



bringing materials to *life*™

*The Challenge of Finding  
and Using Appropriate Tools  
for Competitive Intelligence  
in the Field of Construction  
and Materials*

Nice April 2013, II-SDV

Dr Nathalie GAUTIER-HAMEL

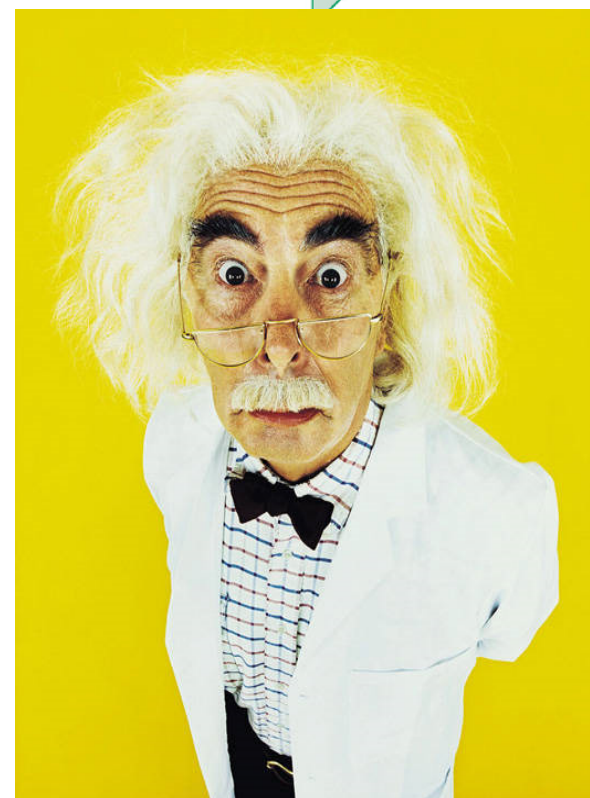
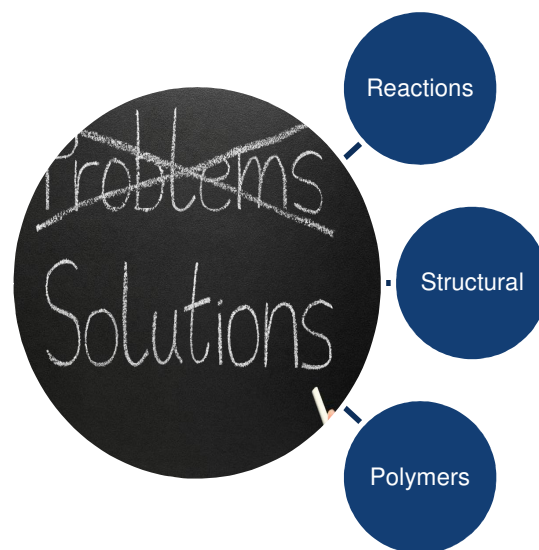
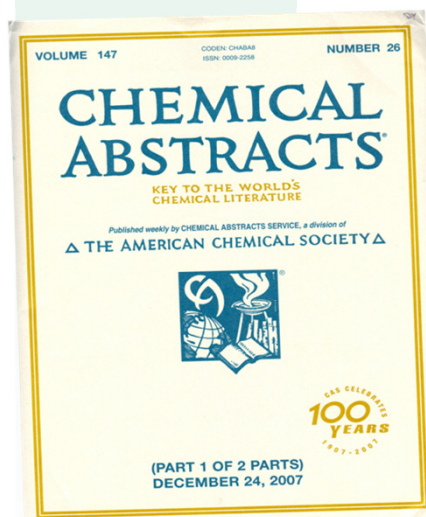
# From Chemical Industry (1990-1999)



