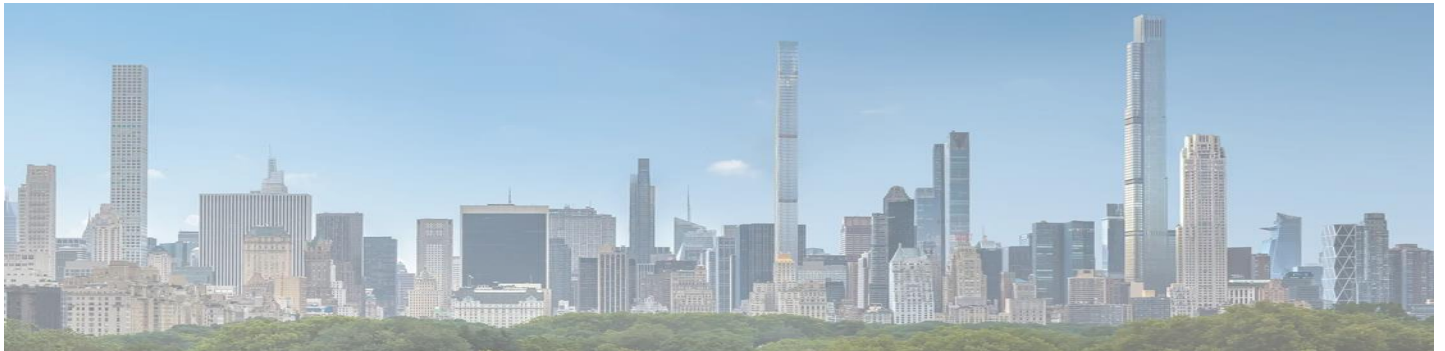


The admixtures market is seeing a wave of consolidation with further structural changes expected following BASF's announcement of the sale of its Construction Chemicals business



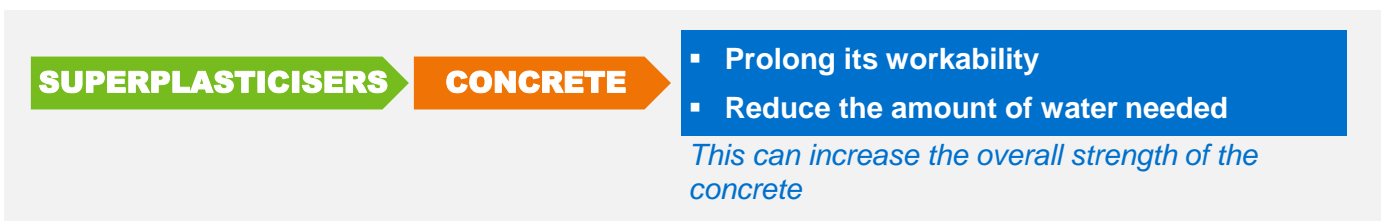
A core component of concrete admixtures is superplasticisers (“SPs”). Demand for high-performance superplasticisers is growing as a result of population growth in emerging markets, urbanisation and changing construction trends and regulation.

Superplasticisers reduce the environmental impact of concrete and support more technically demanding construction projects, e.g., taller high-rise buildings which require better performing concrete.

In this brief paper, we look at the following questions:

- 1** What are superplasticisers and their role in the construction industry?
- 2** How has superplasticiser technology evolved?
- 3** What is driving demand growth for superplasticisers?
- 4** Who are the players and how are they positioned?

- 1** Historically, concrete was a simple mixture of cement, water and aggregate (sand, stone, gravel). Today, concrete can include an extensive blend of performance enhancing chemical admixtures (superplasticisers, retarders, air entrainers etc.), fibres and polymers. Superplasticisers are key admixture agents which are added to the concrete paste with other chemicals to modify the properties and performance of the concrete.

