

# The Globalisation in Industrial Minerals

## A Chance for the Asian Mineral Filler Producers ?

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Globalization has become a common term in our business. In plastics, paints, rubber, paper, cosmetics, and other businesses, a speedy global response to the dictates of the end-markets is more crucial than ever. OEMs like FORD, GM, Honda, Bridgestone, Goodyear, Philips, Whirlpool, Johnson&Johnson, or Marine Paint companies now make and transport their products on a global basis, expecting to meet common, worldwide performance. In turn, these multinationals expect suppliers to consistently meet their specifications and to have their materials available around the globe.

Some OEMs even prescribe specific resins, additives, or brands and ask for specific equipment.

Industrial minerals as functional fillers are increasingly important. Today, they are supplied in large scale only at regional markets. Increasing demands for standard appliances also call for their global availability. The mineral using industry transfers the pressure they receive to their raw material suppliers.

## Industrial Minerals' History of Growth

the Boom Started in the 1970's

- 6 Kaolin was the major mineral for paper
- 6 the European paper industry started in the early 70's to use natural ground carbonate (GCC) as a filler and as a coating pigment; this trend is swapping over the whole world now
- 6 initially, precipitated carbonate PCC was used mainly for PVC and paints
- 6 mid of the 80's the "satellite plants" of Pfizer/MTI initiated a boom for paper applications
- 6 GCC, talc, and mica became important for plastics in the 80's
- 6 CPCC became an effective filler in the early 80's
- 6 Wollastonite has continued to grow in the 90's

The boom in industrial minerals started just a few decades ago. The paper industry was the first big consumer of mineral fillers. Owing to the acid environment, only kaolin and talc were used as fillers. Kaolin was the only coating pigment.

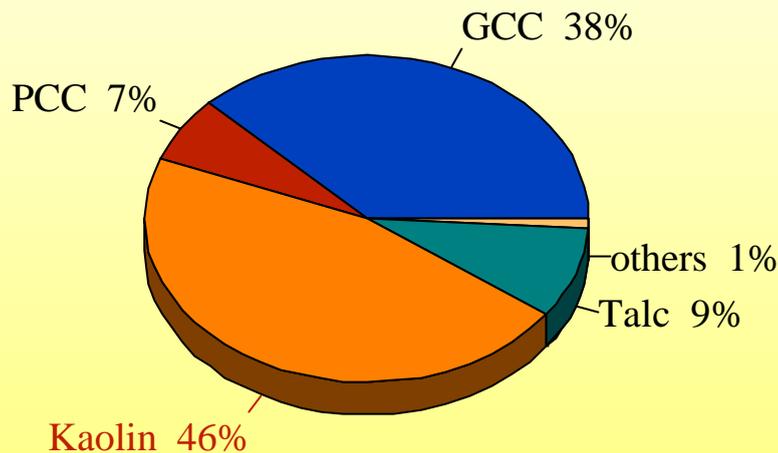
In the early 70's, the change of technology to neutral sizing enabled the use of carbonates as a filler. The high cost performance of white, fine carbonates also widely opened the door to the coating business.

This competitive availability of GCC is not possible everywhere and ultrafine grinding is expensive. The new satellite concept of Pfizer-MTI in the 80's created an admirable boom for PCC.

At the same time the plastic industry started to use mineral fillers more widely. At the beginning mainly for cost-reduction, very soon also for the improvement of mechanical properties. This was the start of functional fillers. The breakthrough for CPCC was made in the early 80's when the first products with a truly effective surface treatment became available. GCC, talc, and mica are increasingly used in a variety of polymers; Wollastonite continued to grow in the 90's.

## Paper Minerals Depend on Technology

worldwide approx. 20 million tons of minerals were used for paper production in 1997, as a filler and coating-pigment



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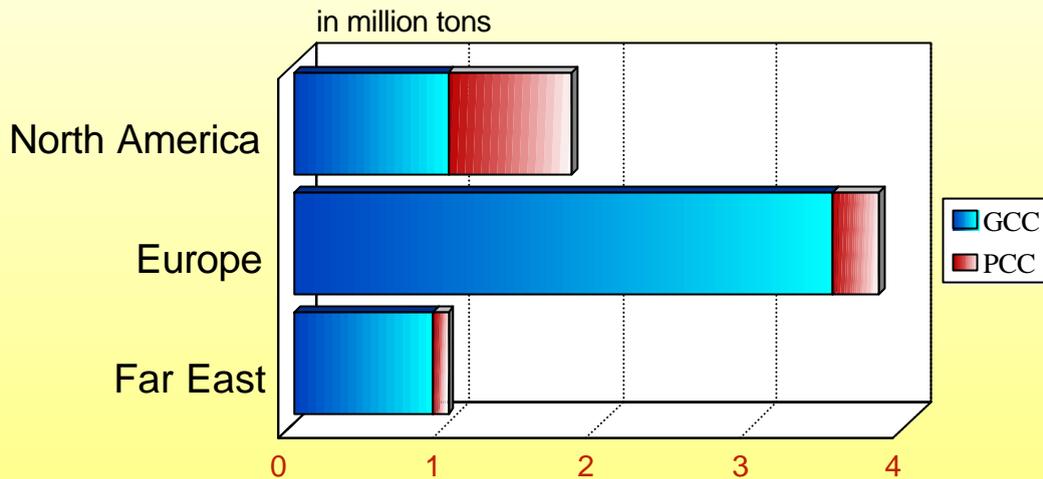
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Today, more than 20 Million tons of minerals are used in paper & board applications. Kaolin still has the lion's share. However, carbonates are growing quickly and will become equal very soon.

