STRAWTEC® - Made in Rwanda

STRAWTEC® has a unique concept to establish local, self-sufficient manufacturing facilities to produce robust strawboard panels, which then serve as the primary building material for mass-housing and commercial construction projects. A STRAWTEC® production facility uses innovative, easy-to-manage technology, local labour and locally grown, natural, renewable resources.

With the high demand for flexible, affordable building solutions and the availability of wheat straw in the area, Rwanda is the ideal location for the introduction of STRAWTEC® technology into the East African Community.

STRAWTEC® is supported by an agreement with Rwandan wheat cooperatives and the Ministry of Agriculture and Animal Resources (MINAGRI) to ensure effective supply-chain management of wheat straw to the production facility.

Benefits to Rwanda

Reduction of trade deficit

- Construction costs in Rwanda are high, with most building materials currently being imported (i.e. cement, gypsum board). Import substitution and strong export potential will lead to an improved balance of trade for Rwanda.

Creation of local jobs

- STRAWTEC® creates new employment in farming and transport, in addition to a significant number of news jobs at the manufacturing plant

Skills development / Vocational training

- STRAWTEC® has partnered with the Workforce Development Agency (WDA), Ministry of Education (MINEDU) and the german Gesellschaft für Internationale Zusammenarbeit (GIZ).

The goal of the partnership is to develop and implement a curriculum for STRAWTEC® construction methods via accredited modular training units and Industrial Attachment Programs.

Training will be offered initially at the STRAWTEC® Training Centre within Nyanza Technical School, and subsequently rolled out to other technical schools across Rwanda, to meet the anticipated demand for construction workers that can build with STRAWTEC®

Additional income for local farmers

- The STRAWTEC® manufacturing process creates a market for wheat straw, thereby providing an additional source of income for wheat farmers

Development of community initiatives

- Together with Fischer Architects, STRAWTEC® donated STRAWTEC® panels, light weight metal profiles, design and structural engineering for Muzanse primary school.

- The City of Kigali and STRAWTEC® have joined forces to provide a semi-public forum in Kigali for workshops, exhibitions and events to showcase innovative green building and architectural concepts. The forum shall provide an environment for the exchange of ideas, education and information combining the private sector with public events.

STRAWTEC® representatives with Rwandan wheat farmers

Permanent Secretary MINAGRI and Chairman of STRAWTEC® sign agreement

Principal of Nyanza Technical School and Chairman of STRAWTEC® agree partnership
STRAWTEC® supplies complete housing solutions with a focus on medium to large-scale neighbourhood developments. STRAWTEC® standardized, pre-fabricated housing kits can be delivered and assembled at high speed, providing a cost-effective yet high quality solution.

STRAWTEC® has partnered with Mace Group, Fischer Architects and Peter Rich Architects in order to be in a position to deliver turnkey developments. With extensive experience in delivering large-scale residential projects, Mace Group is the responsible project management partner for mass-housing projects, Peter Rich Architects develops the master plans and Fischer Architects are responsible for the development and design of the required housing typologies.

Typologies

STRAWTEC® has designed specific row houses and apartment building to be in line with the 2012 EU-financed Rwanda Housing Market Study, allowing for higher density as required by the Kigali City Master Plan.

Single and two-storey detached housing

Row housing

Apartment buildings
Commercial Solutions

Commercial construction is a key area for STRAWTEC® wall partitioning solutions, which do not require a framework and can therefore be constructed up to three times faster than traditional partitioning walls. Pre-cut wall modules allow for optimum construction rates and are therefore a highly economical alternative for contractors.

In addition STRAWTEC® has developed construction techniques enabling buildings to be made solely with STRAWTEC® panels. Construction of the first two-storey office building in Rwanda made entirely from STRAWTEC® panels is planned to start in January 2014.

Education Solutions

STRAWTEC® is the ideal choice to deliver school buildings; the speed of construction is a real advantage, the sound-proofing qualities are ideal for a school environment and STRAWTEC® provides excellent acoustic properties within the classrooms.

