

BASF Construction Chemicals

We create chemistry for sustainable construction

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 **BASF**
The Chemical Company

BASF - The Chemical Company



- Our chemicals are used in almost all industries
- We combine economic success, social responsibility and environmental protection.
- Sales 2012: €72,129 million
- EBIT 2012: €6,742 million
- Employees
(as of December 31, 2012): 110,782
- In 2012, BASF filed for around 1,170 new patents worldwide
- 6 Verbund sites and around 380 production sites



Structure of BASF's segments



Chemicals

- Inorganics
- Petrochemicals
- Intermediates



Plastics

- Performance Polymers
- Polyurethanes



Performance Products

- Dispersions & Pigments
- Care Chemicals
- Nutrition & Health
- Paper Chemicals
- Performance Chemicals



Functional Solutions

- Catalysts
- Construction Chemicals
- Coatings



Agricultural Solutions

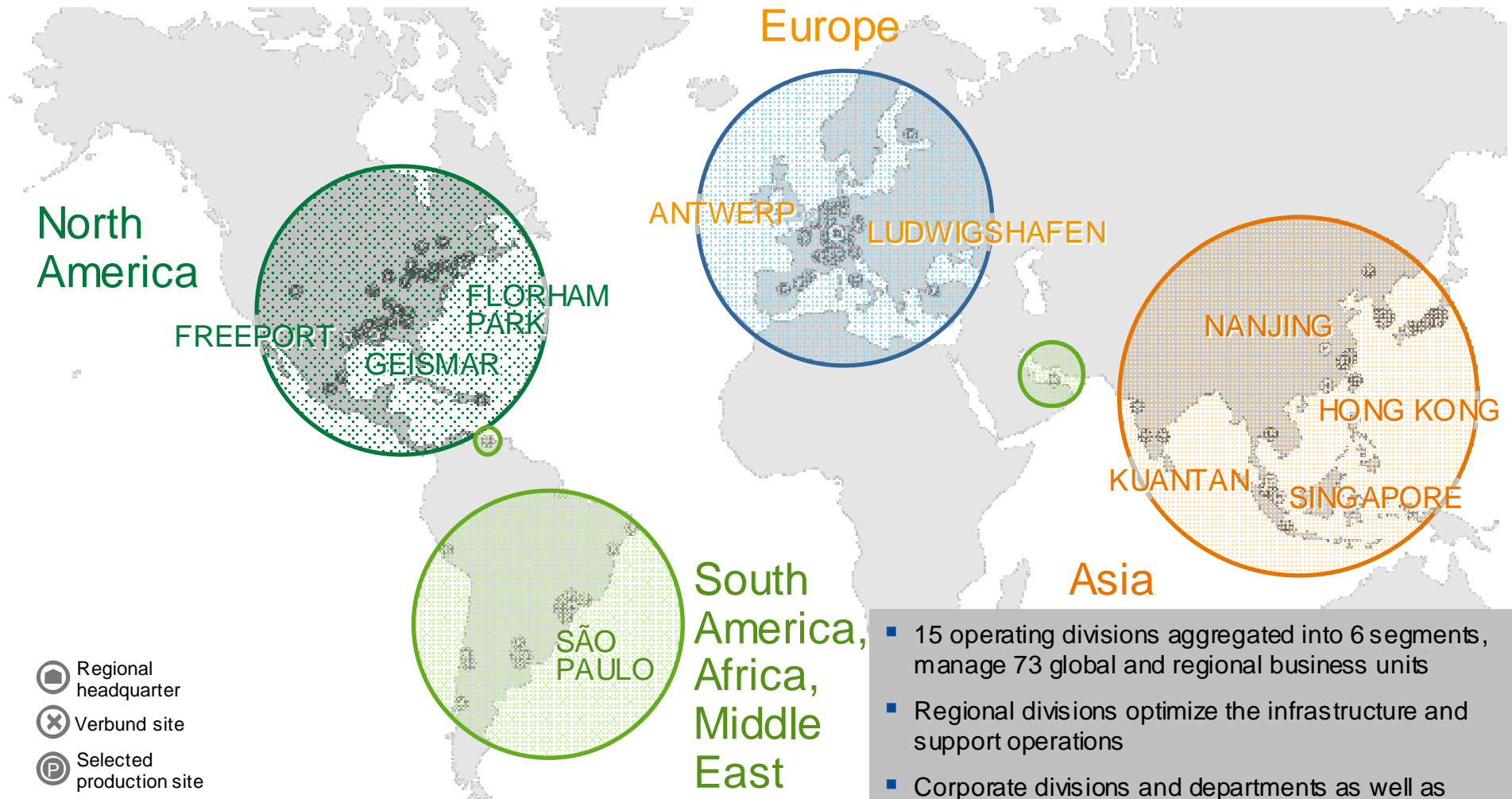
- Crop Protection



Oil & Gas

- Exploration & Production
- Natural Gas Trading

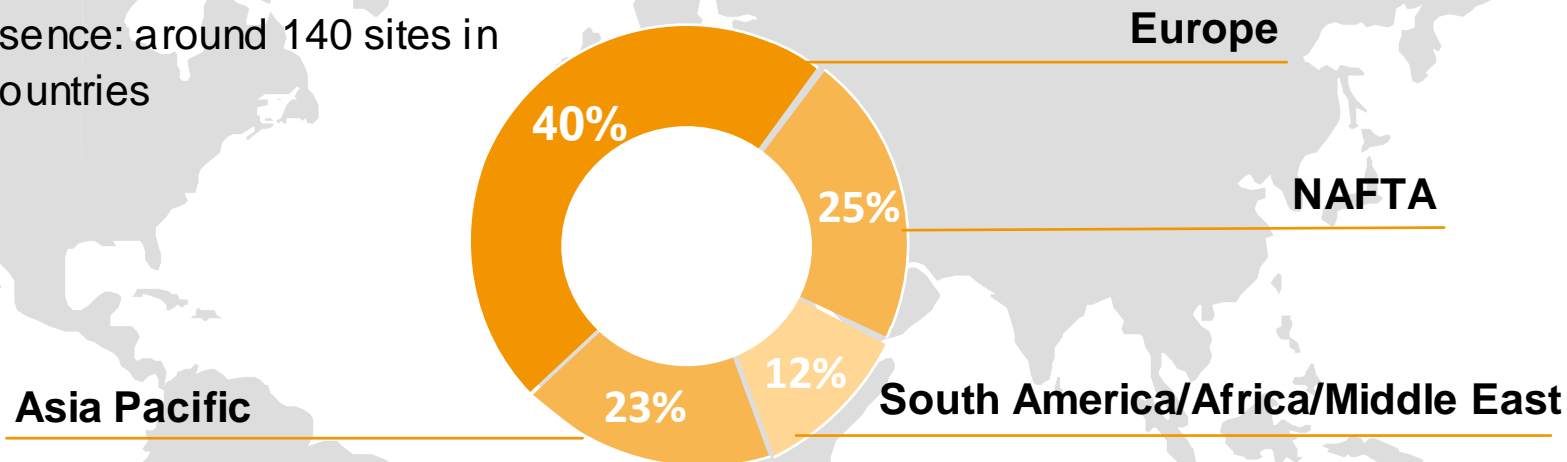
BASF Worldwide



- 15 operating divisions aggregated into 6 segments, manage 73 global and regional business units
- Regional divisions optimize the infrastructure and support operations
- Corporate divisions and departments as well as Competence Centers provide Group-wide services

BASF Construction Chemicals Facts and Figures 2012

- Sales 2012: € 2,315 million
- Employees 2012: 6,400
- Local presence: around 140 sites in over 60 countries



