IFRC-SRU
CONFERENCE: CLADDING AND FIXING

How to fix cladding to a structure

The IFRC-SRU 2014 conference on "Cladding & Fixings" hosted with funding from FVEMT took place on 3-4 September in Luxemburg at the Centre Leonardo da Vinci.

Like the previous year, the conference brought together actors from different Red Cross National Societies, IFRC, UN agencies, various NGO's, Universities and the private sector to share research results and practical experience from the field, creating the link between needs and realities and showing concrete results at all levels from the initial research to the practicalities of field implementation. The conference also served as a bouncing board to capture feedback on new proposed technologies and solutions and to identify design and development needs and opportunities.

The response to the conference was overwhelmingly positive; the vast majority of comments and recommendations suggested extending the research, covering more topics in more depth, and across more regions of the world.

The conference was introduced with the key-note speech by Isabelle de Muyser-Boucher, OCHA's coordinator for the World Humanitarian Summit, (WHS), she highlighted the need for innovation of the products already used as well as the "way we do business" in the humanitarian sector.

Practical information on opportunities to participate in the WHS global consultation process and various options to apply for innovation awards were well illustrated to inspire conference participants to bring their ambitions forward on this global platform.

The presentations given at the conference covered a wide range of topics relating to "cladding and fixing", from academic research and lab testing to practical field tests and beneficiary satisfaction. All presentations are available on **www.ifrc-sru.org**.

Field experiences and studies presented on the first day focussed on quality and performance of different textile cladding materials used mainly for emergency sheltering, such as tarpaulins, shade nets, and different tent-fabrics. The studies on ropes and tensioners undertaken within the framework of the Speedkits Project, supported by the by the European Commission "FP7" funding. (since 2014 "Horizon2020") were also presented.

Promising, innovative, interesting and emerging new cladding solutions presented were; Non-woven textiles, which could be the new low-cost sustainable, cladding material, these have a particularly good insulation capacity and are produced from recycled plastic

Cladding and fixing conference

Tested ropes and tensioners

Tested sample new fixing

International Federation of Red Cross and Red Crescent Societies

Shelter Research Unit
an initiative of the Benelux Red Cross Societies

materials. Fire-retardant plastic sheeting, that could help reduce the high risk of fire accidents in camps was another interesting development presented.

To complement the studies on cladding materials, the IFRC-SRU presented test-results on a whole number of different fixings for textile materials found on the open market, testing also included a comparison with traditional field solutions. The fixing tests looked at fixings of fabrics to rope as well as to frameworks.

The general conclusion showed market solutions barely equalled traditional field solutions, especially on the longer term tests (with the fixings attached to the fabric and loaded with a hanging sandbag) all the market solutions already showed a sliding effect hours after installation.

The stone wrapped in the corner of the tarpaulin and tied with rope is by far the strongest solution to fix a tarpaulin. The long awaited comparison between eyelets and holes punched in the reinforced band of the IFRC tarpaulin showed only minimal higher performance for rope through holes in the reinforced band. Clearly industrially fashioned eyelets outperform the eyelets put in by hand.

The second day was dedicated to "hard" and more durable cladding materials, as used for transitional sheltering. A topic flagged to IFRC-SRU by colleges from the field and the Shelter Cluster during the Haiyan response was the need for comprehensibly consolidated and confirmed information on Corrugated Galvanized Iron sheeting (CGI), one of the most used materials used in all phases of sheltering throughout the world. IFRC-SRU presented results of a series of practical field tests to better define quality and performance of Corrugated Galvanized Iron sheeting and its use for roofing.

Conference feedback session

CONCLUSIONS:

To conclude the conference, a consultation session was held with all participants to identify the most important areas for further research.

The key topics highlighted included:

> Extending the research and testing of the roofing elements to include the other structural elements of shelters, particularly foundations;

> Research on materials with a strong focus on insulations / winterisation materials addressing the needs encountered in the shelter response to the Syria crisis;

> Investigating "living conditions" inside shelters, looking a ventilation / breathability, thermal comfort, etc. especially with an eye to possible impact on health.