The first STRAWTEC® prototype TVET (Technical and Vocational Education and Training) school will be supported by the Workforce Development Agency (WDA) and built on the site of the Nyanza Technical School in 2014.

In co-operation with the Partnership Rhineland-Palatinate / Rwanda, a German NGO, STRAWTEC® is developing a primary school solution and will build a model primary school in the Muzanse District in 2014.
STRAWTEC® Construction Solutions

STRAWTEC® has carried out extensive research and development into construction applications of strawboard. With the specific aim of developing complete housing and commercial structures made from STRAWTEC® for emerging markets, STRAWTEC® has collaborated with Bauhaus University in Weimar, the Weimar Institute of Applied Construction Research, Professor Dr.-Ing. Holger Techen of the University of Applied Science in Frankfurt and the Ethiopian Institute of Architecture (EiABC). STRAWTEC® is now in a position to serve the large demand in these emerging markets with workable, affordable construction solutions.

Structural Solutions

STRAWTEC® Monolithic

Superstructure built using STRAWTEC® panels only

STRAWTEC® + Wooden Frame

Superstructure built using STRAWTEC® panels + Wooden Frame

STRAWTEC® + Lightweight Metal Profiles

Pre-fabricated sections
Complete superstructure up to G+3

STRAWTEC® + reinforced concrete framework

Complete superstructure G+4 and above

Partitioning Solutions

Traditional partitions from cement block or gypsum board can easily be substituted with STRAWTEC® wall modules, resulting in construction time savings, reduced costs and higher performance.

Floor-to-ceiling STRAWTEC® modules can be delivered on site, according to required performance criteria (ie sound-proofing, fire-proofing).

Research Project in Africa

STRAWTEC® participated in the research project ‘Welcome to Africa’ in partnership with the Bauhaus University Weimar and the Ethiopian Institute of Architecture, Building Construction and City Development (EiABC) at the University of Addis Ababa, Ethiopia. The outcome of the project was the construction of the STRAWTEC® Sustainable Emerging City Unit (SECU) on the university campus in Addis Ababa, a 2-storey building which now serves as a university guest house.

Sustainable Emerging City Unit (STRAWTEC® SECU)
STRAWTEC® Production Technology

International demand for flexible and affordable construction requires an entirely new intellectual approach and highly-efficient building technologies. Connected with this is a need to apply and maintain these technologies as simply as possible; only then do they have the potential to function all over the world.

Introducing STRAWTEC® - the cleantech production technology to manufacture highly-efficient, sustainable building solutions.

Sustainable
STRAWTEC® has an negative Carbon footprint, is 100% recyclable and biodegradable. STRAWTEC® already fulfills the future requirements for sustainable, energy-efficient, healthy building materials.

Tests and standards
Strawboard panels have been tested extensively and meet international standards:
- UK: British Standard BS 4046
- Germany: DIN 4103
- France: CSTB
- USA: ASTM

High Performance
STRAWTEC® panels are extremely robust and have an impressive combination of physical properties including:
- a very high strength to weight ratio
- excellent thermal insulation and heat storage capacity
- excellent sound insulation and acoustic properties
- superior fire resistance up to 90 minutes
- high resistance to mould and pest infestation
- load-bearing capacity up to 80kg per screw

The manufacturing process produces zero toxic waste, is completely nonhazardous and requires very low energy input. No water or gas is needed. Although wheat straw is the preferred primary raw material, the STRAWTEC® panel has been successfully manufactured from a variety of cereal straws and grasses in a wide range of climates throughout the world. These agricultural waste fibers are typically burned for disposal, a process that releases harmful pollutants into the atmosphere.

STRAWTEC® technology combines heat and compression in a dry extrusion process that allows the natural adhesives contained within agricultural fibers to bind the fibers to form a continuous high-quality strawboard panel. High strength recycled paper is used to seal the strawboard panels and to give a finish-ready surface.

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**Partnerships**

### Planning & Design

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<th>Turnover</th>
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<tr>
<td>Fischer Architects</td>
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<td>Prof. Dr. - Ing. Holger Techen, Germany</td>
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### Education

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### Research & Development

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