THE EMERGENCE OF A NEW GENERATION OF BUILDING PRODUCTS IN POST-WAR BELGIUM.

The case of lightweight concrete

Stephanie Van de Voorde, Inge Bertels, Ine Wouters

Vrije Universiteit Brussel, Department of Architectural Engineering, Belgium
The emergence of a new generation of building products in post-war Belgium.

The case of lightweight concrete

Post-war building in Belgium

- Organization of the building industry
- Public commissioners and private owners
- Improved traditional building methods

Construction techniques in the periodical press

- La maison
- Architecture
- Bouwen & wonen

The case of lightweight concrete
post-war building in belgium
post-war building in Belgium

Number of houses built in 1945-1975 in Brussels
post-war building in Belgium

organisation of the building industry:
85% small and medium-sized companies (1 to 4 workers)
post-war building in belgium

organisation of the building industry: small, traditional and ‘safe’ contracts
post-war building in Belgium

**public commissioners** vs. private owners

national housing programme for miners (1946-48)

- design team: arch. Léon Stynen, Louis-Herman De Koninck, ir. Louis Baes, etc.
- industrialized building methods: ‘no fines concrete’
post-war building in belgium

public commissioners vs. private owners


- houses built with government support
  - De Taeye-subsidy (=private initiative)
  - social housing companies
post-war building in belgium

# houses in Belgium : 3,632,222
- freestanding: 1,371,260
- semi-detached: 928,974
- terraced: 1,166,002
- apartment building: 165,986

# houses in Brussels: 160,880
- freestanding: 5,745
- semi-detached: 15,436
- terraced: 108,351
- apartment buildings: 31,348
post-war building in Belgium

terraced houses (2 or 3 floors)

apartment buildings (4 or 5 floors)
construction techniques in the periodical press
construction techniques in the periodical press

- dissemination of knowledge: immediate, continuously, heterogenous
- barometer of a building culture in a specific time and place
- articles, technical documentation, advertisements
construction techniques in the periodical press

- *la maison* (1945-1970)
- *bouwen en wonen* (1953-1962)
- *architecture* (1952-1970)

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the periodical press: *la maison* (1945-1970)

one of the earliest and longest running post-war architectural journals

monthly, 26 years, 299 issues, 4000 articles

architecture, equipment and decoration of houses

moderate discourse: to inform and to educate

no technical perspective, yet still technical information
the periodical press: *bouwen & wonen* (1953-1962)

- monthly, 10 years, 99 issues, +1000 articles
- (new) techniques and materials, design, fine arts, urban planning, interior decoration, expositions, contests,...
- Renaat Braem (architect) and Victor Van Coillie (contractor)
- close collaboration with the building industry
- thematic issues + articles + ‘informercials’ on wood, cement and concrete, bricks, new finishing materials, insulation, steel and aluminium, plastics, prefabricated panels,...
the periodical press: *architecture* (1952-1970)

published irregularly, 94 issues during 19 years

‘the new generation of modernists’: progressive, polemic theme issues, often on building typologies + news and topicalities

no specific ‘technical’ focus: information on building techniques was inserted in the descriptions of completed buildings
construction techniques in the periodical press
the case of lightweight concrete
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lightweight concrete = concrete with low specific gravity (500 kg/m³)

two types of lightweight concrete:
  • gas concrete
    foaming agent (aluminum powder) creates a chemical reaction
    °1920s, Sweden
    Ytong, Durox, Siporex
  • concrete with lightweight fibres
    e.g. wood fibres
    Durisol
    °1930s, Switzerland

always prefabricated (controlled factory environment)
the case of lightweight concrete

popular after World War II
- low specific gravity (easy and quick to handle)
- very low heat conduction
- loadbearing capacity
- industrialized production
- resistant to fire and moist
- easy alterations
the case of lightweight concrete

- walls in lightweight concrete
- stacked like ceramic bricks/masonry
- panels in lightweight concrete
the case of lightweight concrete: *ytong*