At the beginning, talc was mainly used as a paper filler in countries where it was cheaply available, such as Finland, France, China, Korea, India and Japan. Today the filler segment is nearly lost in Europe, and this declining trend will go on also in Asia. The new sector of growth is paper coating, where Finnminerals pioneered this application in close cooperation with the papermills. In Europe, most of the rotogravure LWC paper contains talc.

Further market penetration is expected in North America and Asia.

## In Europe the Alkaline Sizing is Most Advanced



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Europe is by far the technological leader in papermaking. Most of the printing/writing paper is produced in an alkaline environment. North America is following quickly, as the economics and the use of recycled fibre forces to change to the alkaline sizing. Only SC-paper shows some advantages, if using talc and clay as a filler.

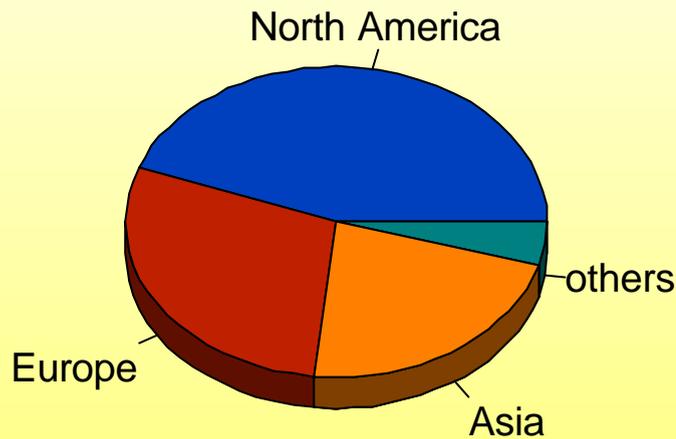
Asia has a different status of technology. The "acid" old papermills have to use kaolin and talc. A number of new gigantic investments for p/w and coated papers, which are expected within the coming years, are designed for the use of carbonates. In Korea, Japan, Thailand, Malaysia, and Indonesia we can already find some state-of-the-art GCC plants. In addition there are some PCC-units.

China is at the beginning with carbonates in paper applications. However, insiders know that it is typical for China that between the starting point and a booming market there are only a couple of years. China's potential is about 3-4 Million tons.

Far East as a whole will become a major paper producer and carbonate production will grow proportionally.

## Pitch Talc Consumption

Estimated World Consumption : 400 kt p.a.

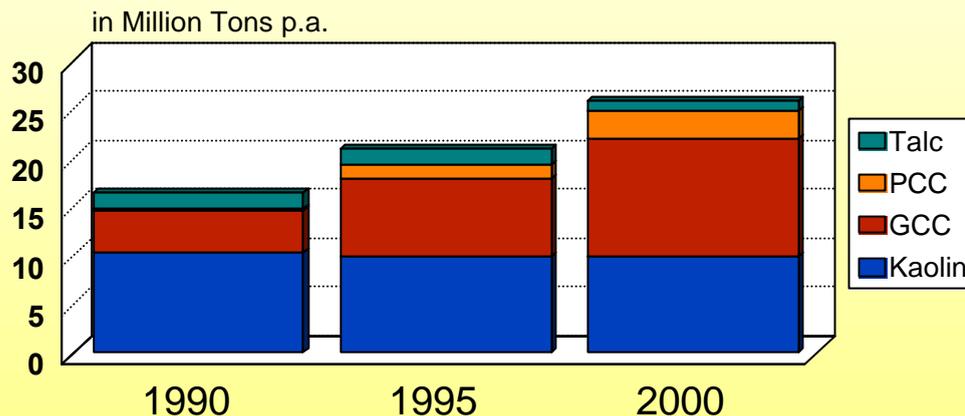


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Talc for pitch control applications is a smaller sector, where minerals are used for the adsorption of sticky particles deriving from pulp and waste paper recycling. Europe, North America, and Japan are nearly saturated markets. Most Asian regions hold a potential for further growth.

