

**Case 1:** To restructure the broom to reduce the pain in the hands of the sweepers and making it light and more efficient for cleaning.

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## INTRODUCTION

First of all, we choose this problem because this is a very major issue in whole India. We tried to understand their daily life and challenges during sweeping. We also tried to investigate the role of different apparatus of state machinery and their attitude towards these people. We found their situation is very pathetic and they are in margin and in unwritten world. There is need to eradicate this manual practice at earliest and make them self-independent and skilful to live a life of dignity and respect.

A thing to note is this that, while consuming goods/products it is individual's property, but after consuming it, they don't care about it at all, why? Also, the minimum wages of any government worker is 500 rupees per day, but they only get 300 rupees per day. According to our observation they need support of both people and the government, but at the same time we realized that if any of them improves (either people or the government) then it will help improve other. People should realize the importance and help them for e.g. let us imagine when the sweeper comes, everyone should come out from their home and bring the garbage present in the front of their home to the centre of the road as mechanical based garbage picking machines are already made but the problem is they can't work in the corners because of the parked vehicles (acts as hurdle to the machine). If we only device a mechanism to ease their work then it is not a complete solution because ultimately the system is making them to sweep and they are not getting the respect they need, so public involvement is must. Their happiness is the only motive and motivation for us.



## FIELD VISIT INSIGHTS



### Main points during our conversation:

- They sweep only in the side/corners of the road.
- 500 m area is assigned to group of two people.
- They sweep twice a day on the same road, once in the morning 9 to 12 and once in the evening 3 to 6.
- Work throughout the week.
- Daily earns 300 rupees only.
- According to them the whole process is tough task and takes lot of effort.
- On asking whether they need a solution, they told us that it would be better.
- On giving them an idea of a cycle then they said yes it would be helpful.
- Women are also there.
- But women cannot ride a bicycle.
- We asked them what you will recommend us to do; he told that a paddle would be better.
- The life span of a broom stick is about 10-15 days. Government provides broom.
- Health facilities are also provided by government.
- Behaviour of people is good till our work is good.
- Some workers are from nearby and some live far and comes on cycle.
- They only clean the garbage which they see...it's not like they are cleaning below the car.
- Approximately 5-6 kilo of waste is collected in one shift.
- Why do they do it...simple answer for stomach.
- Mostly the waste contained tree leaves, fruits/vegetable waste, and plastic.

### Observation and their major problems:

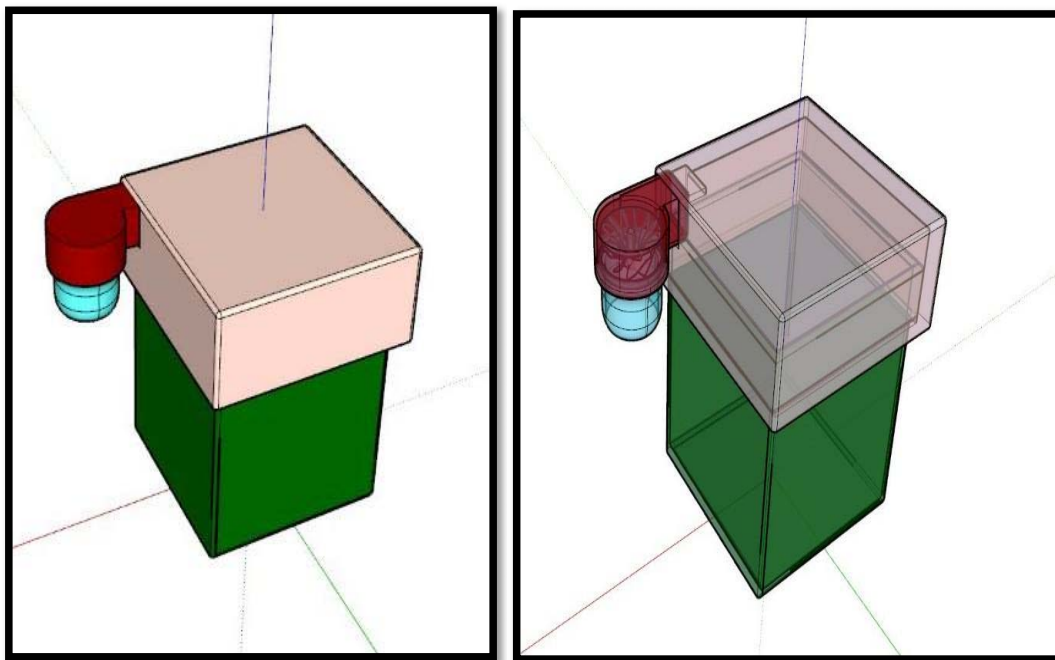
- We observed that they work in intense heat.
- Manual, cumbersome and time consuming.
- They work hard and neglects pain for their livelihood.
- If this work can be done in less time than they can utilize their time somewhere else or can do something else for double earning. After coming from morning shift