- More than 30,000 clients worldwide
- More than a century of experience

The Construction Chemicals Portfolio



Cement Additives

Admixtures

Underground
Construction

Wall Systems / EIFS

Waterproofing /
Sealants



Flooring Systems

Tile Fixing Systems

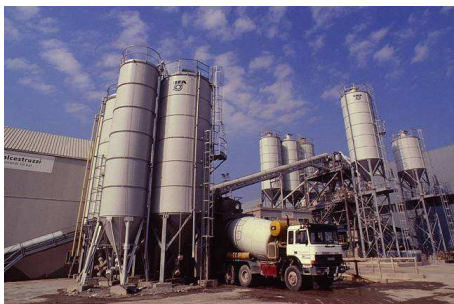
Repair Systems/
Performance Grouts

Expansion Control
Systems

Wood Protection



Admixture Systems



Products

- Superplasticizers
- Plasticizers
- Retarders
- Accelerators
- Freeze protection
- Air entrainers
- Curing compounds
- Form release agents
- Special underground products
- Stabilizer, water retainer
- Cement additives

Market sectors

- Ready-mix
- Precast
- Manufactured concrete products
- Contractors
- Tunneling
- Mining
- Dry mortar, gypsum and refractory industry
- Cement industry



Our Values



Mission

To be the leading construction chemicals supplier by delivering continuous **innovation to provide added-value solutions**, superior quality and economic benefit to the construction industry.

Customer Value Proposition

We utilize innovative technologies and services to enhance the value of our customers product while optimizing total operating costs.

Core Competencies

We achieve this through bundling our core disciplines of:

- Continuous innovation capability.
- Thorough understanding of concrete and its industry.
- High quality of products and service offering.
- Reliable and efficient logistics.

Admixtures for high quality concrete

Demanding to place and compact!



Consistency class S1
Stiff Concrete

Self compacting!



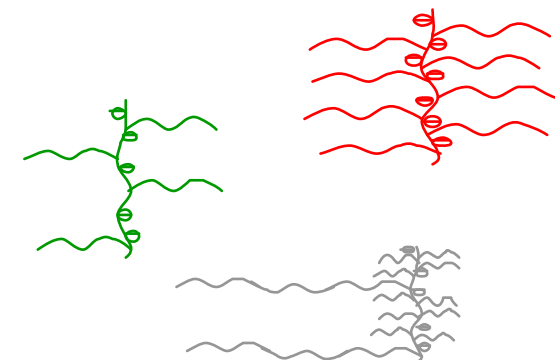
Consistency class S5/S6 & SCC
Fluid Concrete

***It depends on
what is inside !***

The high performance is reached via the tailored adaptation of the chemical structure.

Influencing the molecular “design” is achieved by optimizing:

1. Molecular weight
2. Length of main chain
3. Length of side chains
4. Density of side chains
5. Electrical charge distribution
6. Anchoring other functional groups



How to answer to market needs

■ Driven by the industry's challenges

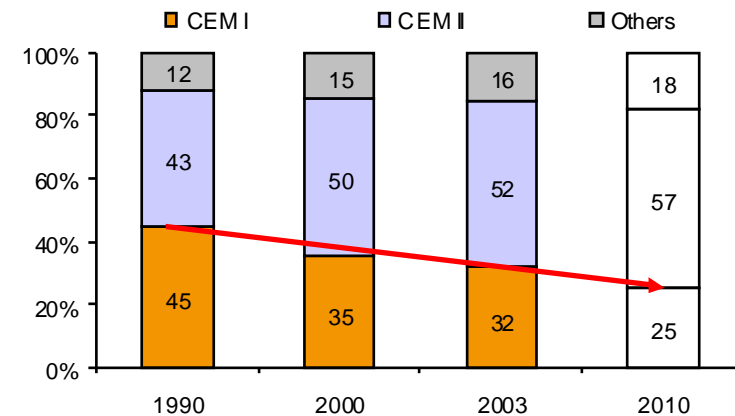
- **Efficient Processes** (Mould rotation)
- **Energy Reduction** (Heat curing)
- **Material Optimization** (CEM & SCM's)
- **Quality Specs** (Durability, Aesthetics)

■ Be more cost effective & sustainable

- High early strength development
- Cost effective mix design
- Easy and reliable workability
- Fast and clean demoulding
- High durability and aesthetic quality