Organic Chemistry

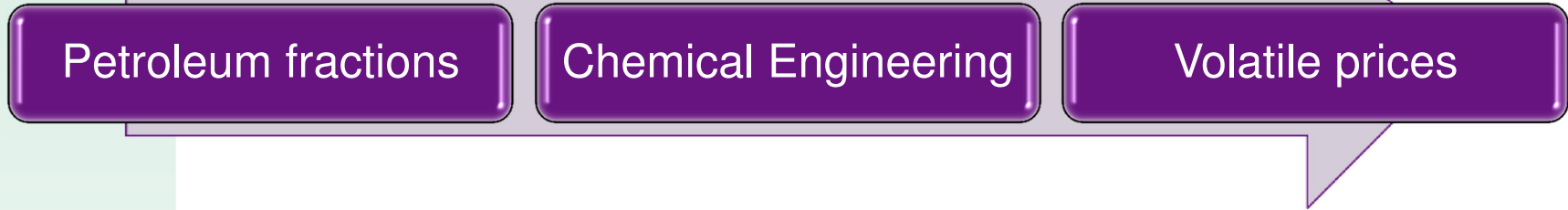
Target molecules

High value products



# STN<sup>®</sup>

# ...to a Petrol Research Institute (2000-2011)

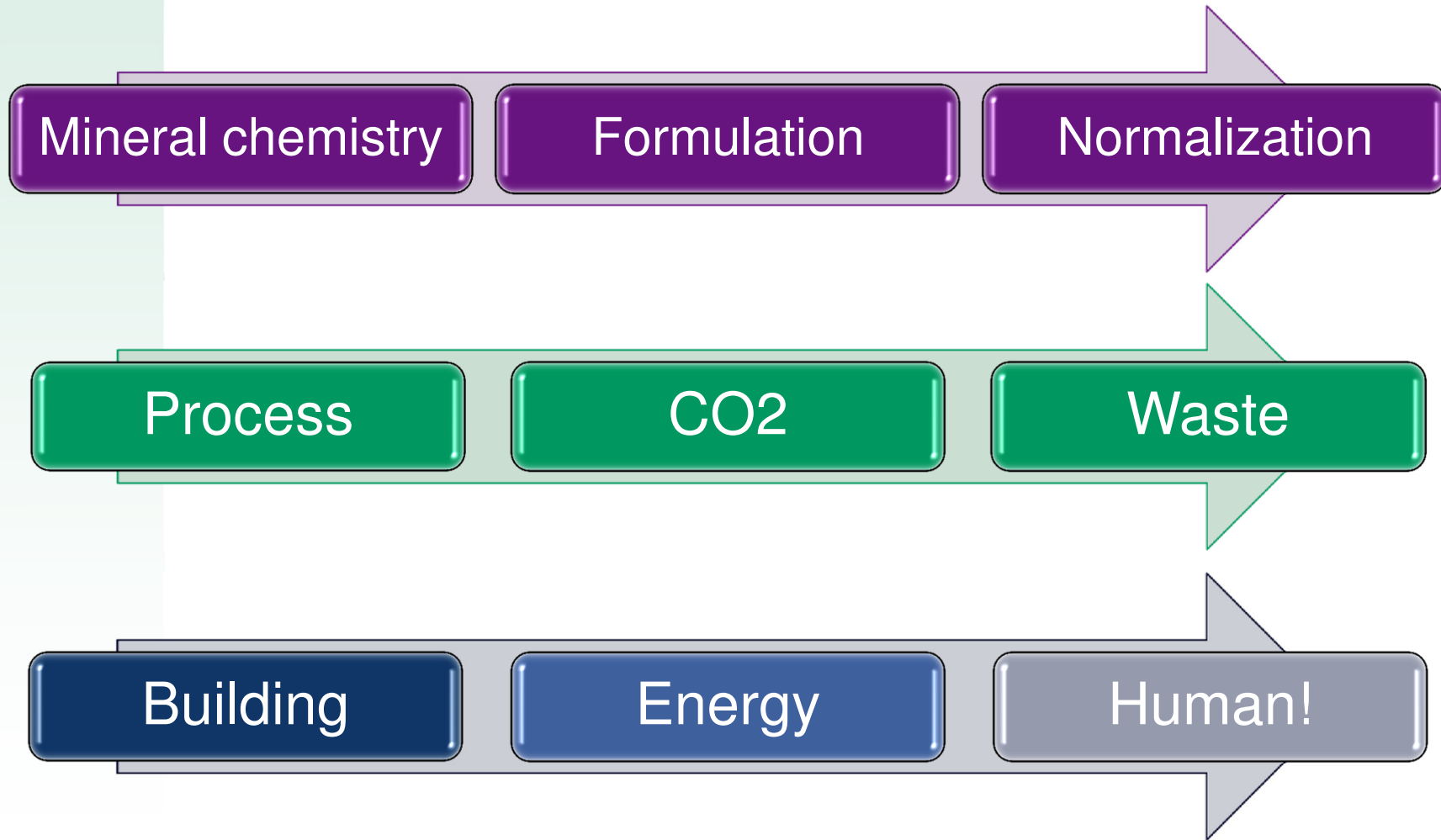


EncompassLIT & EnCompassPAT

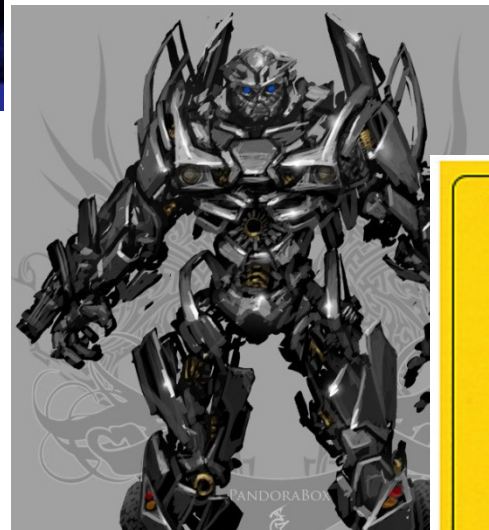




...and now to Construction Materials World!  
(September 2011- )



# From Chemistry to Petrol then Construction... My observations





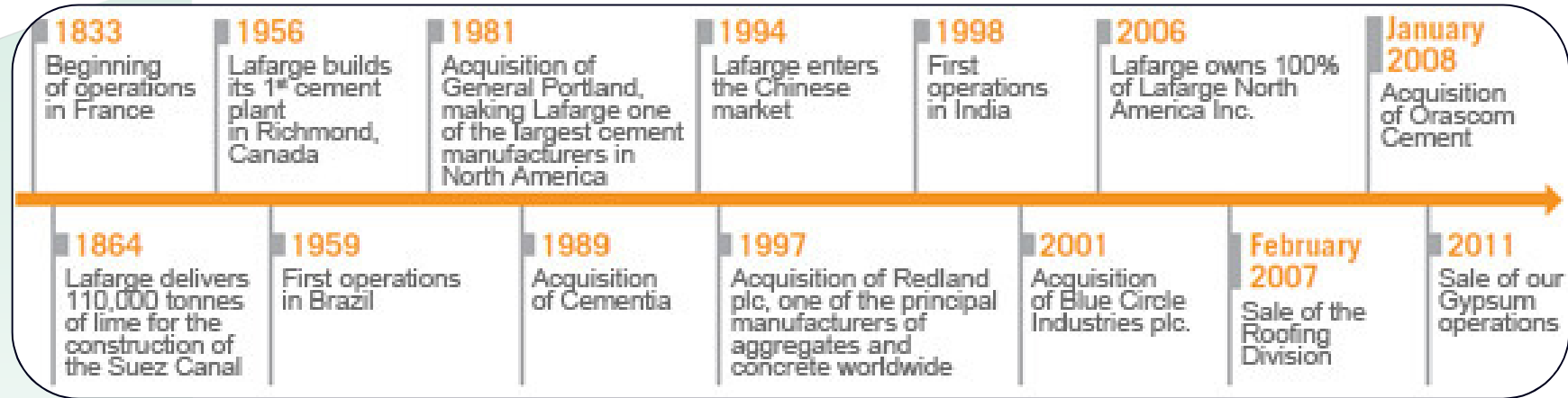
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## Lafarge history



- Starting out in 1833 as a limestone mining company, Lafarge transformed itself and now has a presence in 64 countries.