## The Paper Mineral Consumption is Growing Worldwide

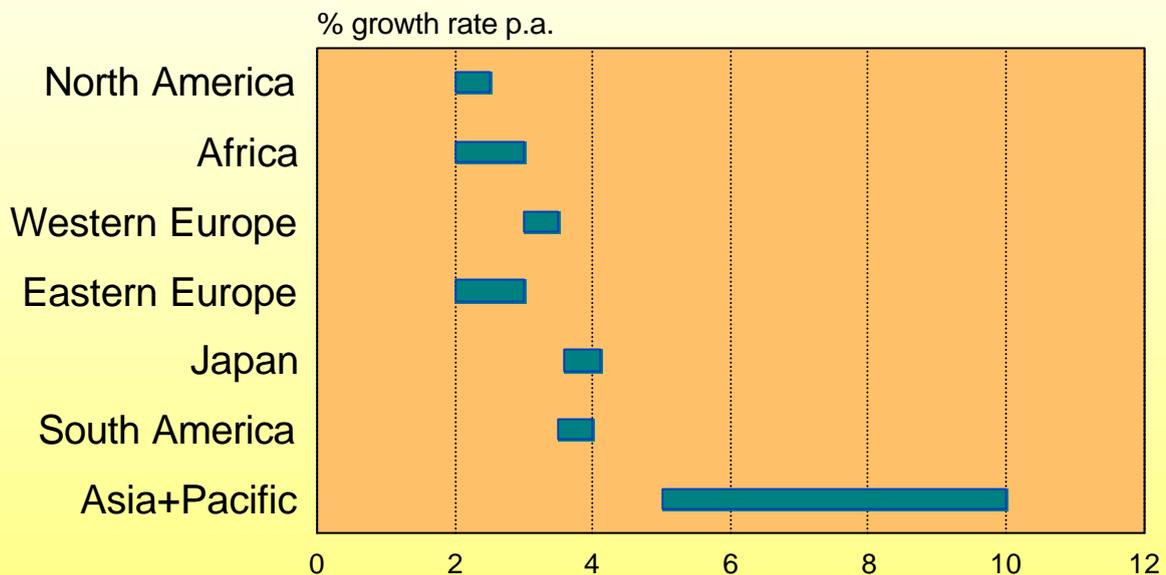


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This graph shows the exciting overall demand in industrial minerals for paper, pulp and board applications. Most of this growth will derive from Asia-Pacific. This is the real potential for the Asian and South American mineral producers. Asia is rich in carbonates and talc. Big GCC players can develop high class products, supplied as slurries for both fillers and coating. There will also be room for some more PCC plants. Kaolin is short in Asia and has to be supplied from Brazil and the USA. China has some suitable sources in the provinces of Guangdong and Anhui. Talc has a good chance as a coating pigment and for pitch control in Asia-Pacific. The actual know-how of the local Asian producers is not sufficient to open these markets. A cooperation with European partners seems to be inevitable.

## Growth in World Paper Demand by Region for the Next Years



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The paper industry is still experiencing a sufficient growth. However, looking at the individual regions, it is obvious that the future for the paper industry lies in terms of production in Asia.

Countries such as Japan, China, and Indonesia have always been important producers. The whole region increased their production by 35 % within the last five years. Thailand, Indonesia, and India are also increasing their production capacity.

The recent economical setback in some Asian countries might reduce this growth rate for a certain period of time. The potential of growth is still immense. The paper consumption per capita is about 20 kgs in China compared to more than 300 kgs in North America.

Western paper groups expand into this area, and they will have influence concerning paper quality and raw materials to be used.

Mineral producers, such as Omya, ECCI, and MTI are already run local production sites in this region. China is going to be the biggest paper mineral consumer in the region. Most of the talc, used as a paperfiller today will be substituted by carbonates. China has one of the best white calcite resources. It will be interesting to see which of the Western carbonate giants will be first in this country, in order to develop the huge carbonate slurry business. To date, China does not have the necessary know-how.

# Minerals in Plastics Applications

## the Change of the Profile

- 6 the growth in the use of minerals in plastics sky rocketed after 1977, when resin prices started to rise dramatically and
- 6 automotives started using plastics in larger quantities at the same time
  
- 6 the first target was to save costs - this was the job of the carbonates
- 6 today, sophisticated formulations include well trimmed filler minerals mainly for mechanical improvements - these are the days of mica, wollastonite, calcined clays, talc, and others

