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Designing a Locally Manufacturable Wheelchair for Nepal

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DESIGNING A LOCALLY MANUFACTURABLE WHEELCHAIR FOR NEPAL

2022 SCHOOL OF SCIENCE, ENGINEERING, AND HEALTH SYMPOSIUM

PAULINE DEUTCHEU

OUR CLIENT

International Nepal Fellowship (INF) aims to bring sustainable improvements in health and quality of life of people and communities. INF currently has 11 locations throughout Nepal. One of the ways that INF provides support is through supplying wheelchairs to persons with disabilities.

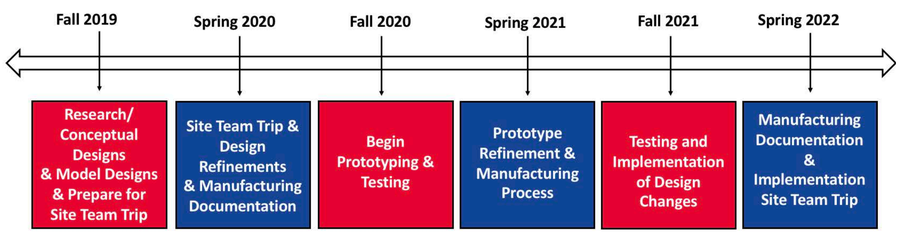
INTERNATIONAL NEPAL FELLOWSHIP

PROBLEM STATEMENT

The wheelchair kits that INF currently uses are expensive, difficult to import, and can be held up at the border for up to 18 months. Replacement parts for imported wheelchairs are nearly impossible to find. INF needs a way to overcome these obstacles in a cost and time efficient manner.

PROJECT GOAL

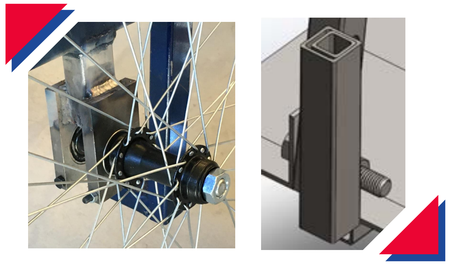
Our team aims to provide International Nepal Fellowship (INF) with a wheelchair design, and manufacturing documentation for it, that can be produced in Nepal by INF staff. The wheelchair must be adjustable to fit specific patients and enable users to engage in their community.



PROTOTYPING

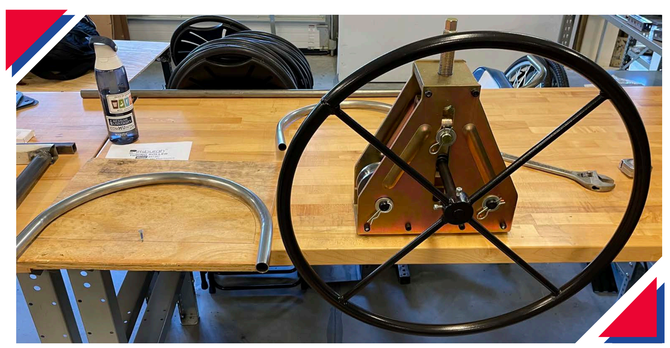
- In previous work an initial prototype was created shown on the far left. A second prototype, shown above, was constructed using steel from Nepal to better reflect the material constraints
- Both prototypes allowed for better insight into the manufacturing process, and allowed for feedback from our clients that lead to design changes

DESIGN CHANGES



- Rear wheel mount was updated to include a thicker axle and larger bearings to increase strength and longevity of the mount
- Footrest redesigned to add a counter weight to allow for the footrest to stay upright

- Caster wheel mount has been rotated 90 degrees to allow for more space between the user's foot and the caster wheel
- Seat and back rest were reinforced with crossmember bars and covered in fabric after feedback from our client on improving user hygiene.



Recent Work

- This semester push rims are being produced with a roller bender and the implementation of this design should add an essential feature to the wheelchair
- Also this semester manufacturing documents are being created for the site team trip this coming May (2022) to turnover to our client

CONCLUSIONS

- The Nepal Wheelchair Team has been able to develop and prototype a functional design that reflects feedback from our client and is well on its way to fulfilling the project goal. We have constructed a complete prototype and are now ready to move into further testing and prepare a manufacturing manual going forward.
- The team believes that the work done this year will allow for the global goal of designing, testing and developing manufacturing documentation for a wheelchair suitable for the Nepal terrain will be met in the coming years.

ACKNOWLEDGEMENTS

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