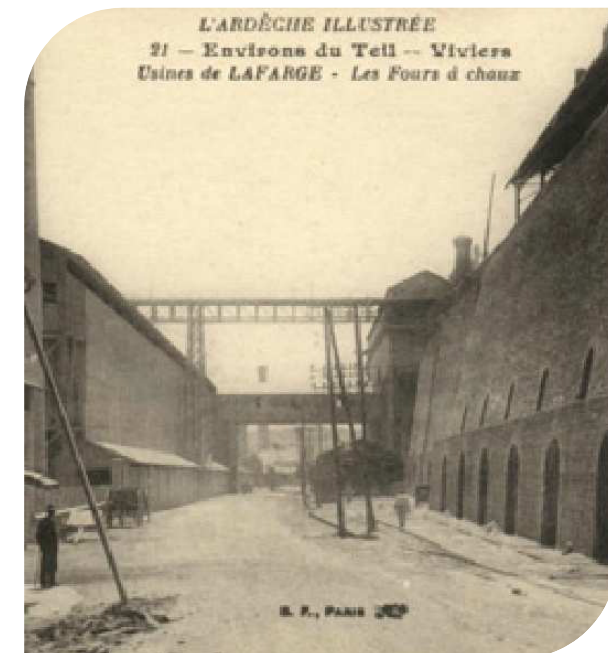


The story of the world leader in building materials began in the Ardèche region, at a place called “Lafarge”, which means “the forge”, near the village of Teil.

Joseph-Auguste Pavin de Lafarge began regular extraction operations in the limestone quarries. He had 2 major advantages, one geological, the other geographical: the limestone of the region is of excellent quality and can be used to replace mortar, and the

Rhône river makes it relatively easy to transport goods.

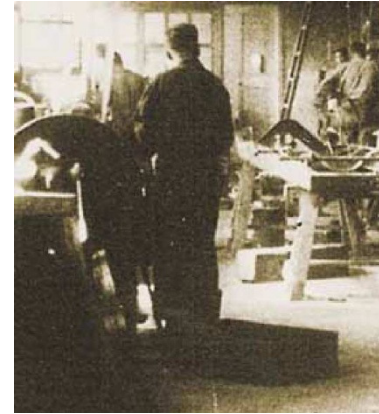
His two sons, Edouard and Léon, developed the family company, which became known as “Lafarge Frères” (Lafarge Brothers) in 1848.





## Profile

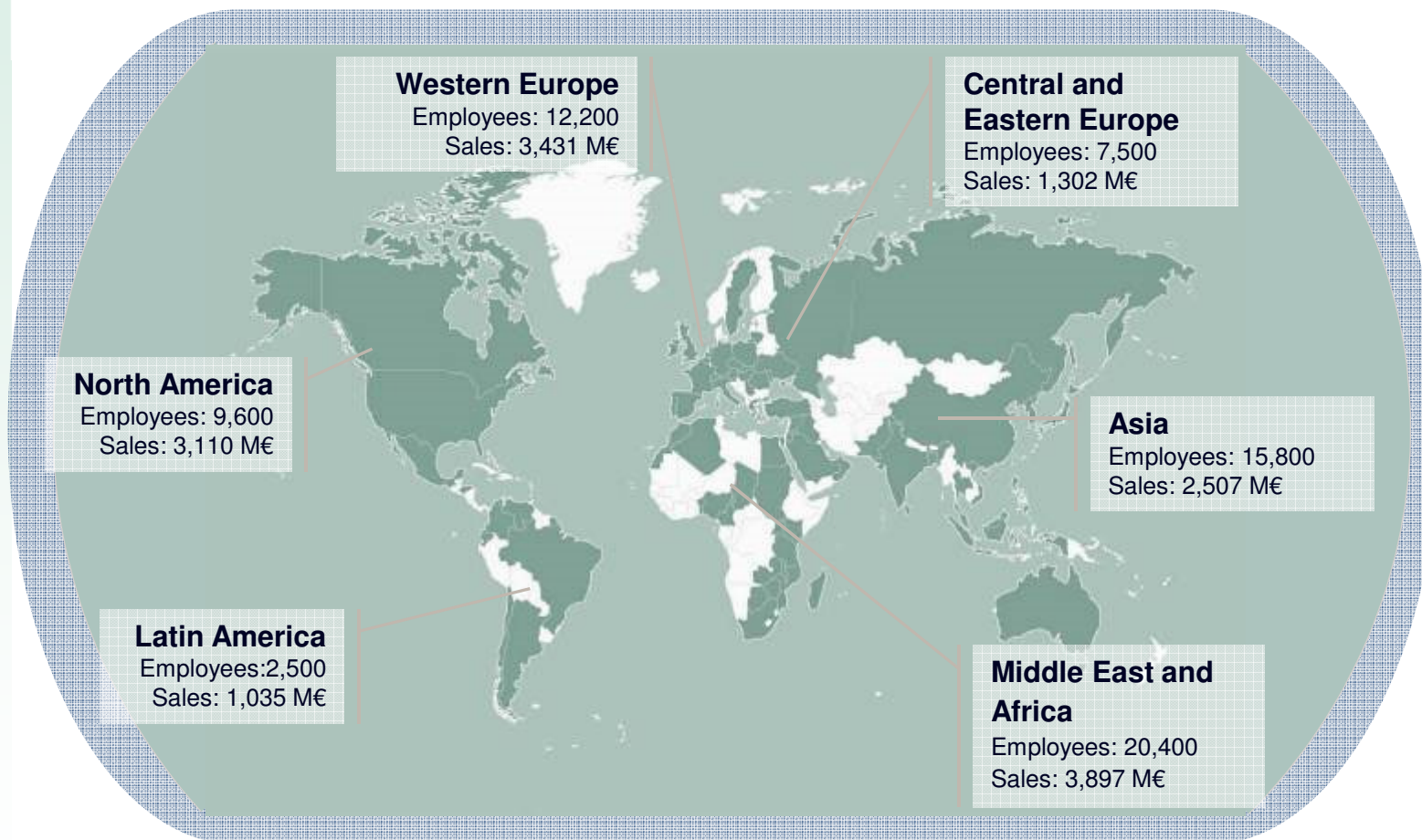
- Player in urbanization by offering building solutions using cement, concrete and aggregates
- Operating in **64** countries
- Employing **68 000** people
- **1,600** industrial sites worldwide
- **15,2 billion** Euros in Sales
- **593** million Euros net income Group share
- Listed on Euronext Paris stock exchange
- Almost **130 million** Euros dedicated to research, product development and industrial process performance improvement annually
- **60%** of this budget is dedicated to sustainable construction.