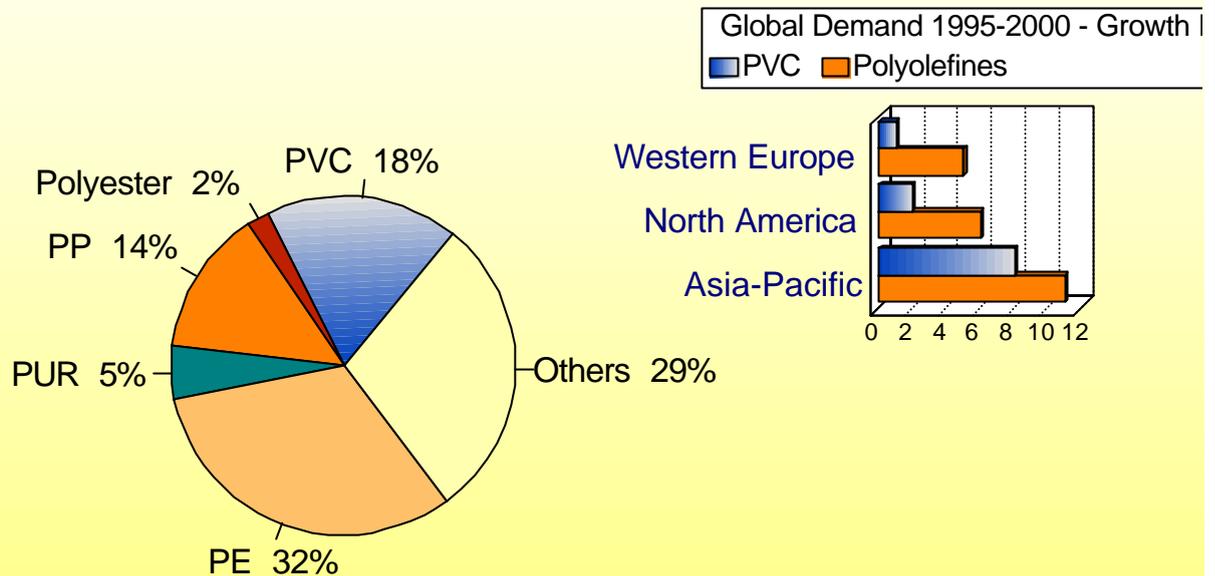
Plastics are another important sector, in which minerals are used with constantly increasing volumes. Initially, mainly carbonates (limestones and chalk) had been used as mineral fillers for polymers. The main reason was to reduce the formulation costs. Suitable compounding equipment and sufficient capacities enabled a swift market penetration.

The automotive industry was and is one of the driving forces for the increased consumption of functional fillers in plastics. Developing a better understanding concerning the interaction between fillers and polymer matrix will support further growth. However, the minerals industry has to show competence in order to be an accepted development partner and to set trends.

For many applications, we can investigate different ways of how to solve technical problems and how to meet material specifications. Sometimes minerals are in competition with each other, sometimes in competition with other combinations. The smaller volume minerals have the disadvantage that the trend goes towards standardization, rather than differentiation. However, some of them are standing small, some have an excellent performance.

# World Plastic Market

in 1997 : 130 Million Tons



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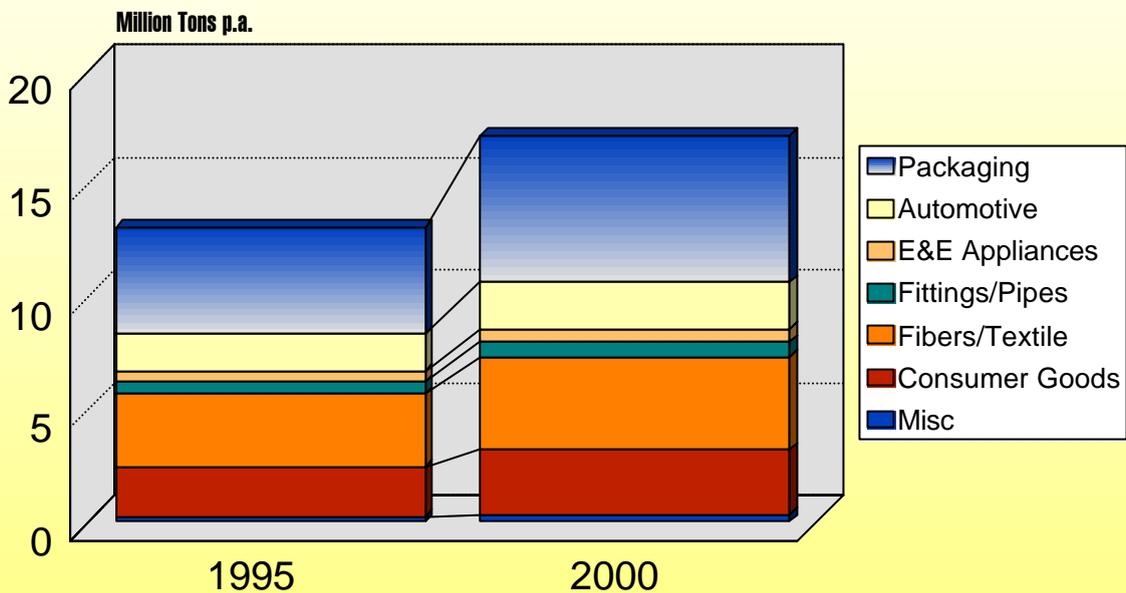
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It is always impressive to show the millions of tons of globally used plastics. These figures are not relevant for the minerals business as only a small portion of it is a potential target market. Nevertheless, we can use these figures as an incentive to improve the functional fillers' position.