> Shelter life cycle, reusability, recycling, disposal

Interesting discussions were inspired by the presentation on "future proof cladding " and the "sacrificial cladding" (presentation for download on www.ifrc-sru.org/conference-presentations/cladding-and-fixing-conference/).

Traditional fixings bottle caps

A clear general demand was expressed for more technically reviewed and tested solutions, for all stages and options of sheltering (emergency, transitional core, progressive, etc.) in different contexts.

IFRC-SRU is continuously looking for collaborating opportunities as well as funding options to explore the topics flagged. Please contact the IFRC-SRU if you wish to discuss research topics, collaboration opportunities, or funding options. ■

UPDATE: WINTERISATION

The Research and development of a winterized tent for the Turkish Red Crescent (TRC) Syria crisis response and the extreme winter shelter for Mongolia is now well advance.

The new TRC tent design is completed with a new conception of the inner and outer tent and introducing an insulated groundsheet.

A full scale final prototype, using innovative materials developed by the University of Marmara has been completed in close collaboration with the technical staff in the TRC tent factory in Ankara. The new model is planned to go into mass production in the TRC tent production facility, to cater to the increasing demand at the onset of winter.

Different prototypes for extreme Winter shelters have been constructed again in collaboration with the TRC tent factory in Ankara. They will be tested in real environment in Ulan Bataar during January & February 2015. In the scope of this development, IFRC-SRU is also looking for suitable performant stove solutions. ■

Prototype of the new TRC tent

Work in progress on the development of Mongolia shelter prototype

Prototype produced in collaboration with the TRC technical staff

WORK IN PROGRESS: PHILIPPINES FIELD TESTS FOR CGI ROOFING MANUAL

The work in progress on safer roofing was presented by IFRC-SRU at the recent conference on “Cladding and Fixings”. This technical information on the use of CGI sheeting for roofing will be complied into a comprehensive CGI roofing manual. The manual will include chapters on the materials used for CGI roofing (including roof structure and fixings, hurricane straps), quality control and storage of CGI sheeting, effects of wind loads and different roof shapes, guiding principles to chose the most suitable roof type for a given context as well as recommendations for maintenance of CGI roofs.

Test for shear resistance of CGI sheeting

Field test setup in Samar, Philippines

The practical tests conducted in the Philippines in August 2014 on a variety of CGI sheets of different qualities as well as different roofing nails on different types of support, have already presented interesting results. For example, the twisted roofing nails, much promoted as better performing only came out with 10% more pull-out resistance but at almost double the price of the more commonly used straight roofing nails (comparison of prices as found in Tacloban hardware stores). CGI qualities were tested by nailing the sample pieces with one nail and pulling one end of the sample until failure “shearing” of the sheet or pulling out of the nail. While the cheapest locally procured CGI sheet of 0.15mm only achieved 20% of the shear-resistance (failure at 34kg of applied pulling force) of the imported CGI quality of 0.5mm (failure at 170kg of applied pulling force) the best quality of 0.45mm found locally reached 94% of the imported quality (failure at 160kg of applied pulling force).

These practical test results are used as baseline information for wind-load calculations applying three different wind-speeds on four different roof types with four variations of slopes in four different exposure situations (urban, peri-urban or open field and costal area). The case study calculations give guidance on most appropriate roof shapes, pitches and necessary amount and type of fixings for different exposure situations

Test for pull out resistance of nails

of given contexts. We are also working to provide automised calculations sheets for the calculation of wind loads on standard roof shapes.

The manual is mainly aimed at shelter practitioners as a resource for technical information and guidance on safe roofing construction using CGI, with particular regard to hurricane resistance.

The field testing in the Philippines was facilitated with support of Red Cross and ICRC at their warehouse location in Samar.

The draft manual will be shared with interested reviewers by end of 2014. If you are interested in participating in the review please **contact us.** ■

MAPPING: HAITI SHELTERS FOR DATABASE

The work on the Shelter Database is advancing and a first draft version is being tested online.

In the context of this effort, a field visit to Haiti was undertaken in August, to map shelters implemented after the 2010 Haiti earthquake. Most of these structures were constructed two to three years prior to the field visit, which allows for a realistic impression of the resistance and durability of the materials in the tropical climate as well as the way the families living in the shelters are modifying the structures according to their evolving needs.

