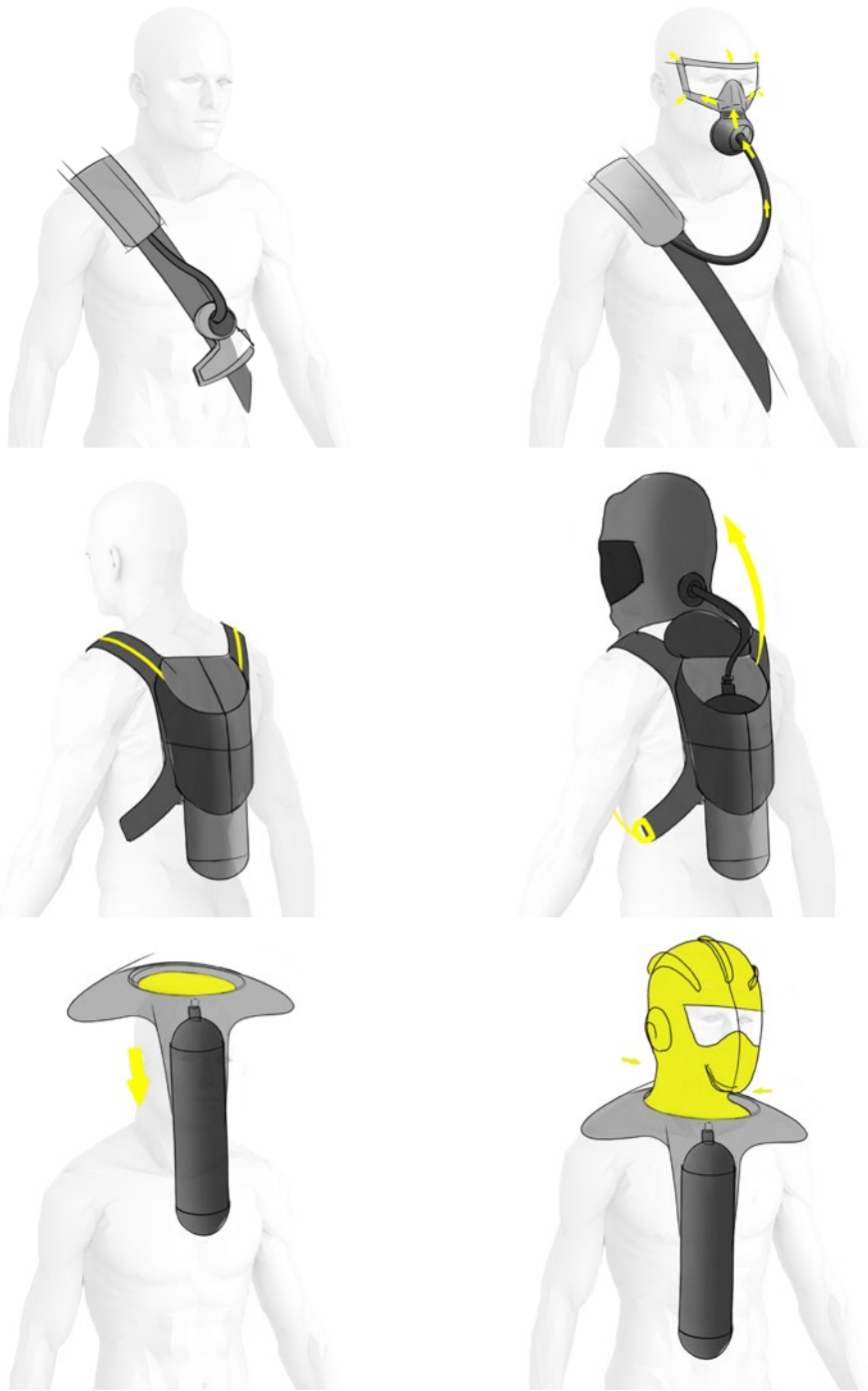


# IDEATION PHASE

As a first step of the concept phase, I started to create scenarios of what could be the new product ideal use. Some of the main questions I had in mind was concerning the way of carrying the air cylinder, since it is the main ergonomic problem of the current product.

As soon as I had some rough ideas of how to improve the product scenario, I started to sketch some variations on the gas masks architecture. The second question I had in mind was about how to create a product 100% effective for bearded people as well as people with no beard. Sketching gas masks, helped me to consider this problem and I came to the conclusion that the best way to avoid leaks in the gas masks sealing, would be to use an inner mouthpiece, based on the scuba diving products architecture.