The growth rates for plastics are still good. PVC has minor importance in Western countries, but is attractive in Asia, as automotive & construction work has high importance.

Polyolefines are booming all over the world. Asia will be an attractive place to invest in order to satisfy regional market demands.

## Global Development in Polypropylene



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The graph describes an estimation of the world market development. Polypropylene is a major outlet for functional fillers - talc, mica, wollastonite, and carbonates. The growth rates are steady.

This graph shows the expected development of PP-market segments for the years to come. Not all systems implement a lot of functional fillers. The automotive and domestic & electro appliance segments are of importance.

Especially these segments show strong globalization tendencies.

## Globalization Will Take Place

- 6 the automotive industry & the electro appliances are the driving forces
- 6 cars will not change much in their basic technologies within the next 5-10 years
- 6 globalization will take place
  - 6 regional differences will subsist in the external appearance of vehicles
  - 6 sub-systems and components will be uniformed
- 6 we expect substantial global convergence in sub-systems and components
- 6 the designs will align, worldwide
- 6 large investments in technology are necessary,
- 6 which can be digested only by global suppliers

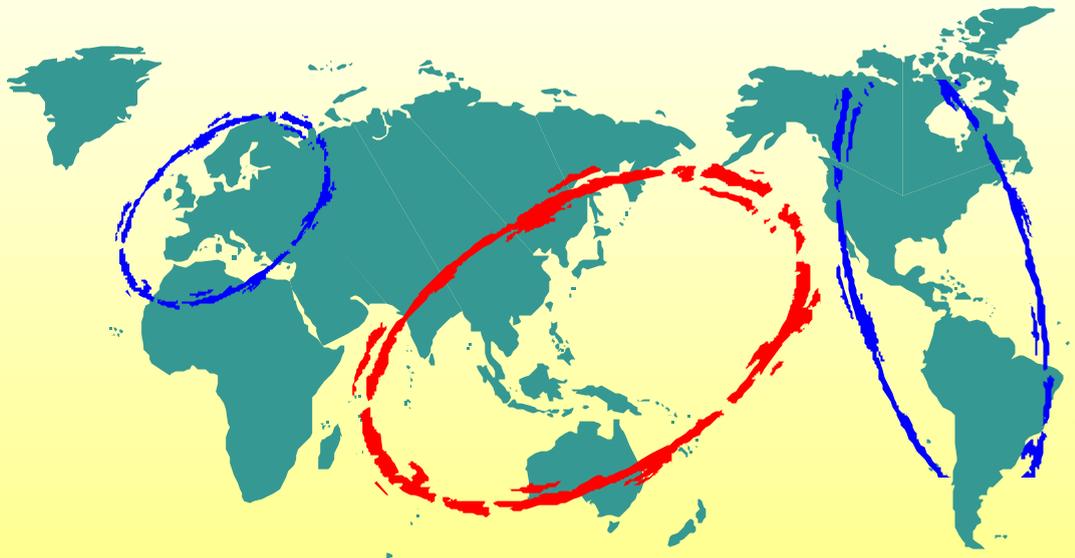
The globalization of the automotive and domestic appliance industry will take place, in the case of vehicles, mainly at the invisible level. However, regional differences will subsist in the external appearance of cars in order to enable variations in use, taste, and local regulations. The economic regions will be designed large enough to offer sufficient volumes to justify investments in local adaptation.

We assume that there will be substantial global convergence in sub-systems and components.

Worldwide alliances will be initiated to enable large investments in technology and to reach requested economies of scale through standardization.

The business will be concentrated in the hands of global suppliers.

## The Automotive Industry Will be Organized by Major World Regions



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We expect three major regions for the automotive design to form :

- » North America and Europe will become more similar
- » South America will have an individual development, but will be strongly influenced by North America and Europe
- » Asia-Pacific will be led by Japan
- » China's way has not been decided by now

The domestic and electro appliance segments are already global businesses. The OEMs produce in all these regions and follow their end-users and low labor costs. Today, Western compounders ship material from their central domestic operation plants, respectively, they started with local compounding and alliances recently.

The mineral producers are not that flexible. As they cannot shift mines, they can start local processing at best. So far, we could not see a lot of these activities.