- first type of autoclaved aerated concrete
- °1923, Swedish architect Johan Axel Eriksson: experiments with the autoclave to speed up the curing process
- lime and silica, mixed with aluminum powder
- harden in (steel) moulds, sawn into pieces, put in autoclaves under steam pressure to finalize the chemical reaction
- *ytong*: Yxhult (town where the first factory was located) + betong (Swedish word for concrete)
- 1954-55: first ytong-factory in Belgium
- blocks (+panels)
the case of lightweight concrete: ytong
the case of lightweight concrete: ytong
the case of lightweight concrete: ytong

- experimental house in La Hulpe
the case of lightweight concrete: *ytong*

- Cité Ban-Eik, Wezembeek-Oppem
  289 houses
  arch. Groupe Structures
  cavity walls in Ytong and masonry
the case of lightweight concrete: **siporex**

- °1935, Sweden
- = ytong, except: artificial Portland cement instead of lime
- produced in Belgium since January 1956
- shape and size: blocks, wall panels, floor or roof plates, lintels, etc.
  - 25 cm high, 61 cm wide
the case of lightweight concrete: siporex

- siporex-house (cellar, floor, outer and inner walls, roof, lintels, staircase in siporex): two men in one and a half week.
the case of lightweight concrete: siporex
the case of lightweight concrete: durox

- durox: ‘dur’ (French for hard) + ‘rox’ (rock, strength)
- blocks (39 by 24 cm, 5 cm) and panels (570 by 50 cm, min. 7.5 cm).
the case of lightweight concrete: durox

- ‘complete’ application in Belgium: experimental durox-house
  Renaat Braem
  National Building Center in Antwerp
  external walls 21cm thick
  inner walls 11 or 15cm thick
  roof plates 15cm thick
  joints between the panels were flushed,
  external walls were painted
  March 1960, five days
the case of lightweight concrete: durox
the case of lightweight concrete: **durox**

- social housing project in Seraing
  - arch. Constant and Godart
  - 60 houses
  - standard Durox panels
the case of lightweight concrete: **durisol**

- 1930s, Switzerland
- cement, water, chemicals + fibrous (waste) materials (wood, textile and vegetable products)
- low specific gravity, easy alterations (sawing, drilling or nailing)
- either as flat panels, planks and slabs
- or as hollow blocks and hollow floor slabs (permanent mold for loadbearing walls and floors in reinforced concrete)
the case of lightweight concrete: durisol

hollow blocks:
- 50 cm x 25 cm, 15-30 cm thick
- made in a rotary press: pressed and vibrated, formwork is removed, 6 weeks in an open-air storage site
- stacked in a staggered arrangement, hollow cores are filled with concrete (+ reinforcement)
- finished with mortar or cement, lime and/or sand renders

hollow floor slabs:
- 50 cm wide, 12 - 24 cm thick
- cylindrical holes in a lengthways direction
- permanent shuttering and insulation for in situ cast concrete floors (compressive layer + reinforcement)
the case of lightweight concrete: durisol

applications
- Kiel (arch. Braem, Antwerp)
- Plaine de Droixhe (arch. EGAU, Liège)
- ...
the case of lightweight concrete

lightweight concrete

- ‘improved traditional’
- economical and pragmatic advantages: light, quick, cheap
- prefabrication, rationalisation, innovation
- minor implications on architectural design, traditional concept
- changes in the building practice < > no changes in the architectural design

- many examples of applications: integrated in the daily building practice
beyond the case of lightweight concrete

3 journals, 1 image?
- each journal shows different aspects, at different times in the development
- innovation, stimulating technical progress
- between clichés and advantages
- ‘anonymous’ descriptions of applications

scientific progress?
- ‘delay’ between different journals: from innovation to daily practice
- need for a scientific litterature (foundation of the BBRI/WTCB/CSTB in 1960)

business and industry
- the manufacturers pursued an active policy (advertisements, infomercials), mostly addressed to architects
- no idea on the ‘resistance’ of contractors against the introduction of new building products on the building site

post-war building practice
- applications and construction details
- need for renovation/restauration?
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