Based on this conclusion, I kept sketching some scenarios of use, trying to integrate this mouthpiece in order to facilitate the entire scenario of use of the product. This mouth piece can also be considered as a second layer of sealing, making the product fitting even more people regardless if they are adults or childrens.





# EXPERIMENTATION

During the concept phase, I felt the need to go back and forth through sketching and quick experimentation using yoga mattress and duct tape. It's very hard to keep track of the process during this method, but I can say that those back and forth were an essential step in the concept development, making the decision making quick and efficient and minimizing the risks of a wrong feeling for the final concept.

During this step, I built several quick and dirty mock up and found some users around me to try out the product. I was giving people the mock up with no indication on how to use it, and I was observing if they could figure out intuitively.

On the final concept mock up, the users-feedback as well as what I could observe by watching them using it, was very positive. The concept mock-up is composed by a "bag" made of yoga mattress, containing the air cylinder, and on which the gas masks are integrated. I built the mask by combining scuba diving mask and workshop filtering mask on which I mounted a snorkel mouth piece. The product is putted on using one, non interrupted gesture, and naturally fall on to the right position.











## THE CONCEPT SCENARIO

The entire process to put on the product is now reduced to less than 3 seconds, using this functional concept mock-up. It makes a real improvement, considering the minimum of 8 seconds needed for the current product today in the refinery.

Using one single and non interrupted gesture during the entire process of putting on the product, is also making the scenario very intuitive, and is limiting the risk of doing it wrong even for non professional peoples. The mouth piece makes it safe and leak proof for beard and non beard users.

During the refinement phase, I will be focusing my energy on how making a more compact envelope in order to facilitate running, but having the same air capacity. I will be focusing also on creating a gas mask which could be used with this product as well as without for a more regular use.







## THE REFINEMENT OF THE BAG

As the appearance of the bag is completely shaped by the function, I already felt pretty close of the final appearance of the bag at the end of the concept phase. The gesture and the philosophy behind didn't need any refinement as it was perfectly working already.

What was needed to be refined was the proportion of it, in order to bring more comfort to the user especially while running with the product. The concept version was a bit too high to provide an optimized comfort to every users.

Because the height of the product was constrained by the height of the air cylinder, I decided to refine the product with two smaller cylinders instead of one, but providing the same air capacity. From this decision, I started to create a lot more quick yoga mattress mock-up, in order to try out the best orientation of the two air cylinders as well as the best cut to spread the weight on both shoulders of the user.

The final version is larger but shorter and gives and makes the running much more comfortable.



