

Wheelchair for developing countries designed by students

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Credit: Erik Ohlson and Christian Bremer

Muddy, unpaved roads and doors with high thresholds. Operating a wheelchair in a developing country is a challenge. In their degree project for Industrial Design Engineering, Chalmers students Erik Ohlson and Christian Bremer developed the Walter, a wheelchair designed for developing countries.

At the end of June, Christian's and Erik's wheelchair won RESNA Student Design Competition 2013 in Bellevue, Washington; it received a great deal of praise from [physical therapists](#), [occupational therapists](#) and product developers.

It all started with a project in Kisumu, Kenya, and a visit to a school for

[disabled children](#). The wheelchairs there were poorly adapted to the prevailing conditions, and Christian and Erik were part of designing a proposal for modification. They then contacted a company producing wheelchairs for [developing countries](#), Whirlwind Wheelchair International - a non-profit [social enterprise](#) in San Francisco, California.

After four weeks at Whirlwind in San Francisco, where they developed a prototype, Christian and Erik spent two and a half weeks in Yogyakarta, Indonesia. There they met [disabled people](#) who tested their wheelchair and gave valuable feedback on what worked well and what needed improvement.

A wheelchair may lead to a job

Sri is one of the people who tested the new wheelchair. She was injured in a motorcycle accident at age 23 and with no wheelchair, she could not leave her parents' home for ten years. Now she works for UCP Wheels for Humanity Indonesia, who provides disabled individuals with wheelchairs around Yogyakarta. They also helped Christian and Erik to find users for testing.

"There are many people like Sri in developing countries. If they are offered the opportunity to leave their homes with a wheelchair designed for the local context, a whole new world opens up – it might even lead to a job," says Erik.

What makes Christian's and Erik's wheelchair unique is the alternating seat. The wheelbase is 50% longer than on a traditional wheelchair, and there are two different seat positions. Using the foremost position means moving the centre of gravity forward and the user can work harder to get up a steep hill, with less risk of tipping over backwards.

The possibility to move the seat forward also means the user can more

easily perform transfer procedures, without the back wheels getting in the way; for example, when moving from the wheelchair to a bed or other furniture - tasks that a wheelchair user needs to do several times a day.

More stable and easier to manoeuvre

Erik and Christian used a fixed frame with a folding backrest and detachable rear wheels. This makes the chair more stable and easier to operate. The fixed frame also means that the framework lasts longer before maintenance is needed. Many wheelchairs in industrialised countries are made of lightweight metals, but this chair is almost entirely made out of steel so that broken parts can easily be welded and repaired at the nearest bicycle repair shop. The front casters are from Whirlwind and their solid rubber design is inspired by a shopping cart in Zimbabwe. They work well in rugged conditions, such as sand, mud and snow.

Funding needed for the wheelchair to become reality

Christian and Erik now want to produce more prototypes so that more users can test the wheelchair to see if it helps them become more integrated in society. The [wheelchair](#)'s future is dependent on finding some form of funding. It is a complex financial situation since the users themselves generally are unable to cover the complete costs of a chair. In many cases, charity organisations are involved in providing these users with wheelchairs. "We want to live up to all of the expectations we have encountered from the users in Indonesia," Christian finishes.

Provided by Chalmers University of Technology

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