they can only do rest as they have to prepare their body for the next evening shift.

- After cleaning the road and collecting it somewhere the problem which comes is picking it up and putting it in the lorry manually. They then take the lorry to the location where all of the garbage is collected. Pushing the lorry is also a problem.
- Mask is provided but they prefer cloth.
- Garbage while cleaning spreads in air becomes problem for people passing nearby.
- Their health and health of people passing nearby.
- This method is not at all efficient.
- Pain in the hands of the sweepers.
- Back pain of garbage collector/lorry holder.
- Problem of less storage capacity of the lorry.
- The garbage is mostly at corners but on streets vehicles are parked which acts as a hurdle to their work.

### **BRAINSTORMING (Mind mapping and initial literature review)**

After brainstorming, we initially decided to take the problem of collecting garbage. We initially thought to use vacuum to collect garbage, here is our design.



Initial design



Talking with a member of indo German tool room

On discussing our vacuum based design with a member of Indo German tool room, he gave us very valuable feedback:

- The product should not depend on other sources of energy like electricity etc., it should be independent otherwise for example if light goes in the area then their work will be left undone.
- Vacuum cleaners can be a solution but the problem is that the waste gets stuck and hence they require high maintenance cost.
- We should also consider that what is the reason behind generation of garbage on the street because if we will be able to reduce the garbage on the street then their half of the problem gets solved.
- One idea could be putting dustbins inside the ground at an interval of 10 m each, which will ease their collection problem as they can easily pick those dustbins from inside of the road and unload them in the lorry.
- Also, according to him, swachh bharat mission focuses on all over cleanliness but no one is concerned about cleaning of toilets. According to him, the flushing system which uses water to flush is totally bad idea as the waste do not gets dried out and makes it way to the rivers. But on land it used to mix with the soil and promotes greenery.
- If the product developed by us removes job of someone then we should also make sure that he gets employed in different and better sector or just simply provide them future scope. for e.g. your product removes 50% jobs so you should think about how they can be skilled/employed in different sectors of garbage processing that can be sorting or working in garbage processing industry which will help them earn better livelihood.
- They are doing this job because they cannot do anything else, hence we can increase their skill through any means.