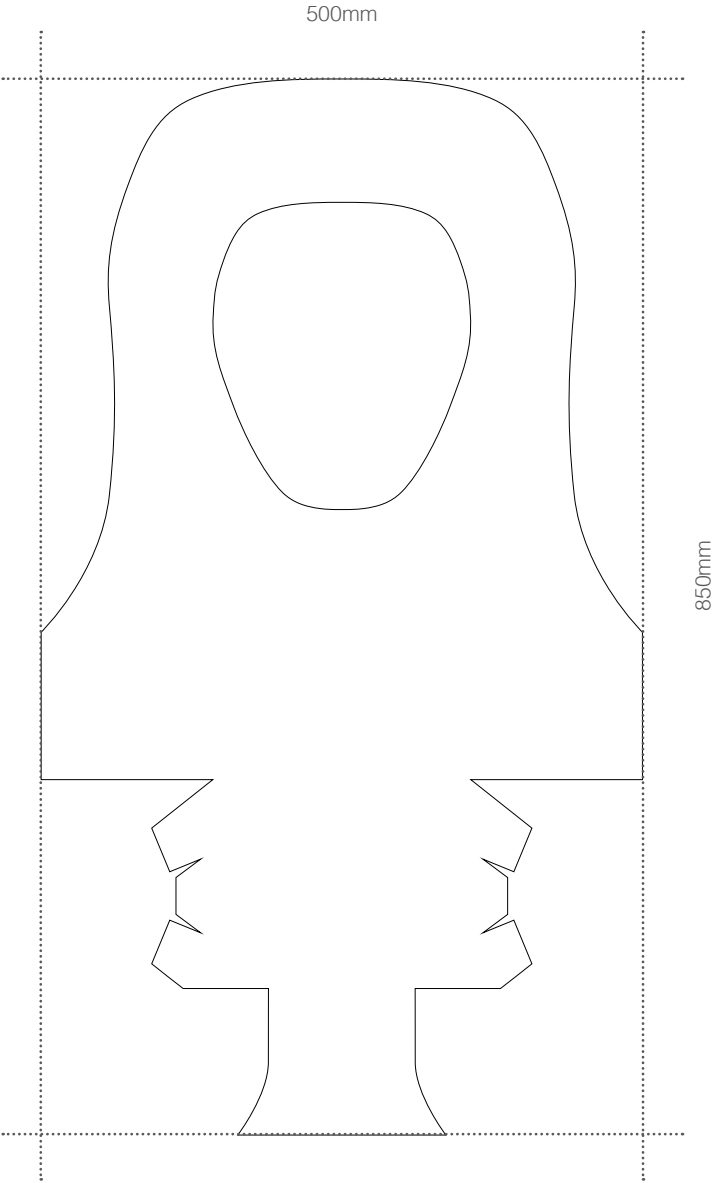
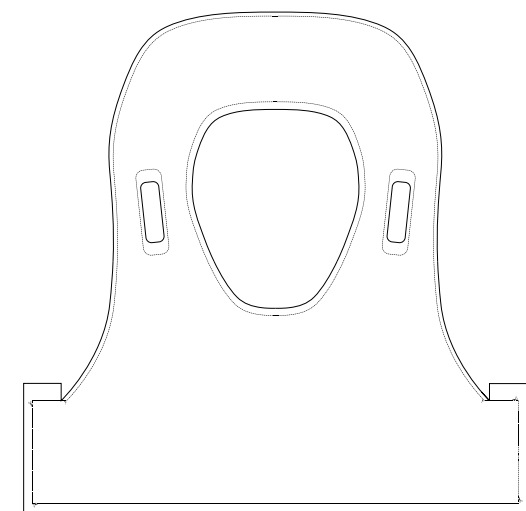


# THE REFINEMENT OF THE BAG

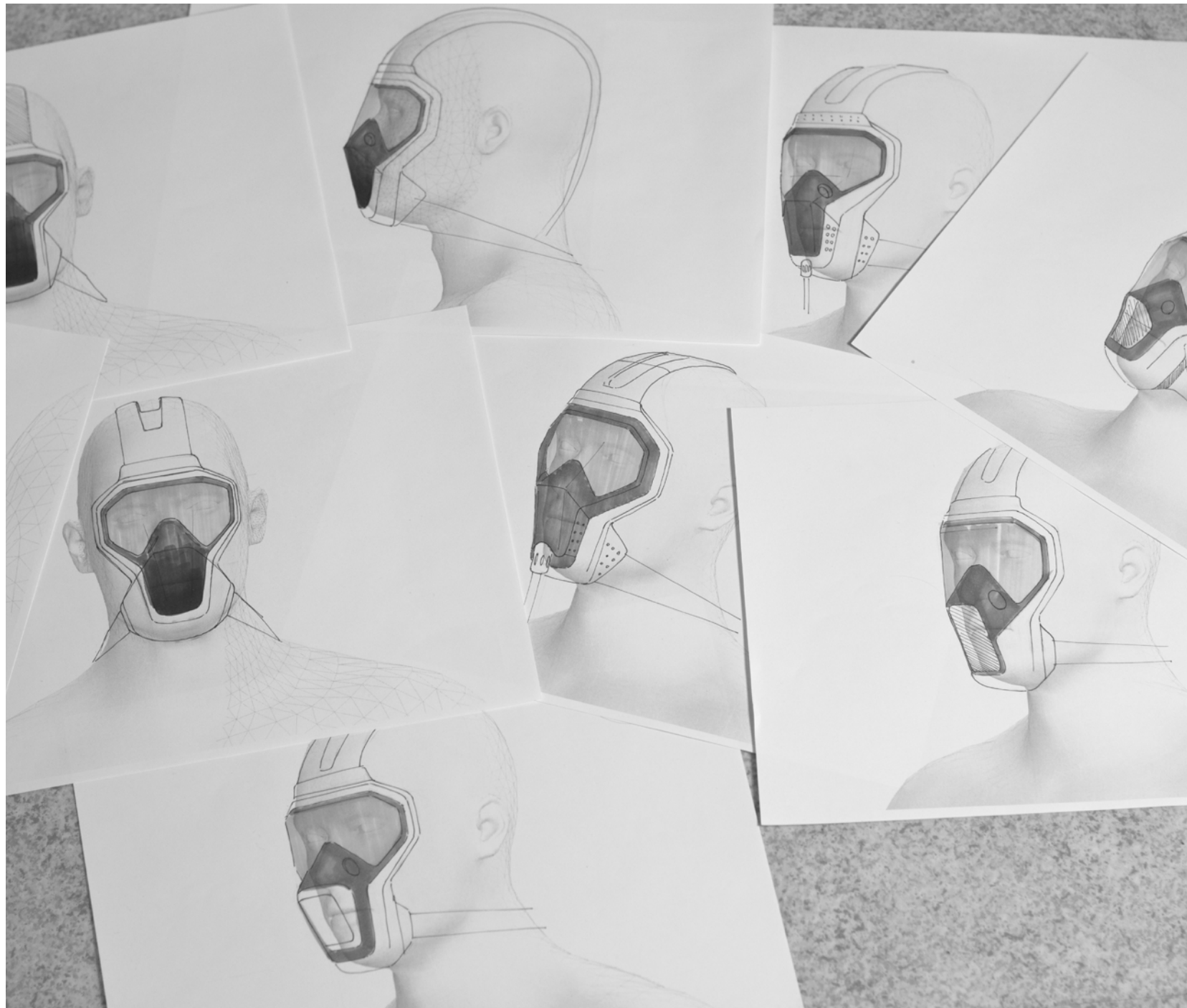
As soon as I found the final shape of the bag, I had to find a trick to extract a template in order to create the fabric skin going around.