In 1908, Lafarge research director Jules Bied filed a patent for Ciment Fondu, obtained by mixing limestone and bauxite



# A well balanced geographical portfolio, present in 64 countries and on every continent



# Our markets



HOUSING



ROADS  
RAILROADS



INFRA-  
STRUCTURES



PUBLIC/PRIVATE  
BUILDINGS



For all these markets, Lafarge offers innovative and environmentally-friendly solutions.



- Concrete is just after water, the most consumed material in the world.
- Every person on earth consumes an average cubic meter per year.
- More than 7 billion m<sup>3</sup> of concrete per year is produced ( $1\text{m}^3 = \sim 2300\text{kg}$ )
- Concrete  $\sim 0,04 \text{ €}/\text{kg}$
- Ready-mix concrete is a mixture of aggregates, cement, additives and water to create the most used material in the world.



## Bridge in Térénez, France



18,000m<sup>3</sup> of Chronolia® 24H concrete - 515m long - 85m wide  
144 cable stays - 2 pylons, each 100m tall  
This curved cable-stayed bridge is a first in France!



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**Urbanization challenges**



## Technology and Competitive Intelligence Department



- We are 8 to 12 people in the team
- We relate hierarchically to Corporate Innovation Segment, and my “N+3” is the CEO of Lafarge
- Our Department is nearby LCR “Lafarge Research Center” site
- Internal scope of users/clients: Corporate Innovation Segment, R&D and Technical Centers, Excom, BU’s

... cement, concrete and aggregates products, mineral and organic chemistry, additives (polymers), formulation, solid mixtures, properties, cement-concrete-construction processes, construction systems/solutions, rival and mixed materials (wood, clay, glass, steel, brick,..), prefabrication, climate change, CO2, energy, water, waste, recycling, architecture, constructors, designers, start-up, universities, PPP projects, public and private buildings, affordable housing, infrastructures : bridges, road, railroad, ..., standards and normalization, human behavior...



## BUSINESS DECISION SUPPORT

- What does the technology landscape look like?
- What are the trends in innovation?
- Where do inventions/innovations originate?
- Who owns what?
- Who works with who?
- Who is active now?
- Who covers specific technical aspects?
- Which are the high impact inventions/innovations?
- Are there licensing or collaboration opportunities?



# Innovation services



**COMMUNICATION**

- + Presentations
- + Networking
- + Animation



**PRODUCTS**

- Bibliography +
- Focus +
- Bulletin +
- Studies +
- Automatic Alerts +
- Flash +



**TIPS & TRAINING**

- + Help to define your needs
- + Develop your research strategy
- + "A la carte" trainings
- + Specific training



**SERVICES**

- Documentation Center +
- Acquisitions +
- e-Resources +
- Archives +

# Challenges

- Mismatch in the number of patent to be analyzed ! The average of direct competitor's portfolio is ~50 patent families, but the chemists have more than 1200 patents per year...
- Scientific and Technical literature is important, but widely disperse, and local publications...
- Standards and normalization are very important and country dependant
- Start-up detection could be crucial
- Who financed what? مهنة البناء 建設
- Language problem!
- WEB, WEB, WEB,... news, clips, social networks, images?

Analyzing tools?

Databases?

Worldwide coverage? Cost?

Monitoring tools!

Techno-financing...

Formats, images, links...

# Literature publications : STN & WoS answers on “Construction materials”

## WoS has a greater reactivity:

most of our documents are available earlier than on STN databases.

- The interface provides a simple way to access different functions, End-Users friendly, cited-citing tool
- The easy access to full text when available
- End-Note Web to share results

## WoS has a less extensive coverage

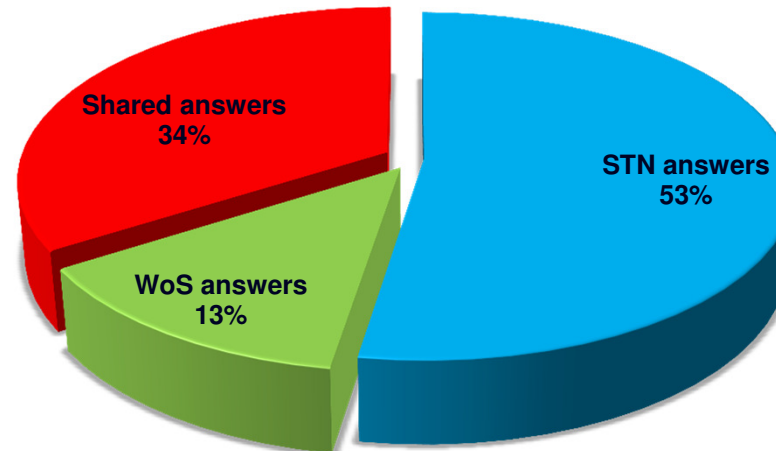
- Less accurate answers on our thematic
- Most of the missing references come from Asian publications (Chinese, Indian, Japanese...) or proceedings\*.
- Not enough technical coverage on construction field

