Prototype collective centre

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Prototype Collective Centre (reusable, lightweight, low cost, modular, rapid deployable)
A design and prototype made by the Eindhoven University of Technology, The Netherlands
Tim de Haas, Mark Cox, Roel Gijsbers, Eelko Brouwer, Peter Erkelens

Project summary
A full scale prototype of an innovative (semi-permanent, reusable, lightweight, low cost) Collective Centre was developed, which can be assembled and deployed within a couple of hours without the need for trained staff or heavy equipment. This Collective Centre can be extended by modules of 4m and was tested a number of times.

Introduction
After a disaster, permanent community buildings are mostly used for first relief of refugees. These buildings play an important role in the local community. However, when used as a shelter, these buildings can not be used as such, which will hamper the recovery of the local community. Currently, non-permanent, rapidly deployable Collective Centres are not available in the market. The Dutch Red Cross challenged the experts from the Shelter Research Group to develop a semi-permanent Collective Centre.

Collective Centre
An easily deployable, low cost, lightweight, modular semi-permanent Collective Centre has been developed, using a minimum of building elements. The developed Collective Centre has a long technical lifespan (10-50 yrs) and can be reused and setup in a minimum of time and without heavy equipment, additional power tools or schooled staff, which will not be available in an emergency situation. The Collective Centre has a span of 20m and dept of 20m (5 modules) which is extendable with a multiple of 4m. The internal plan of the Collective Centre is freely dividable and can resist hurricane wind speed 1 and a large amount of snow. Therefore, it is applicable in most countries worldwide.

Figure 1, One module of the Collective Centre prototype during testing at the university campus at October 1st of 2010
**Concept**

The use of the developed Collective Centre in the early phase after a disaster is of great importance for immediate relief. Later on, the Collective Centre can change into a transitional phase, acting as a (temporary) community building to start up communal activities (see circular concept scheme below). After a number of years, when the settlement transfers into a more permanent situation, the current strategy of the application of the Collective Centre includes that it will be dismantled and taken into storage again, awaiting the next disaster. The Collective Centre has a technical lifespan of approximately 50 years and is still fully functional to apply in another situation. Collective Centre can be used for community purposes, such as a hospital, distribution centre, marketplace, church or school.

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**Figure 2, Cycle of use of the developed Collective Centre**

1. Transport; 40 ft. Container, basic layout of 3 segments, operational within 24 hours
2. Assembly; Intuitive, logical unpacking, lightweight parts, easy to install i.e. picture manual, colour coding, clever connections
3. Recognition point; Span of 20 meters, height of 5 meters, bright colour use, pictograms on the skin
4. First aid facilities; Instruction aid workers, registration refugees, hand out existing emergency shelters, acclimatized emergency hospital
5. Extension; Beginning refugee settlement, need for more space, unlimited extendable, flexible room division
6. Collective Centre; Centralized place in camp society
7. Facilities in transitional phase; Flexible change of user functions, such as: distribution centre / storage / hospital / trade / etc.
8. Disassembly; Re-usable, durable
Advantages of the Collective Centre
- Easy deployable
- Assembled within 5 hours
- Low cost
- Lightweight
- Modular
- Reusable
- No powertools required
- No heavy equipment required
- Long technical lifetime

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Shelter Research Group
The Shelter Research Group (SRG) was formed at the Eindhoven University of Technology (TU/e), Department Architecture, Building and Planning, with the objective to actively support the humanitarian aid movement providing innovative solutions for post-disaster sheltering. The SRG consists of members with different backgrounds and interests such as product development (Tim de Haas), building technology (Peter Erkelens), building physics (Mark Cox), structural engineering (Roel Gijsbers), impact measurement (Simone van Dijk) et al. and also includes a staff member of the Netherlands Red Cross (NRC). All members are academia and have a wide network within the industry.
Pictures

Figure 3, The Collective Centre at ICWE 13 at RAI venue, Amsterdam, the Netherlands

Figure 4, Side view of one segment of a Collective Centre
Figure 5, Front view of a Collective Centre

Figure 6, Top view of one segment of a Collective Centre