# The Global Game

## Forces the Suppliers to Follow their Customers

- 6 the OEMs follow their consumer markets
- 6 the OEMs optimize their production costs
- 6 initially, the moulded parts were made centrally and were sent to emerging markets for assembling
- 6 moulders start local production at new markets
- 6 compounders follow
- 6 raw material suppliers have to make their products available as well

More and more, those who specify compounds are demanding that their suppliers take over a part of the globalization process. Delivery schedules have to be accelerated and suppliers have to provide high-speed access to all types of information. Globalization is forcing compounders to meet even more exacting and repeatable delivery and quality standards, wherever material is needed. The slogan is : "Supply the compound, in time, worldwide, for the lifetime of the product, at best price".

Price differences from one to another region normally end up at the lower end; this is another peculiarity of our business.

This is the chance for Asian supplier to become major raw material suppliers at multi-national corporations. However, they have to act globally as well.

## The Economics of Global Products

- 6 R&D work can be centralized for global components
- 6 product approval is only made once - for the moulded part, the compound
- 6 the development work for regional products is concentrated at local production sites
- 6 production can easily be shifted to other production units all over the world

**The result : cheaper - higher flexibility - faster**

The reason for globalization is clear : "Save costs, reduce dependances, create flexibility".

OEMs have to reduce R&D and approval work for new parts. They prefer identical material whenever it is possible. The local production centers only develop parts specified according to local taste, fashion, or legal requirements. In case that product life-cycles are over at one place or the labor costs became to high, the OEMs would like to get rid of the products at place A, so they shift to place B. This horror scenario is mainly valid for the domestic and electro appliance business, less for the automotive segment.

For the minerals producers & processors, this short reaction time is the major concern. Micronizing facilities must be dedicated to a specific mineral. When losing a key account in an oversea's region, not many alternatives can be developed at short notice.

In addition, the mineral producer has to act globally, concerning supply and service, which needs a lot of expertise.

# The Centers of Polymer Production

## The Markets Become Fragmented



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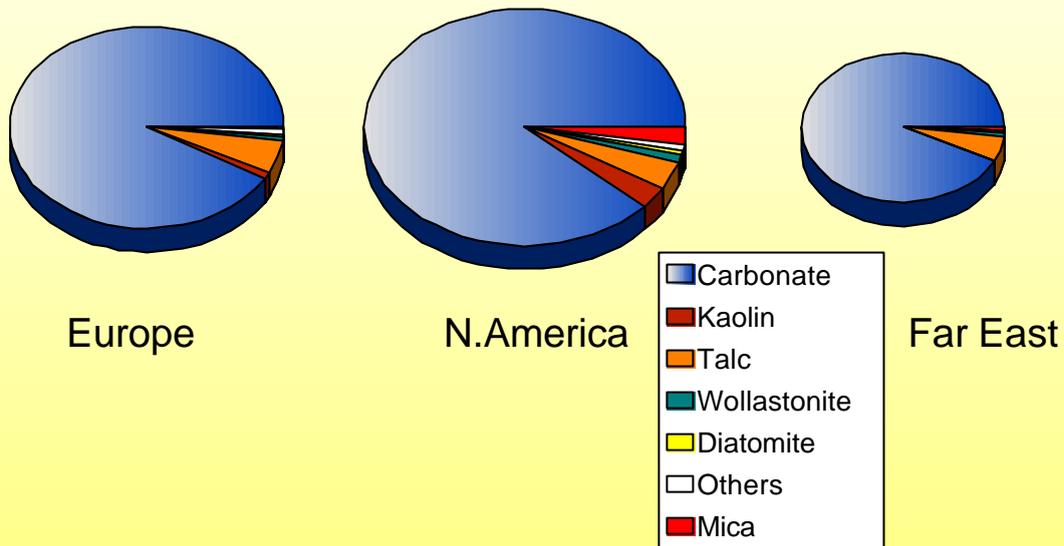
Nevertheless, the globalization takes place and it is up to us to either join or to stay smart and local.

A few years ago, North America, Europe, and Japan were the centers of compounding and plastics use. Within the last few years, decentralization has started.

Some of those new stars are already active, some of them are in a planning stage. Most of them are part of the international global business. Some of them are in discussion to merge & to form strategic alliances.

# Functional Mineral Fillers in Plastics

Global Consumption : 10 Million Tons of Minerals



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Market segmentation is an attractive field, one can play with volumes and categorizations. Carbonates are the broadest range of products, from low grade limestones to brightest ultrafine marble and precipitated carbonates. This is the reason why people speak about a mineral volume in plastics between 8 and 14 million tons p.a. worldwide.

The diameters of the pies are in relation to the absolute consumption figures of a region. North America is the largest consumer of minerals in plastics to date.