## Missing on STN

- Less End-users friendly
- Less easy to share results with users
- Online cost

## Comparison WoS / STN results

*With a keywords query using booleans and proximity operators over two years period*

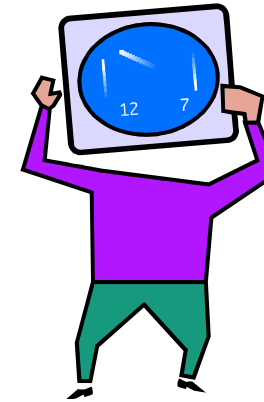


## STN has the best coverage (geographic and thematic)

- More complex queries allowed
- Homogeneous indexation
- French publications also available
- The scientific and technical coverage, especially CA, Compendex, Pascal, which provides access to Russian, Japanese, Korean, Chinese publications.

## Web 2.0

- [CREE building](#)
- [Concrete Tent](#)
- [3D-Printing](#)



<http://www.linkedin.com/>

- On LinkedIn we found the relation between two persons that gave us the answers on affiliation questions :
  - a scientist who has participated in a 3 years project (R&D on building systems) financed by the Danish Advanced Technology Foundation that was very interesting, and
  - the CEO of a new small company (profil relations)
  - And therefore... the 5 patents related to this new company



# Internet monitoring platform

## Why ?

A growing time spent in searching for information (Website Watcher, Google Reader for RSS feeds, newsletters...) involving a lack of reactivity

A limited time devote to analyze and thus less value-added to the information

The difficulty to capitalize and share the information amount the company

To large geographic scope (language, sources..)



Decision to implement a **Competitive Intelligence Software** , a « **One stop shop** » with a search engine, a collaborative tool able to capture and share the information anywhere in the world

**Digimind** was chosen among the other market leaders for several reasons: 600 000 web sources included, users autonomy (to add sources, define formats, etc..), ergonomoy, search engine power, analyzing tools (concepts, graph...), collaborative tool, attractive dashboard, etc.

And also the reactivity of the Digimind Team!



## Expected benefits:

- To save « searching time » for each information specialist
- To increase time for analysis
- To increase the amount of information processing
- To create a corporate sources/information capitalization with different community of interest

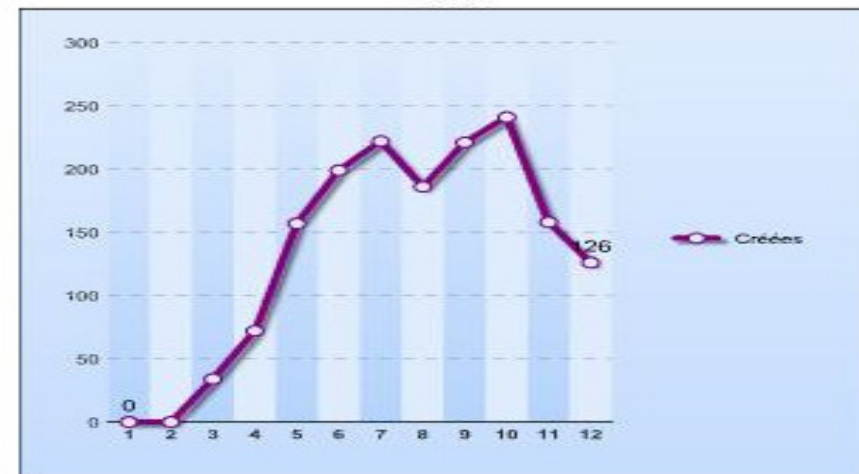
## After 1 year (including 5 months project):

- We had increase our volume of specific sources from ~200 to more than 2000, and reduced by 4 the time spent per day/person to read the news.
- We have now an automatical treatment of our selected information and enlargement of the geographical coverage.

Also, after 1 year, we launched **5 new intelligence products** (competitive watch, technology bulletins...), and 8 full strategic monitoring projets.



Nombre d'infos créées  
2012

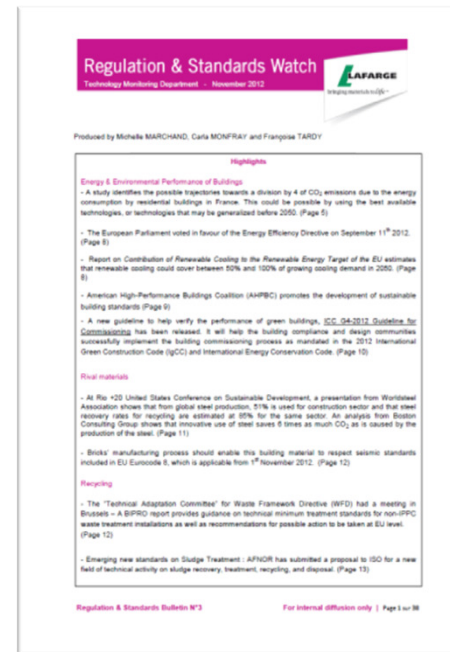
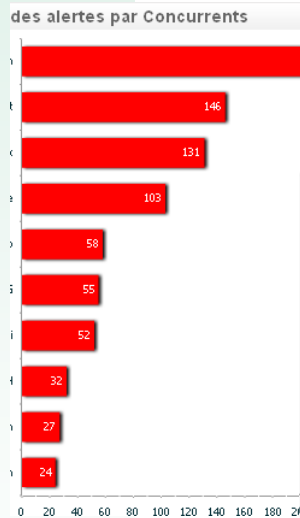


April 2013



## Difficulties encountered:

- The syntax for queries is not easy to implement (no proximity or plural...) and also, being an information specialist this was difficult to apprehend
- We have a very specific technical area, so queries must be accurate
- No real flexibility in some fonctions (ex. report format)
- Quid next year cost?