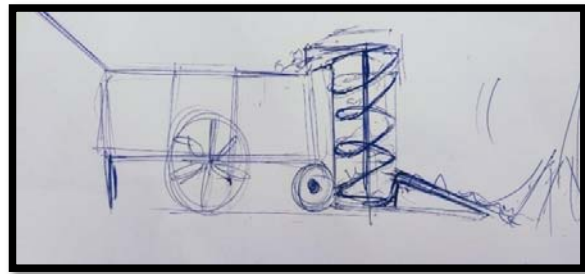
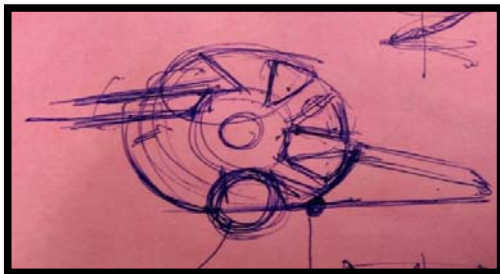
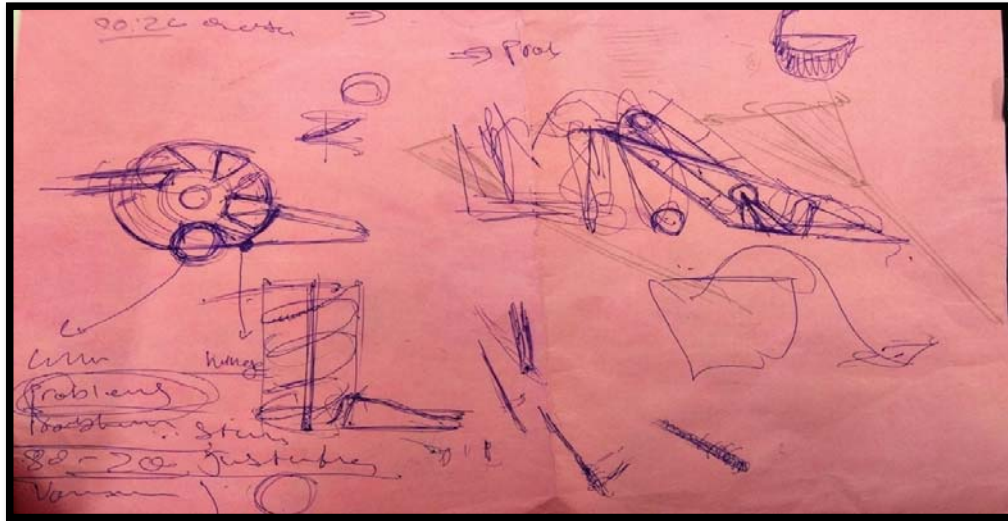
Problems with our design:

- High maintenance.
- Will not be affordable.
- Depends on external sources of energy.
- Blockage like plastic bottles, stones etc. can get stuck.

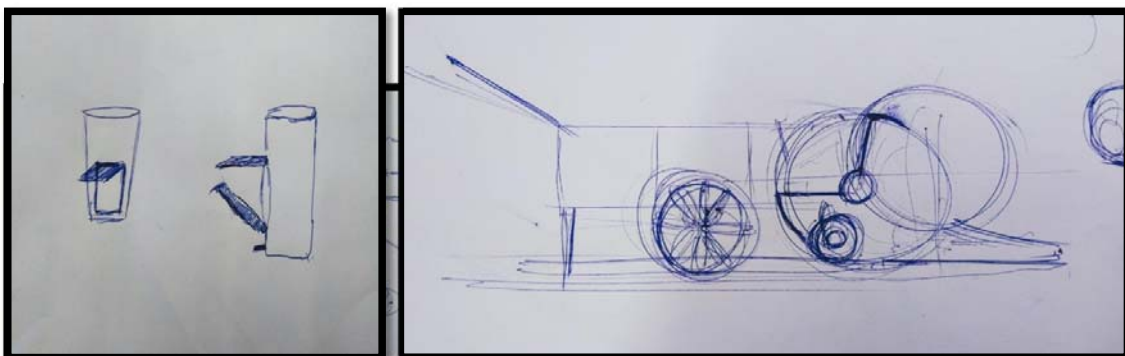


Hence, we dropped this idea.

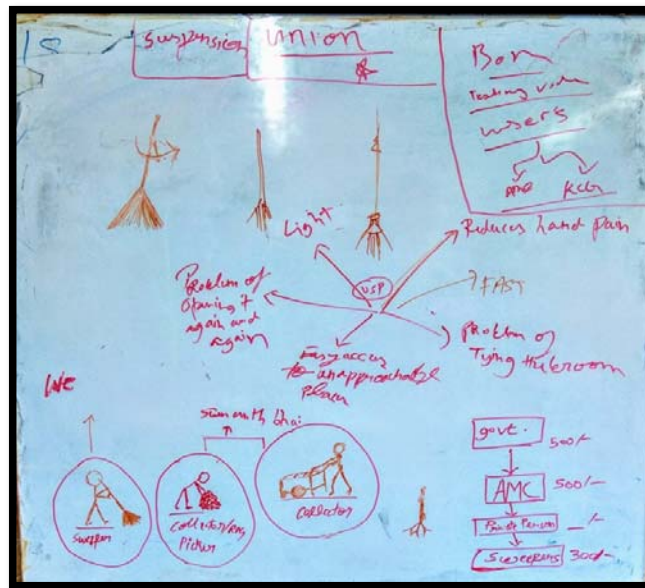
Here are the rough drawings of some new ideas.