First, I used some masking tape to cover the entire surface of the bag. The next step was to remove the tape from the product and cut it until I could obtain flat surfaces. Finally, I could scan the flat pieces of tap and work with vector drawing in order to transform them into fabric template.

I finally laser cutted the fabric parts, and reassemble them together around the final version of the bag.



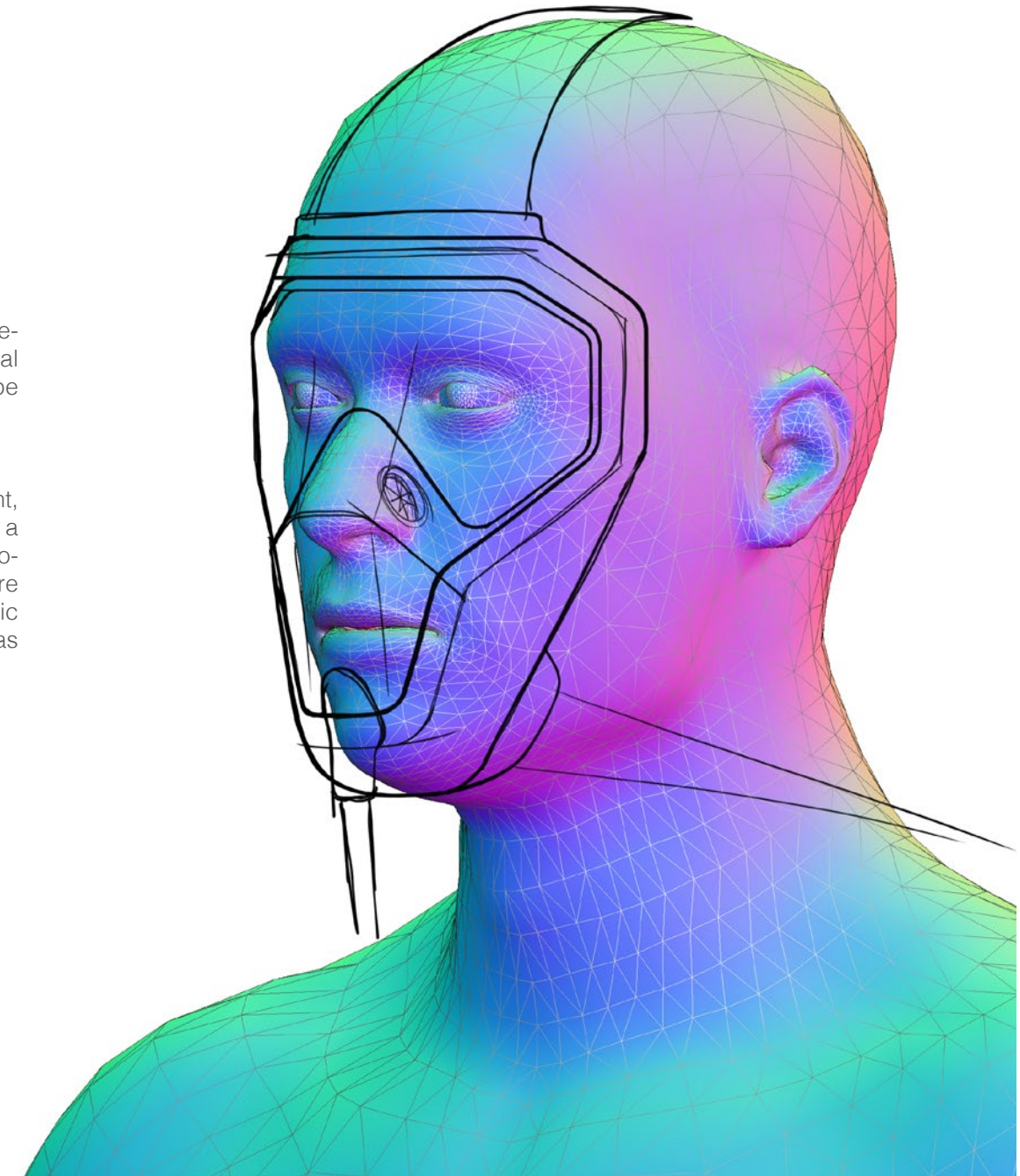




## THE GAS MASK REFINEMENT

When I started to refine the gas mask design, my intention was to 3D print the final piece in order to have a functional prototype at the end of the project.

As a first step of the gas mask refinement, I've been back to sketch before to start a 3D model, in order to put my new ideas together and also to study how gas masks are made. I wanted to end up with a realistic product bringing some new ideas in the gas mask design.







## THE GAS MASK

By studying how gas masks are made, I could realize the complexity of the design made by the need of being airtight. They are composed of a lot of different pieces in needs to be sealed together using other pieces.

When I built this gas mask, my idea was to keep the amount of different pieces as low as possible, because each sealing is one more risk of leaks in the final product. Only one sealing is needed to maintain the gas-mask together, making the design extremely safe in terms of possible leaks. Keeping the number of parts low was also a good way to save money on the building cost, and to offer a cheap product.

Unfortunately, when the building was completed and all the parts ready to be 3D printed, I realized that I couldn't afford it with the Dolf budget. I must say that I was really sad as I really wanted to try the comfort of the product I just designed and prove the realism of it...





## THE GAS MASK

The gas mask is built around a masterpiece acting as a structural element and allowing to decrease the amount of parts. This masterpiece is the transparent shield, on which every part of the gas mask is connected together.

The tightening straps are directly mounted on the transparent shield, instead of being part of the rubber skirt as it is usually. This applies an equal pressure on the entire rubber skirt, giving a better sealing in contact with the user face as well as an improved comfort feeling. A simple tightening system is allowing the user to interact with even with gloves, still being 100% safe thanks to the mouthpiece.







## THE FINAL PRODUCT

The final product is composed by a bag holding and protecting the air cylinders from scratches and heat. The gas mask is integrated into the bag hole shape, and the automatic tightening system is hidden in the bag foam thickness.

The final bag is covered by a high visibility yellow fabric, reflecting light in darkness. The bottom is covered by a high resistance fabric to keep the product looking clean.

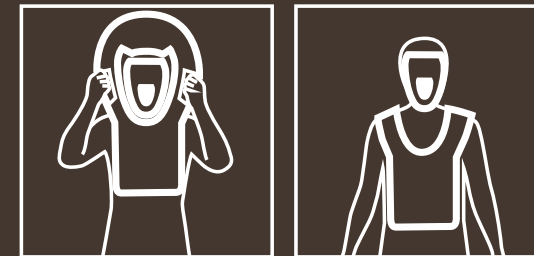
Only two information icons are needed, and placed on the front of the product. A handle is placed on the back, in case the product needs to follow the potential user in a risky task.







SAFE, IN LESS THAN 2 SECONDS





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