## Ongoing tests and ... questions for 2013?



- **Intellixir** (3 months) : to analyze patent & literature, and how to include a selection of web news from our monitoring platform?
- **Dolcera** (test) : to see how deep and easy they can go deep in construction materials data? Dashboard?
- Maybe a test with **Linguamatics** for non patent information?
- **STN** : what about the new platform?
- **Questel-Orbit** : is “Gold access” a real advantage?
- **Espacenet** is more and more attractive ...
- Others...Any suggestions?





## Wishes!



- We are now in an information world where
  - we would like to pick up the best of each tools and databases in term of **content**, and,
  - we hope that these tools and databases will **communicate** or be **link more “easily”!**

**Our wishes...**that more agreements between vendors can be realized to optimize the tools and databases usage.

**Our wishes...**that we spend less and less time in formatting the information.

**Our wishes...**that language barrier could be easily resolved without hiring a person from each country...

## Un grand merci à Anne Girard

Anne gave me the enthusiasm to  
continue in this profession,

And the strength to face new  
challenges!





Thank you all for your attention

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Head of Technology and Competitive Intelligence Department

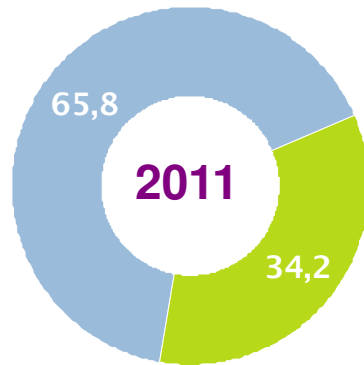


# Annexes

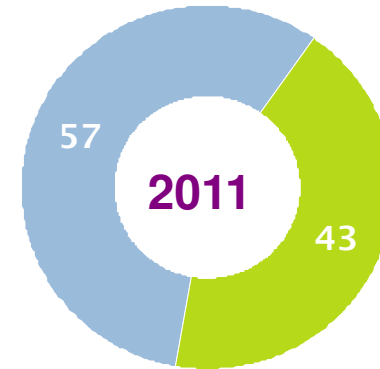


# A Group which has been evolving for 10 years

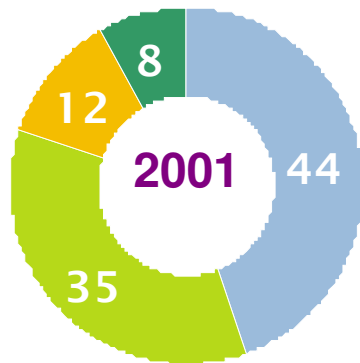
For the last 10 years, the Group has been pursuing its development strategy in emerging countries, which are now the drivers of economic growth and refocusing its Cement, Aggregates and Concrete businesses.



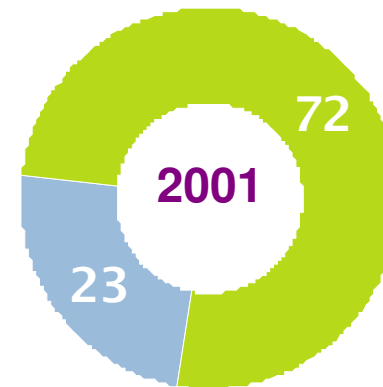
New focus on its cement, aggregates & concrete businesses



A new emerging/mature country balance



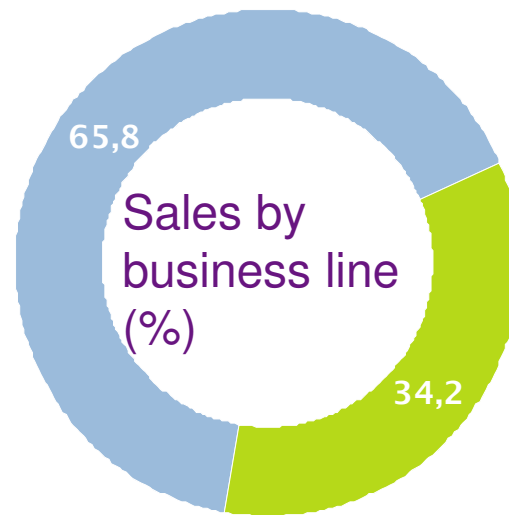
■ Cement ■ Aggregates & Concrete ■ Roofing ■ Gypsum



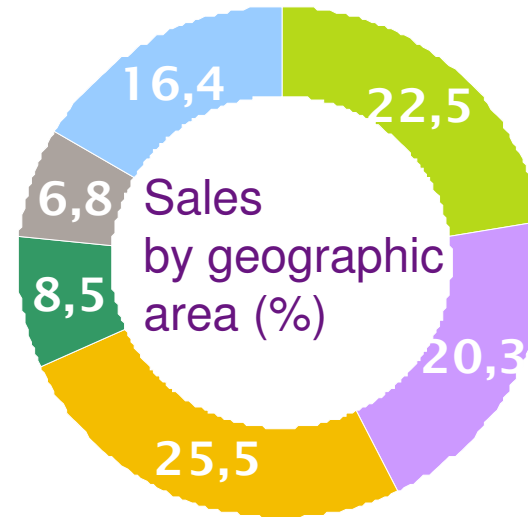
■ Emerging Countries ■ Mature Countries



## A worldwide presence to benefit from different markets' opportunities



- Cement
- Aggregates & Concrete



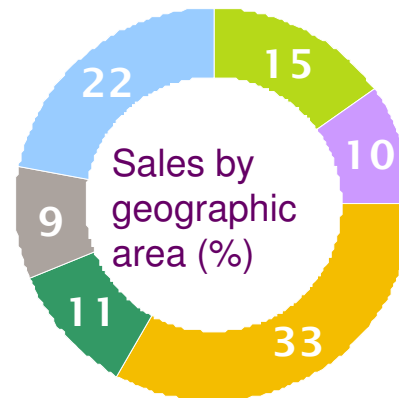
- Western Europe
- North America
- Middle East and Africa
- Central & Eastern Europe
- Latin America
- Asia