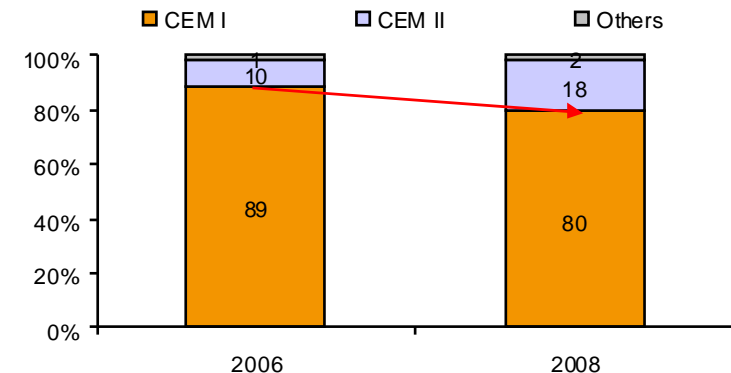
Globalisation of megatrends, but local materials and conditions of construction require general innovation path with **customized developments**

Concrete Market Europe



Source: OneStone consulting in ZKG International

Precast Market Europe



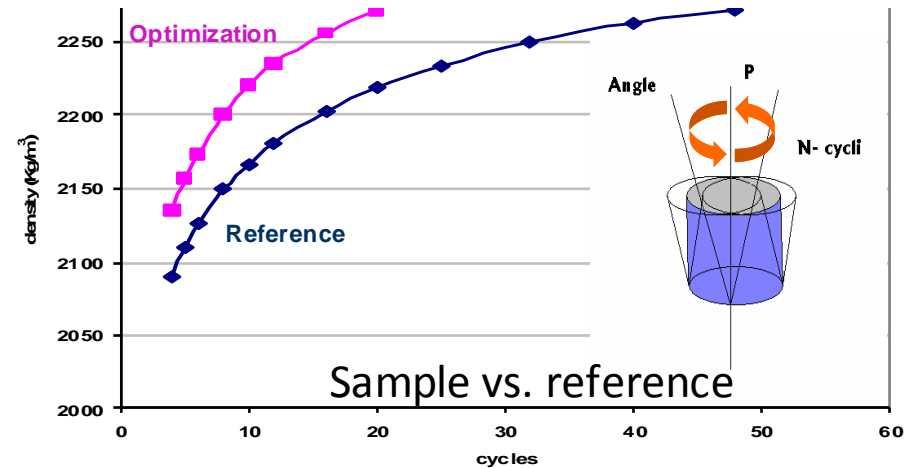
Source: E-EBA Precast Survey 2006 & 2008

The Production Efficiency Method

Production



Laboratory



Mix cost & robustness

Productivity

(fixed costs amortization, flexibility)

Maintenance

(impact of vibration level)

Energy (curing)

Quality

(choc resistance, efflorescence)

Cement & fines / strength & deformability

Fillability, compactability

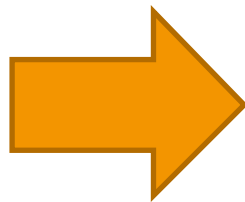
Accelerate hydration

Surface aspect & permeability

The Hollow core slabs case



Extrudability
Green strengths
Low deformability



The Production Efficiency Method



- 1) **“Compactability”** = **“extrudability”** of the mix (ICT)
- 2) **Deformability** (blood pressure device)
- 3) **Green strengths** (press for fresh splitting strengths)
- 4) **Paste outflow** (ICT)

Advantages for the customer

- Increase of **tolerance to water**
- Reduction of the scrap, in some cases 10% of the total production
- Improvement of strand bond
- Picking up easier
 - Improved "extrudability" = possibility to increase the machine speed
 - Possibility to cut the tendons earlier -> increase the production
 - Smooth production (no stops)
 - Less dependence of quality from the experience of the operator (currently checking every single batch sometimes)
 - No need of cement addition in winter due to frozen aggregates

Example 1

Componente		Competitor	RheoFIT 700
		0,60%	1,0%
RIVER SAND	Kg/mc	330	330
CRASHED SAND	Kg/mc	780	780
STONE 6-12	Kg/mc	690	690
CEM I 52,5 COLACEM GUBBIO	Kg/mc	385	370
WATER	lt/mc	75	77
RIVER SAND MOISTURE	5,00%	17	17
CRASHED SAND MOISTURE	3,00%	23	23
WATER	lt/mc	115	117
ADMIXTURE	lt/mc	2,31	3,7
W/C RATIO		0,30	0,32
MACHINE SPEED	ml/min	1,70	1,90