The message of these pies is simple :

- » the carbonates have the lion's share
- » talc follows with steadily increasing market shares - worldwide
- » mica is of importance mainly in North America
- » wollastonite tries hard everywhere and holds a good potential

Minerals such as barytes, quartz, flame retardents, and pigments have not been included in these graphs.

# Asian Minerals

## a Good Basis for Global Products ?

- 6 Asia-Pacific is rich in industrial minerals
- 6 Japan has enormous limestone occurrences, more than 9 M tons are filler grade GCC
- 6 Indonesia has the best quality limestone for filler applications
- 6 Malaysia & Thailand have carbonates as well
- 6 China has huge reserves of talc, mica, wollastonite, and white carbonates
- 6 India is an important producer of carbonates, talc, mica, and wollastonite as well

In Asia, there are enormous reserves of major functional filler minerals. Limestone is everywhere available in good quantity and quality. Talc, mica, and wollastonite are available in India and China. China is the world's largest producer and exporter of talc.

All these resources do not say a lot about the chance to become a global supplier of industrial minerals. We can see that Japan has a high standard of mineral processing. However, they mainly act at their domestic market. In some SEA countries multinational carbonate processing companies have participations.

However, most of these Asian mining countries are used to export commodities rather than specialties. Their intention is to supply big quantities on an FOB-basis to a variety of grinders & traders, rather than to commit themselves to a strong - not necessarily big - marketing partner.

The typical fragmentation of the Chinese mining industry and the competition between the mining companies is wellknown and prohibits a long-term policy. Those mineral producers will have to go a long way to be accepted as a global supplier. They are missing the added value today. They are lacking application know how.

## Carbonates are Global Products

- 6 Plues Staufer-OMYA, ECCI are already global players
- 6 their grinding technology, application know how are top
- 6 they are leading the Asian carbonate business and they made the local mines a part of their global business

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The world of carbonates is an easier matter for globalization. There are fewer mineral modifications and there are real global players. A common global source is less important.

OMYA are by far the leader and they define the standards. They have more than 100 operations in the world. They are using the same grinding technique worldwide and run the same specifications. They have a dominant position in Europe, an outstanding performance in the Far East and they will certainly establish themselves also at all other places in the world. It is only a question of time.

ECCI is also active in Europe, North America, and Asia. All other carbonate producers have a longer way to go to become a global supplier.

Omya and ECCI have technologically leading operations in Japan. Omya also produces in Korea and Indonesia.

We can summarize : carbonates are sufficiently available and are processed according to world standards by the key players.

However, China has to find his own way.

## Talc - Commodity or Specialty ?

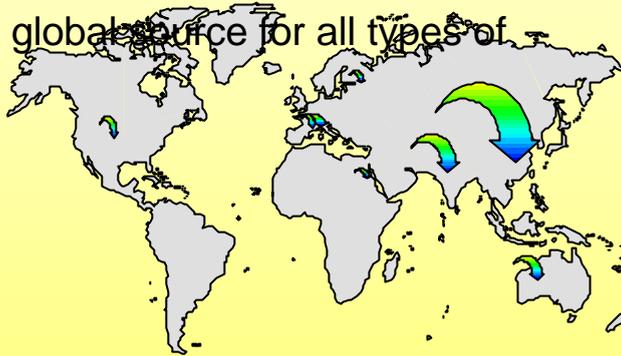
- 6 talc is of increasing importance for PP applications
- 6 today, talc is mainly supplied from regional sources in North America and Europe; Japan is using a wide range of Chinese talcs
- 6 micronizing technology became more important as fineness is increasing and, subsequently, so is the technical performance
- 6 R&D work and technical sales support is the key to success
  
- 6 today, more than 400.000 t of talc are used for plastics applications
- 6 talc became a widely accepted functional filler - new product developments of ultrafine talcs became specialties

More than 400 kt are used for plastics applications. Talc became the standard functional filler for Polypropylene. Initially, mainly coarse products of 200 and 325 mesh had been used. Today, the trend goes towards finer & finer grades. Micronization of this platy mineral demands special know how in order to protect the lamellarity and to save energy costs.

Talc suppliers have to provide basic and detailed development support to the compounding industry. Ultrafine talcs are a highly technical matter now, and talc shifts from a commodity to a specialty functional filler.

## White Talc is Short in North America & Europe

- 6 the world talc market is about 6 million tons p.a.
- 6 talcs differ widely from one mine to the other
- 6 high brightness talcs are rare in North America and Europe
- 6 Asia and Australia have sufficient resources and are able to become a global source for all types of applications



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Total worldwide talc production is about 6 Million tons p.a. Europe and North America have a production and consumption of above 1 Million tons p.a. White talcs are rare in Europe and North America. Both continents import white talcs from China and Australia.

India has good sources but higher costs for transportation to the ports.