## RE-BRAINSTORMING AND FINAL PROBLEM STATEMENT

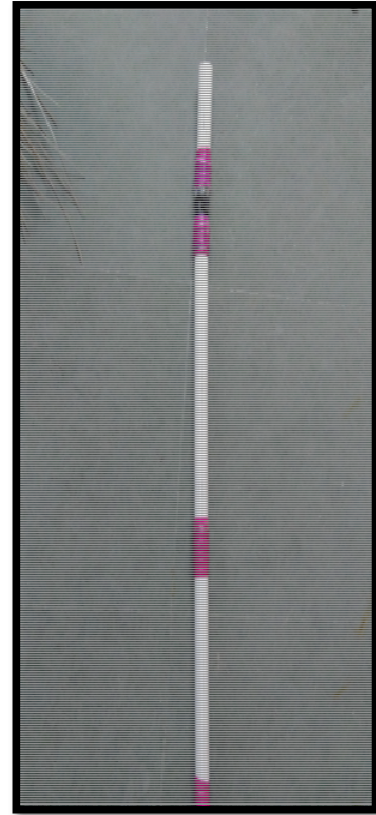


Initially, we focused on a better collecting device but our seniors gave us advice to work and improve a current machine made by someone (here is the link: <https://drive.google.com/file/d/1RPDGaGJhNs2NSc-xwendzdDAaiRTxDrE/view?usp=drivesdk>). We talked to him face to face. We also gave him a idea to make their machine work well, but due to unknown reasons we are not able to come in touch with him. But his machine also had a drawback that it can't work in the corners. Hence, due to many reasons and shortage of time (as we spend much time in realizing each and every problems well) we changed our problem statement and decided to work on the design of the broom itself to reduce pain and increase efficiency of the sweepers.



## DESIGN

We decided to provide hinge (universal joint) to the broom which will decrease the work of their upper hand which they use to provide axis for the circular motion of the broom. Also we made the broom light weight as bamboo is heavy. The bamboo they use easily pierce their hand after long use hence we used aluminium rod which is light, provides better grip and it is safe for hands. The hinge used also increased efficiency of cleaning. We want to give a solution to them which can be made easily with the existing products they use and which are easily available in the market.



## USER TESTING

On giving our product to the users they were very happy without even using it because they were very happy to see that someone is working for them. Their happiness made us feel something very odd inside which was not common for us. Many users said us that their hands have become strong enough that even if you give us a heavy stick it doesn't matter but it is our duty to give them the best possible thing.

Coming to the product testing we realized that they are very habitual to their early practice and it was very difficult for them to adopt this. But still, most of them found it useful after using it and they were saying that after 2-3 days they will be fine with it. Some of the users were saying us to make it especially for their home.

On listening to the manufacturing cost which is just 60 rupees, which is cheaper than the present broom they were amazed.



#### **COMMENTS/SUGGESTIONS BY EXPERTS AND USERS**

We met members of safai vidhyalaya, environmental sanitation institute and they gave us very valuable feedbacks.

First of all, they really appreciated our work and they were also very amazed on listening to the manufacturing cost. We also met with the expert in broom making over there, his name is kanchan dada. He was also happy with our product. They suggested us many changes which we are listing below:

- Instead of using thread for the grip you can use a movable cricket bat grip.
- Instead of using thread for tying the broom with the stick use the PVC made clamp (they also showed us the PVC clamp they made).

He advised us to keep in touch and we also asked him to help us in our future work/improvements in this field.





## WAY FORWARD



We believe that our work is not done yet. This was just a beginning of our work. We know that we have made a product but still we believe that many improvements can be done not only in the product designing but also in the policies. We want to give the respect they deserve. While meeting the users the pain can be easily felt in the eyes and we can't betray them, we will just not make promises to them but also we will fulfil them. We are developing in the defence, science sector etc. a lot but the complete development will be only when these problems will be solved and for this everyone will have to unite,

understand, collaborate and solve. If these problems (not only sweeping) are solved then nobody can stop our country.

We would like to thank the SRISTI team a lot, who gave us a chance to solve these kind of grass roots problems and we felt very blessed to do this work.