		1 d	7 d
Competitor 0,6%			
385 Kg/mc cement	strenght	42,0	50,4
RheoFIT 700 1%			
370 Kg/mc cement	strenght	48,8	56,6



Example 1

Goal of the test was:

- Increase the production via the “extrudability” machine speed from 1,70 m/min to 1,90 m/min
- Reduce the cement dosage -15 kg / m³

“The customer appreciated particularly the aesthetic of the beam”

di lavoro EV ant. sec.	8	Tempo di lavoro silo ant.
di pausa EV ant. sec.	8	Tempo di pausa silo ant.
di lavoro EV pos. sec.	10	Tempo di lavoro silo pos.
di pausa EV pos. sec.	4	Tempo di pausa silo pos.
Traslazione cm/min	170	
Fodere g/min	200	
Vibratori g/min	6000	

SALVA

Competitor

Ricetta		TRAVETTI h s
Tempo di lavoro EV ant. sec.	8	Tempo di lavoro silo ant.
Tempo di pausa EV ant. sec.	8	Tempo di pausa silo ant.
Tempo di lavoro EV pos. sec.	10	Tempo di lavoro silo pos.
Tempo di pausa EV pos. sec.	4	Tempo di pausa silo pos.
Traslazione cm/min	190	
Fodere g/min	200	
Vibratori g/min	6000	

SALVA

RheoFIT 700

Example 2

Component		REFERENCE	RheoFIT 701
h 50 cm		Competitor	0,5%
WHITE SAND	Kg/mc	356	356
COARSE SAND	Kg/mc	537	537
GRAVEL 5-8	Kg/mc	404	404
GRAVEL 8-12	Kg/mc	612	612
CEM I 52,5 CEMENTIR SPOLETO	Kg/mc	390	360
TOTAL WATER	lt/mc	174	151
ADMIXTURE	lt/mc	1,0	1,8
W/C RATIO		0,45	0,42
CASTED IN 2 MINUTES	ml	1,40	1,53

		cubes	sclerometer	carrots
		18h	18h	7 gg
Competitor	weight	2439		2442
390 Kg/mc di cemento	strenght	47,6	36,0	53,6
RheoFIT 701 0,5%	weight	2450		2439
360 Kg/mc di cemento	strenght	47,1	38,0	54,5

Example 2

Goal of the test was:

- Increase the production via the “extrudability”
+ 13cm/min
- Reduce the cement dosage
-30 kg / m³

“The customer appreciated particularly the remarkable reduction of dirt in the machine”



New **MasterCast** under current plant tests for further mix design optimisation (RheoFIT brand replaced by MasterCast)

Exceed present solutions

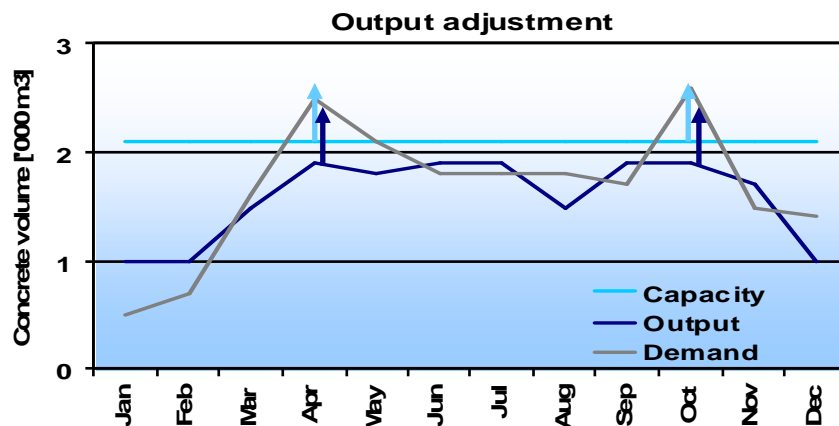


Seeding – the concept of X-SEED



Suspended CSH seeds

Why waiting for the crystallization nuclei to be formed if we can add them?