## Cement: key figures

### Cement World Leader

SALES <i>Million €</i>	PRODUCTION SITES	EMPLOYEES	PRESENT in
<b>9 975</b>	<b>166</b>	<b>43 400</b>	<b>58 countries</b>



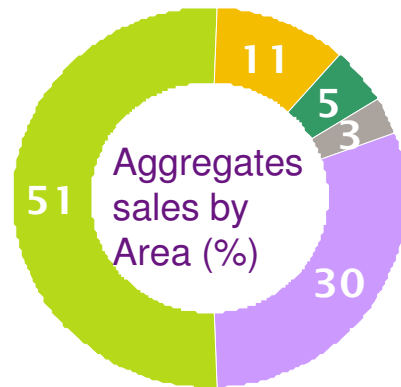
- Western Europe
- Middle East and Africa
- Latin America
- Central and Eastern Europe
- North America
- Asia



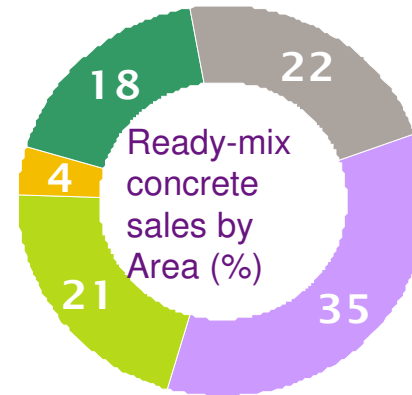
# Aggregates & Concrete: key figures

**Aggregates & concrete** No. 2 & No. 4 in the world

SALES <i>Million €</i>	EMPLOYEES	PRODUCTION SITES		PRESENT in <b>35 countries</b>
		AGGREGATES	CONCRETE	
<b>5 227</b>	<b>23 200</b>	<b>392</b>	<b>1 046</b>	



- Western Europe
- North America
- Central & Eastern Europe
- Africa & Middle East
- Other



- Western Europe
- North America
- Central & Eastern Europe
- Africa & Middle East
- Other

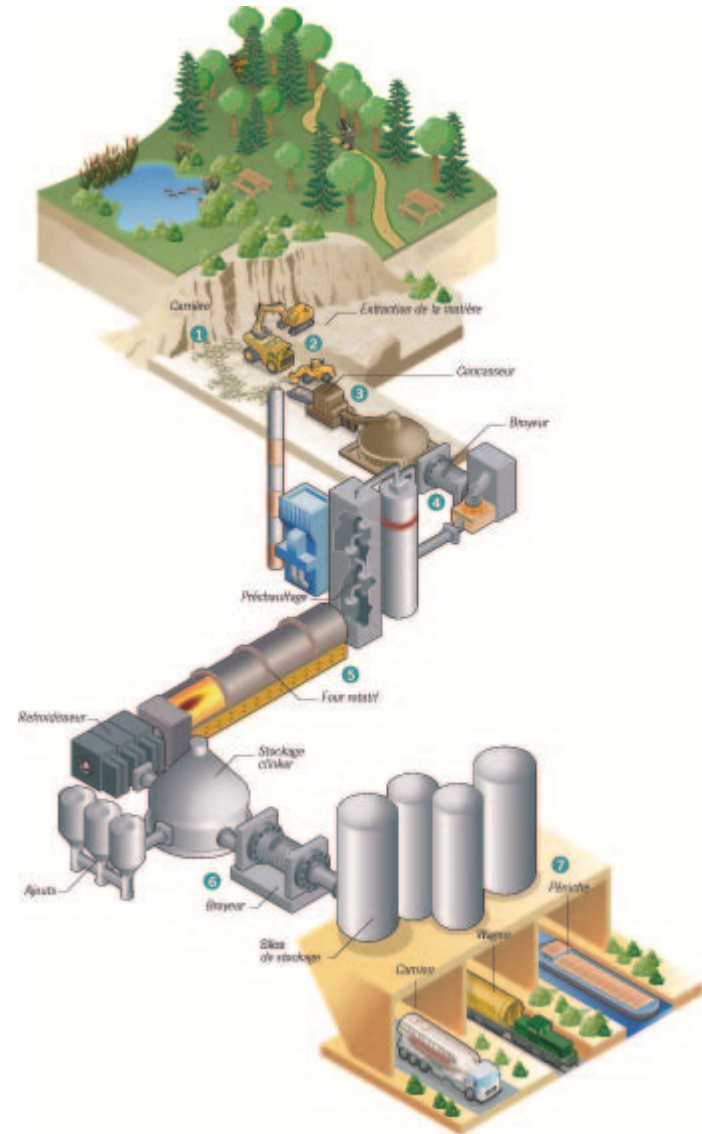


# Cement manufacturing process

**Definition**  
**Cement**, a hydraulic binder and a key ingredient in concretes and mortars, meant mainly for building and public construction industries.

**225 million tons**  
of production annual capacity

**Industrial performance**  
An industrial expertise supported by 175 years of experience, four technical centers with over 600 engineers and technicians worldwide. Culture of knowledge, best practice and experience sharing.

