Project Proposal

on

Fabrication of Portable and Cost-Efficient UV Torch “प्रज्जज्जवल 1.0” for surface Disinfection

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Shishir Agrahari	Manas Shrivastava	Dr. Jitendra N. Gangwar	Dr. Samir Saraswati
(B.Tech 6th Semester)	(B.Tech 6th Semester)	(Assistant Professor)	(Associate Professor)
(Mechanical Engineering)	(Prod. and Ind. Engg.)	(MED)	(MED)

Abstract:

The outbreak of a global pandemic, COVID-19 has forced many challenges to mankind. Various measures have been taken to stop its spread. Social distancing, regular hand washing, etc have been advised to prevent its transmission. Countrywide lockdown is one of the major steps taken by the government of India to fight back COVID-19. Essential services like groceries, medicines, etc are necessary for sustenance. If a person is found to be affected with COVID-19, they have to be carefully treated and kept in isolation so that the health workers treating the person may not get affected. One of the root causes of the rapid spread of Corona virus has been due to transmission by surface. Countries like Italy and Spain has suffered a huge outbreak due to transmission through surfaces among other mediums of transmission. In the case of India, this outbreak can be devastatingly huge if not brought under control within this small timeframe. To counter this problem, i.e. contraction through surface transmission, a UV based portable surface disinfectant is hereby proposed.

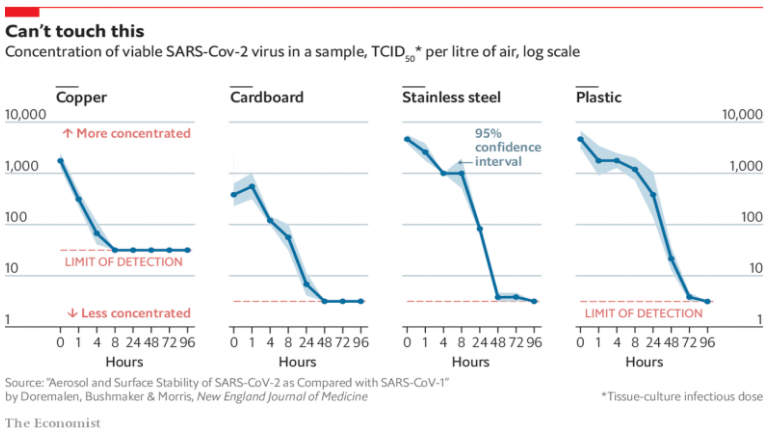
Proposed Product:

A low-intensity UV lamp will be placed at the focal point of a parabolic mirror which would result in a parallel beam of UV light. In order to be portable, the device will be battery powered and by virtue of the simplicity of design, it will be affordable, cheap, easily manufacture and economically feasible to be used widely in the country.

Introduction and Case Study:

- The average life of coronavirus strain on various surfaces is as given below:

(source:https://www.economist.com/graphic-detail/2020/03/19/how-long-can-the-novel-coronavirus-survive-on-surfaces-and-in-the-air)



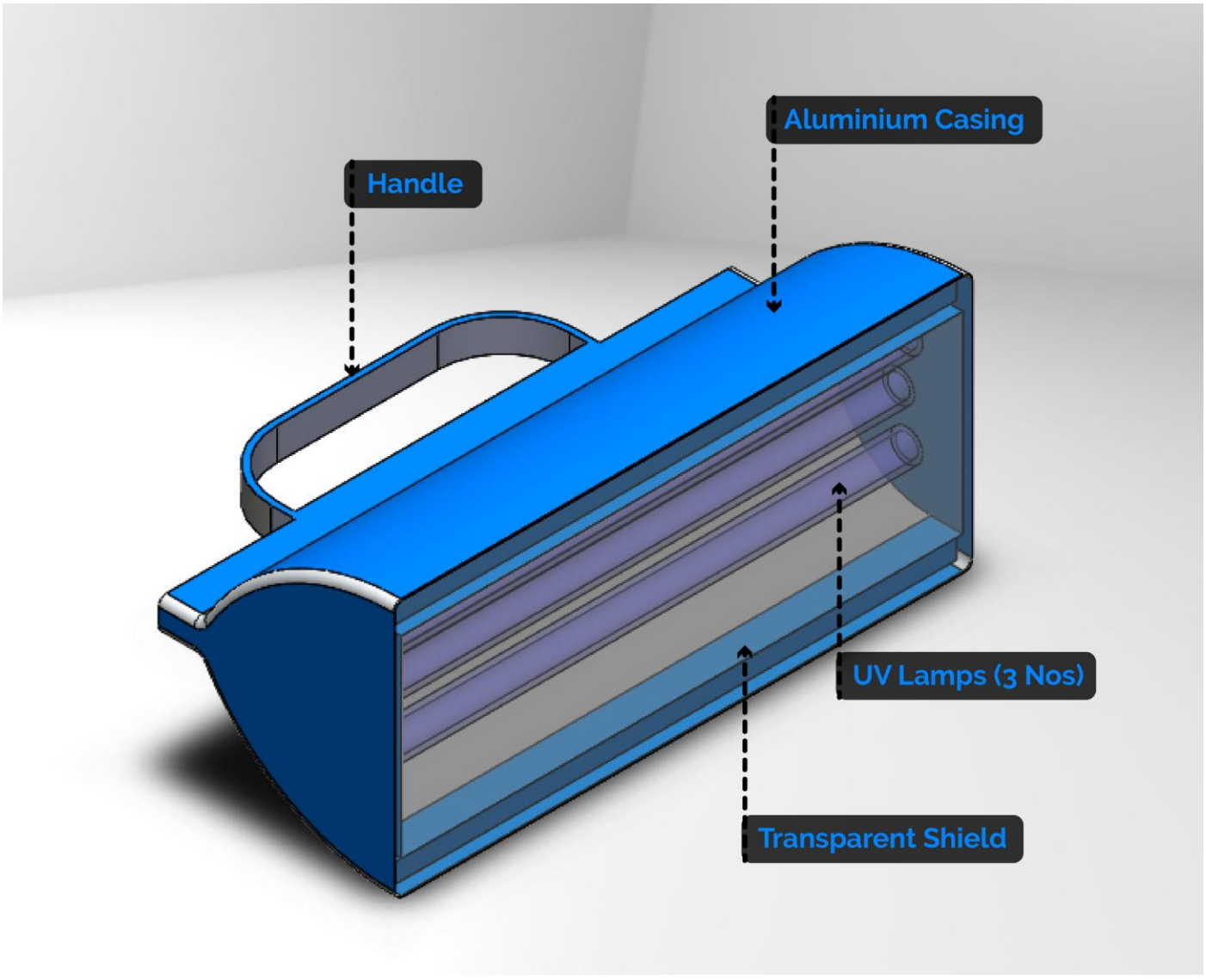
- The case of pizza delivery boy from Delhi who tested positive came into light on 16th of April, 2020 where 72 families of South Delhi had to be put under quarantine after receiving delivery of pizza from the same delivery boy. Such cases can be easily avoided by using the UV torch. 17 other delivery boys had to be quarantined and all the people who came in contact with them had to be tested and monitored. The resources, kits, workforce, etc spent on this single case could all have been saved if the pizza delivery outlet and the households had the UV torch. (Source: https://www.indiatoday.in/india/story/delhi-pizza-delivery-boy-tests-positive-for-coronavirus-72-families-quarantined-10-points-1667588-2020-04-16)
- Several other cases would have been prevented in countries like Spain and Italy where spread took place in places such as parks and bars where surface transmission is rampant. In India, the suitability and need of the product are even more required than other countries.