Features and advantages

- Flexible capacity / production tuning (to meet peaks in demand)
- Accelerates at all curing conditions, from cold to steam curing temperatures
- Less moulds needed / better use of expensive forms
- Earlier loading/finishing of fresh product surfaces possible
- Shorten process cycles and improve operating cost efficiency (avoid overtime or reduce extra cost for shifts)

Customized Innovation in Fibers



MASTERFIBER® - the comprehensive range of fibers creates a particularly efficient internal reinforcement network in the concrete.

Fibers represents a possibility to replace parts of reinforcement and to open new design and optimization potentials:



Microfibers for improved durability and performance

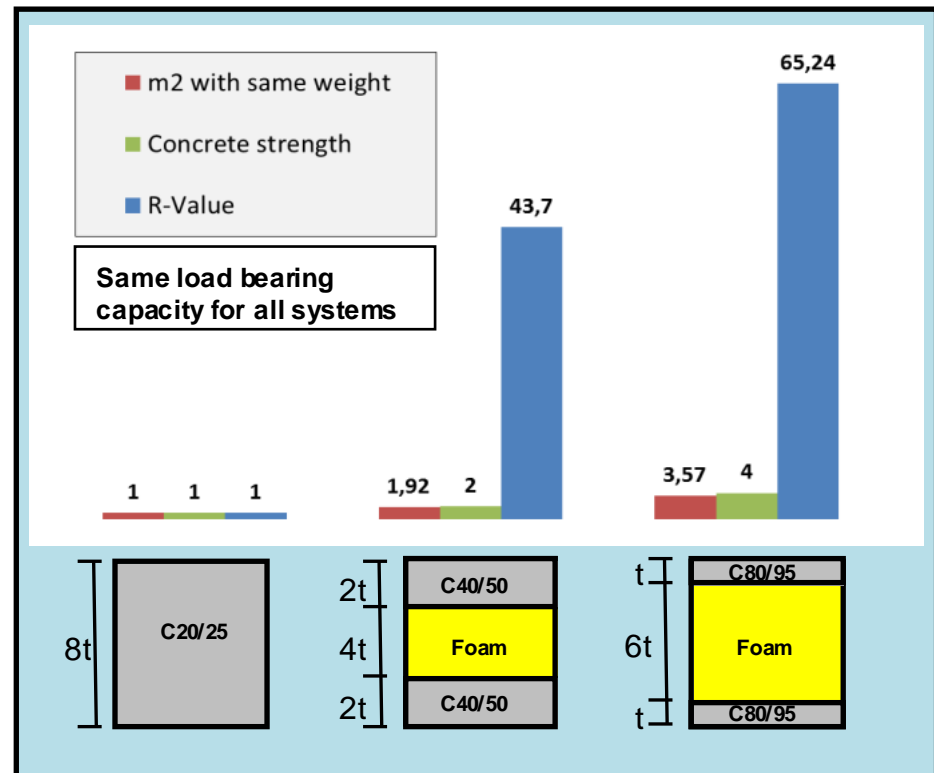
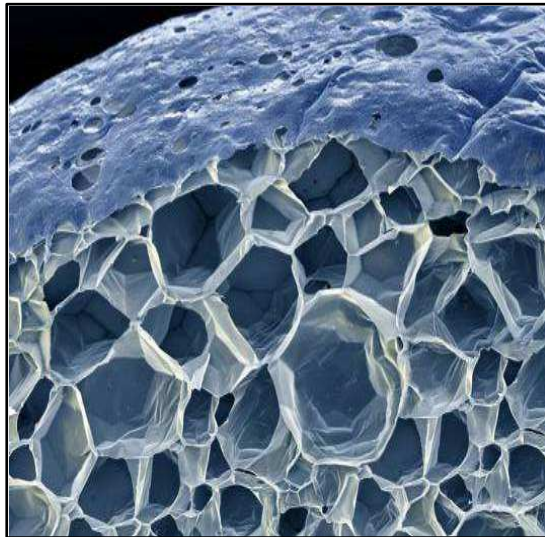
Macrofibers for improved shrinkage crack resistance