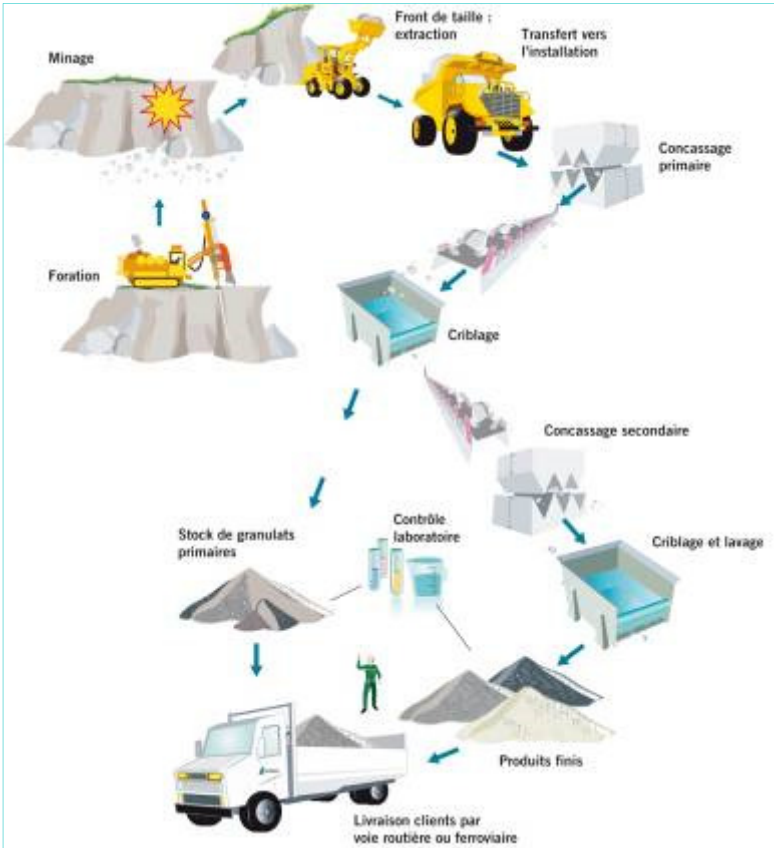


# Aggregates manufacturing process

**Definition**  
**Aggregates** are obtained by quarry extraction and grinding into different sizes. Aggregates can also be obtained from sand and gravel extraction.

**Sold 193 million tons of aggregates in 2011**

**Asphalt**  
 The Group also produces asphalt, a mix of aggregates and tar. Plants in North American and the UK produce 5,000-500,000 tons per year. Lafarge is developing innovative road construction solutions offering cutting-edge environmental performance: Duraclime® & Duracycle®



## Concrete manufacturing Process

**Definition**  
**Ready-mix concrete** is a mixture of aggregates, cement, additives and water to create the most used material in the world. Its various benefits include traction and pressure resistance, durability, placement speed, aesthetics, workability, and low environmental impact.



➔ **manufactured 34 million m<sup>3</sup> of concrete in 2011**

**value-added concretes  
 =  
 almost 30 % of our sales in 2011**

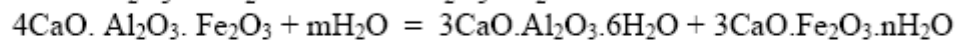
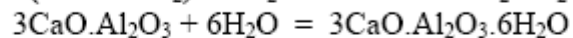
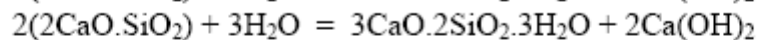
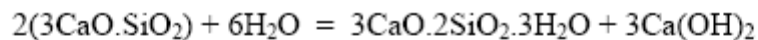
## An exceptional cellar using Agilia®, France



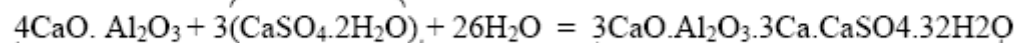
*designed by architect Christian de Portzamparc*

The soft and undulating line of the cellars of the Château Cheval Blanc in Saint-Emilion gives the building lightness and a feeling of movement thanks to the four 40cm-thick curved walls cast from Agilia® concrete.

	Cim. Portland	Ciment Portland composé		Ciment de haut fourneau			Ciment pozzolanique		Ciment au laitier et aux cendres	
	CPA-CEM I	CPJ-CEM II/A	CPJ-CEM II/B	CHF-CEM III/A	CHF-CEM III/B	CLK-CEM III/C	CPZ-CEM IV/A	CPZ-CEM IV/B	CLC-CEM V/A	CLC-CEM V/B
<b>Clinker (K)</b>	/95%	/80% ≤94%	/65% ≤79%	/35% ≤64%	/20% ≤34%	/5% ≤19%	/65% ≤90%	/45% ≤64%	/40% ≤64%	/20% ≤39%
<b>Laitier (S)</b>	*	6%≤	21%≤	/36% ≤65%	/66% ≤80%	/81% ≤95%	*	*	/18% ≤30%	/31% ≤50%
<b>Pouzzolanes (Z)</b>	*	total	total	*	*	*	10% ≤ total ≤35% (fumée ≤10%)	36% ≤ total ≤55% (fumée ≤10%)	18% ≤ total ≤30%	31% ≤ total ≤50%
<b>Cendre siliceuses (V)</b>	*	≤20%	≤35%	*	*	*				
<b>Fumée de silice (D)</b>	*	(fumée	(fumée	*	*	*				
<b>Cendres calciques (W)</b>	*	de	de	*	*	*				
<b>Schistes (T)</b>	*	silice	silice	*	*	*	*	*	*	*
<b>Calcaires (L)</b>	*			≤10%)	≤10%)	*	*	*	*	*
<b>Fillers (F)</b>	*	*	*	*	*	*	*	*	*	*



**GYPSE**



**CIMENT PORTLAND**

**HYDROSULFO-ALUMINATE CALCIQUE**