A technical documentation and a beneficiary satisfaction survey were completed for some 17 different shelter models resulting in very practical findings for consideration in future projects. The documented shelters are being registered in the online database by as part of the test phase of the shelter mapping project.

Following are some first findings on how technical details and materials impact the durability and use of the studied shelters:

> Windows shutters and doors that are perceived as inadequate in an insecure urban context, are not left open by the inhabitants resulting in very poor ventilation of the space and clear effects on the comfort;

> are not well protected from the rain are ending up being closed definitively, making it very hot in the shelters;

> Very fast deterioration of the lower part of wooden structures and plywood cladding in cases where the shelter was not elevated from the ground level, due to rain, humidity of the soil and termites ▶

Spanish Red Cross Core shelter with veranda extentions by beneficiaries

International Federation of Red Cross and Red Crescent Societies

Shelter Research Unit
an initiative of the **Benelux Red Cross Societies**

Canadian Red Cross shelter with extention by beneficiaries

- > Most of the shelters had water infiltration through holes and joints in the CGI roof cladding, mostly due to poor workmanship;

> The same shelter type was found to evolve very differently when implemented in urban or rural context. In urban contexts most beneficiaries want to rebuild a concrete block house so they don't invest in upgrading the wooden shelter. At the same time in many cases the shelter is occupying most of the plot, thus hampering new construction. In semi-rural context, where more space is available, families who have the financial means use the shelter as a core structure to add other rooms;

> The levels of deterioration of shelters were different between neighbourhoods that had different construction teams, but also depend for a large part on the maintenance by the beneficiary.

The detailed report with analysis of the findings will be available by the end of 2014, posted on **ifrc-sru.org** and further disseminated.

The first version of the database is planned to be ready online for consultation and open for entry of new shelter projects by end of 2014.

Next mapping mission planned:
According to the strategy set out by the IFRC-SRU governance, IFRC-SRU should aim to consistently map shelters and produce technical reports, following major natural disasters where the Shelter Cluster was activated. Following this logic, the Philippines should be the target of the next mapping effort.
IRC-SRU is looking to pool resources from different implementing agencies in the Philippines to facilitate this next mapping mission. ■

UPCOMING EVENTS

BANGLADESH SHELTER WORKSHOP 21ST–24TH NOVEMBER 2014

IFRC- SRU has been invited by Friendship Bangladesh to provide the content and facilitate a technical workshop, addressing challenges of sheltering in Bangladesh.

The focus of this workshop is on the technical aspects of sheltering, starting from material distributions that best support the self-help efforts of the affected population and following through to the practical challenges of shelter projects ranging from temporary, transitional and core, to permanent sheltering. The technical topics addressed will include site organization, as well as the critical constructive elements, foundations, walls, roofing etc. always taking into account local construction techniques and materials in order to better adapt the responses to the different regions of Bangladesh.

The workshop brings together experienced shelter professionals from local and international NGO's, the RCRC Movement, the Bangladesh Shelter Cluster as well as the academic world to share experiences, discuss different shelter solutions, and together draw conclusions regarding technical suitability and quality of shelter responses.

The Bangladesh Ministry of Disaster Management and Relief and the Bangladesh Shelter Cluster have expressed their support of the workshop. Representatives of both will participate and take up the outputs in their official key messages and guidelines.

For those interested in participating in this workshop, please write to **IFRC-SRU@croix-rouge.lu** or Friendship Bangladesh **kaziamdadul@friendship-bd.org** for more information.■

Post-Sidr shelter implemented by IFRC and BDRCS extended by beneficiaries

AIDEX-BRUSSELS

THE GLOBAL HUMANITARIAN EVENT

If you want to meet us at AIDEX, we will be around the Red Cross stand. IFRC-SRU will also be taking part in the panel discussion: "Is innovation Good for us? How can we keep innovating form preventing progress? The tried and true vs. reinventing the Wheel". Further more we will be present at the launch of the World Disaster report with focus on Culture and risk, to promote the importance of cultural suitability of sheltering. For more information on dates, times and other participants on the panel discussions visit **http://www.aid-expo.com/brussels/visit/conference-2015**

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