New innovative fibers for structural enhancement of building parts

Customized Innovation in insulation

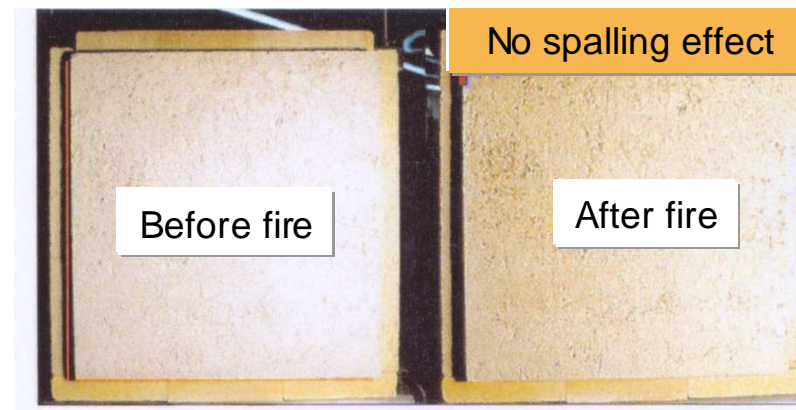
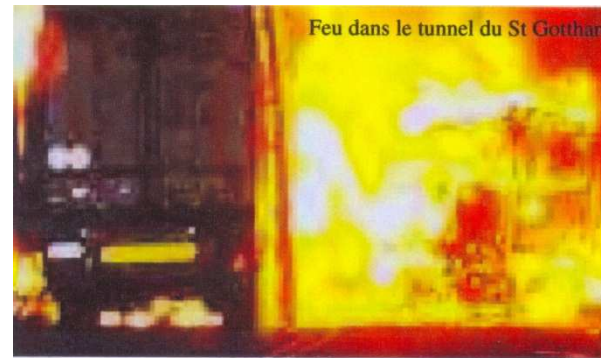
New insulating solutions

- Organic and inorganic insulating materials
- Possibly foamed or produced into the concrete plant
- High thermal properties allowing thickness reduction



Fire protection membrane

- Meyco Fix Fireshield 1350 is a fire protection solution being used in tunneling



Use synergies between BASF's segments



Chemicals

- Inorganics
- Petrochemicals
- Intermediates



Plastics

- Performance Polymers
- Polyurethanes



Performance Products

- Dispersions & Pigments
- Care Chemicals
- Nutrition & Health
- Paper Chemicals
- Performance Chemicals



Functional Solutions

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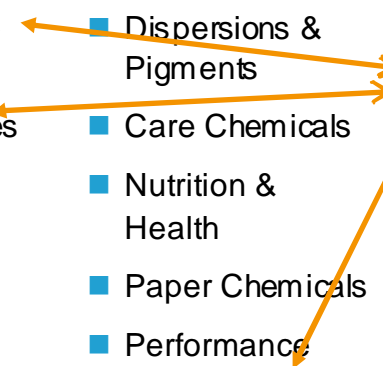
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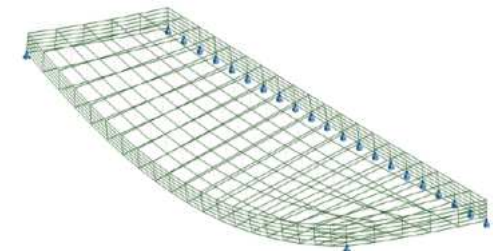


The BASF approach in Prefabrication

What we propose to the customer is a new structural solution, not just adding our products in the same concrete piece but

Propose a new element design optimised in regards to:

- The element shape and its technical function,
- Reinforcement and insulation properties,



Run a project management approach with the customer :

- Understand and anticipate the key parameters for the customer
- Deal with engineering and certifying offices

Organise design workshops involving different value chain actors:

- Architects and contractors for the product characteristics expectation,
- Manufacturer and engineering office for the feasibility,

BASF Value Driven Customer Approach