Scope:

- The product can potentially restore the supply chain of courier, parcels, e-commerce platforms, vegetable market; daily needs market by enabling common vendors and retailers to disinfect the surfaces of products, thus eliminating the risk of Coronavirus spread through their product's transmission through the supply chain.
- The medical workers, delivery staff, police, people working in sectors of essential services such as electricity boards, mining, banks, etc will be safer from the risk of getting infected through the product as they can disinfect their garments and other possessions very easily and frequently.
- The product will ensure the safety of people working outdoors for various services like linemen, pump operators, drivers, etc who are at high risk of contracting the virus through surfaces.
- The exchange of currency notes at various stages of most businesses possesses a great risk of contamination. This too can be solved through disinfecting the notes at various junctions through the product.
- It is not always possible to wash hands with soap but the UV torch can be carried and used almost everywhere conveniently.
- Manufacturing benefits: Since the product is very similar to a torch and has a simple structure and function, it's mass manufacturing is economically feasible and can be done rapidly.

Proposed Design of the UV Torch Model:

The proposed model of the UV Torch (**प्रज्ज्वल 1.0)** consists of a protective aluminum casing with 1 UV Lamp of 11 W powered by direct supply, operation controlled by a switch. The aluminum casing makes it a lightweight and Handle provided at the end of the torch makes it ergonomically suitable to carry. A cheaper version is planned to have plastic casing as its body. The design includes a parabolic mirror on whose focal point the lamps will be placed so as to create a parallel beam of UV thus preventing its divergence and spreading onto unwanted surfaces. The power button is provided with a safety latch so as to prevent an accidental switching ON of the torch.



Estimated Cost of Product:

Sr. No.	Details of Items	Quantity	Rate	Total Cost
1	**Aluminum Casing**	**1**	**200**	**200**
2	**UV Lamp (11W)**	**3**	**200**	**600**
3	**Power Plug**	**1**	**50**	**50**
4	**Protective glass**	**1**	**25**	**25**
5	**Switch and cover**	**1**	**5**	**5**
6	**Electrical fittings**	**3**	**5**	**15**
			Grand Total:	**Rs. 895**

Variants:

- Three variants have been planned out for the product:
    1. 3 UV bulbs for increased intensity costing- Rs. **895.**
    2. Single UV bulb for household applications costing- Rs. **495.**
    3. Single UV bulb with plastic casing for reducing cost, costing-Rs. **375.**

Challenges:

- Possession of UV emitting devices is a huge risk to the safety of people if used in an irresponsible manner. Provisions to prevent its misuse need to be worked upon and implemented.
- Strict warnings and usage instructions have to be mentioned clearly on the product.

Future considerations:

The UV torch's portability can be enhanced by providing an option for battery-powered units. Other improvements can be made on the basis of feedback that will be received.

Conclusion:

The UV Torch (**प्रज्ज्वल 1.0)** is ready for manufacturing of a prototype and for production of subsequent units after improvements and final tweaks made on the basis of feedback received. The product might prove to be of immense usability in each household and office during the times of this pandemic. Owing to its cheap cost and easy handling, we hope that our contribution towards fighting the outbreak succeeds in its purpose.