China is the largest mine operator with more than 2.5 Million tons. They have the largest reserves of white talcs. The best known talc grades come from the Liaoning and Guangxi provinces. Not all imported talcs used in North America are of good and consistent quality. The Chinese people are also good businessmen, and you get what you pay for.

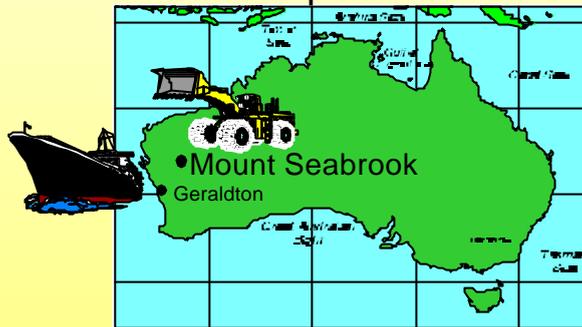
Australia has two major mines. They have a good potential for the future's global business - Three Springs for the paper and Mount Seabrook for the plastics and cosmetics business.

IMI-Fabi, Italy, is an important talc supplier for the compounds business. They have their own global source of white talc at Mt. Seabrook, using this ore globally. This is the supposition for a worldwide concept, with regional processing on three continents very soon, expert partners, and globally coordinated marketing.

## Australia's Mount Seabrook

Started as the First Global Talc Source for Plastics

- 6 the first Western talc source being used on a global basis seems to be the Mount Seabrook mine in Australia.
- 6 Australia offers well balanced transportation costs to all parts of the world



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As we could see from the previous slide, there are only few white talc mines available in the world, offering good quality, availability, and the logistical links for exportation. Western Australia's Mount Seabrook mine has a big potential in this concern. IMI-Fabi, having a significant market shares in the talc business for PP-applications in Europe, will develop this mine and will make it to a global source for the plastics industry.

The goal is to have one mine, regional processing at and with experienced partners, the same product specifications everywhere, coordinated marketing, R&D, and inter-active technical sales support.

# Speciality Minerals

## Have a Long Way to Go

- 6 Mica and Wollastonite are good examples for plastics applications
- 6 their major markets are the highly developed regions - mainly the USA, Japan, and Europe
- 6 they are shipped globally to compounders
- 6 their prices depend very much on transportation costs
- 6 most of these businesses are made by "agents & distributors"

We do not expect regional mineral processing to start to use a single global source of raw material soon as the total consumption volume is too small

Specialty minerals will have more problems becoming global products, using one mineral source, processed regionally, offered at similar prices worldwide.

The North American mica and wollastonite industry are a good example of a very successful development at domestic markets. The global acceptance is more difficult to reach as the shipment in containers to overseas' destinations makes these products too expensive for a wider use. Local processing is not expected for the next years because volumes are too low.

In China and India most of these minerals are available at larger scale. Their mining & processing industry is only of local importance. Lump and some ground material is exported. The quality level is different to US and European producers. There is no global player involved so far. We can see a big potential for these minerals to become global products.

# How to Become a Global Supplier

## for Industrial Minerals

- 6 Asia - Pacific has premium ore reserves at large scale
- 6 the logistics have to be improved
- 6 state-of-the-art processing has to be used - if possible the same technology on a global basis
- 6 ISO 900x is not an award, it is a supposition
- 6 Asian operations need a global marketing concept
- 6 the products must be offered on a global basis

The Asia-Pacific region is full of excellent industrial minerals. Some of them are in remote areas. The logistics have to be improved as vessel capacity is short. Asian mineral producers need know-how partners and have to invest in state-of-the-art technology. Considering a global supply, the same processing technology has to be used everywhere in order to supply according to the same specifications. An ISO 9000 quality system has to be installed. It is most important that the Asian operations develop a global marketing strategy, a global processing & distribution network, and a global price policy. The selection criteria for these strategic partners is a sensitive matter; we believe that specialists must have priority rather than giants in a commodity business.

## Summary

### Global Minerals Will Have a Bright Future

- 6 globalization goes on in all types of businesses
- 6 flexibility in supply and global availability is required
- 6 functional minerals are of increasing importance
- 6 mineral producers have to follow their customers
- 6 prices & costs must become more uniform in North America, Europe, Asia, and South America
  
- 6 finally, all types of fillers and additives have the chance to become global products
- 6 global products will have a higher growth potential
- 6 time is a significant aspect

One fact is for sure - globalization will go on. The only question is, whether we are part of it or not. All types of functional fillers and additives will be required on a worldwide basis. Producers of higher volume fillers will be able to offer significant cost advantages, if they use one global mineral source and process regionally.

Time is a significant factor.

Let us use these days and hours during this conference to hear more about everybody's demands and visions. Let us develop some common ground and relationship. It will be advantageous to all of us.