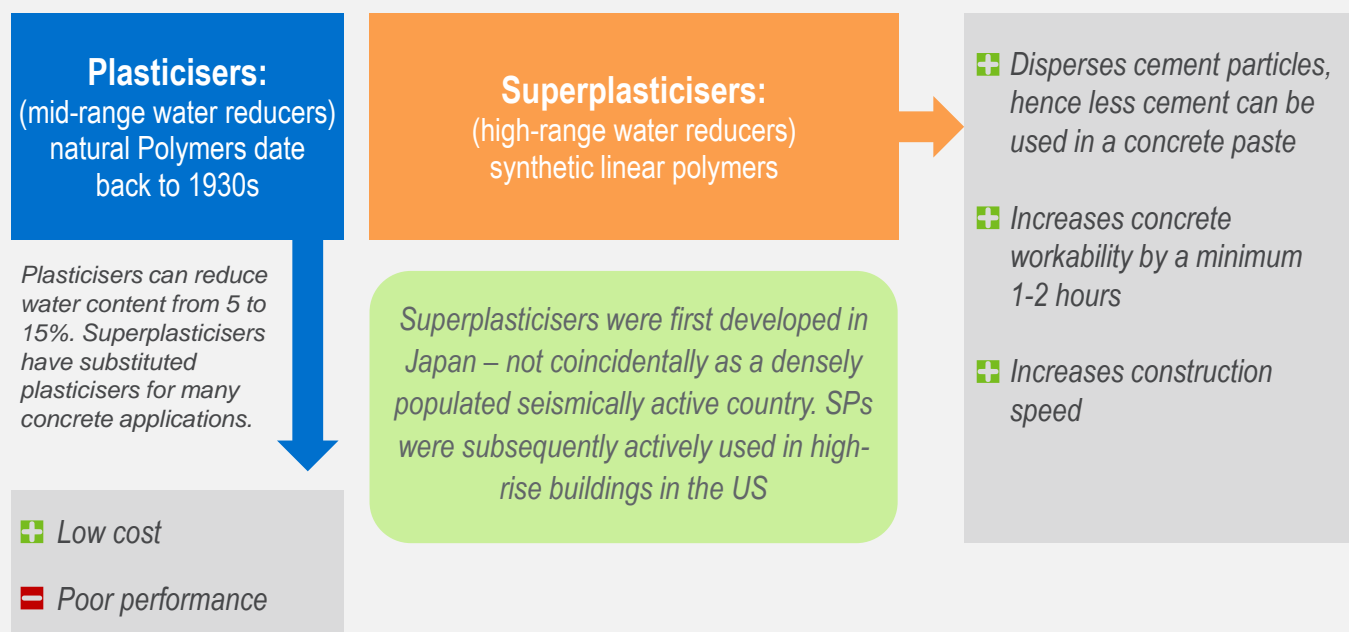


The water/cement (w/c) ratio is the most important characteristic of concrete, as it controls the microstructure of the cement and the overall performance of the concrete. Lower water content can lead to a stronger, more workable and environmentally friendly concrete.

Concrete is very energy and water intensive – producing 4-8% of the world’s CO₂ emissions and representing nearly 2% of global water withdrawals. SPs reduce both the water addition in the concrete by up to 40% and the amount of cement added in the concrete paste, thus lowering the environmental impact without compromising the performance of the concrete.

The choice and the dosage of the superplasticiser depends on the final application of the concrete and the season of construction.

Key features of plasticisers (natural polymers) and superplasticisers



The types and water reduction levels of superplasticisers:

Process route	Generation	Superplasticisers type	H ₂ O reduction
Polycarboxylate ether	3 rd	Polyether carboxylates (PCE)	Up to 40%
Melamine & formaldehyde	2 nd	Melamine sulphonates (SMF)	20-30%
Naphthalene & formaldehyde	2 nd	Naphthalene sulphonates (SNF)	Up to 30%
Paper process	1 st	Lignosulphonates (plasticisers)	Up to 10%

PERFORMANCE & PRICE

2 Polycarboxylate ether-based SPs were first developed in Japan in the 1980s and maintain the concrete fluidity longer than naphthalene and melamine based SPs. These SPs are preferred for high-strength and ultra-strength concrete and are projected to see faster growth in demand than other SPs (up to 5% p.a. demand growth expected over the next five years). Although more expensive (3 – 4 x SNF and SMF), they provide superior performance and offer the advantage of a formaldehyde free solution.

Producers are continuously developing new SP technology and formulations to meet the changing requirements of the construction market. Including the demand for new admixtures which offer greater flow during long transportation periods and aid in light-weighting, while creating high strength concrete which is “pumpable” at high elevations.

“ As the height of the buildings goes up, the demand for SPs increases, constructors are looking for higher workability of the concrete without adding a vast amount of cement so it can be pumped to the required height. ”
– Special Products Manager, Leading Global Construction Materials Manufacturer

Driven by sustainability and resource efficiency concerns surrounding the concrete industry, one of the latest developments in SP technologies includes the production of bio-based polycarboxylate ether SPs from by-products of renewable raw materials rather than conventional crude oil.

In the past, higher performance SP demand was mainly limited to Western Europe, the US and Japan. However, growing demand for high-performance concrete in developing economies, in particular India, China and the Gulf countries (UAE, Qatar, Saudi Arabia) is driving investment in new SP capacity in these emerging regions.

Major producers continue to develop their superplasticiser technologies and invest in admixture capacity – particularly in emerging markets:

- BASF introduced its new MasterEase 9000 and MasterSure LDP superplasticiser admixtures in June 2018. This new SP technology allows the production of extremely low-viscosity concrete with longer processing times and improved rheological properties.
- In 2016, BASF opened its sixth concrete admixtures plant in Kharagpur, India to meet growing local demand for high quality construction chemicals.
- Sika introduced a new mid-range water reducing polycarboxylate-based admixture SikaPlast®-100 MR in July 2018.
- Sika also opened the first concrete admixtures plant in Tanzania in 2017, driven by port installations and other investment in transport infrastructure.

3 There is a growing global trend towards “Vertical Urbanisation” – the construction of taller high-rise buildings in response to increased urban density and more costly city centre land. The construction of these high-rise buildings is partially facilitated by advancements in concrete technology – including the use of SPs.

- Between 2019 and 2020 alone, 30 “Super-Tall” (+300m) high-rise buildings are to be completed with three “Mega-Tall” (+500m) buildings to be completed in 2021⁽¹⁾.
- Superplasticisers are a key ingredient in high-performance concrete, enabling the construction of these taller buildings and other demanding infrastructure projects^(*) such as bridges and airports.

Superplasticisers are one of the fastest-growing chemical admixture in the concrete market. Going forward, demand will be supported by buoyant construction in emerging markets⁽²⁾ and the environmental benefits from continuously improving superplasticiser technology.



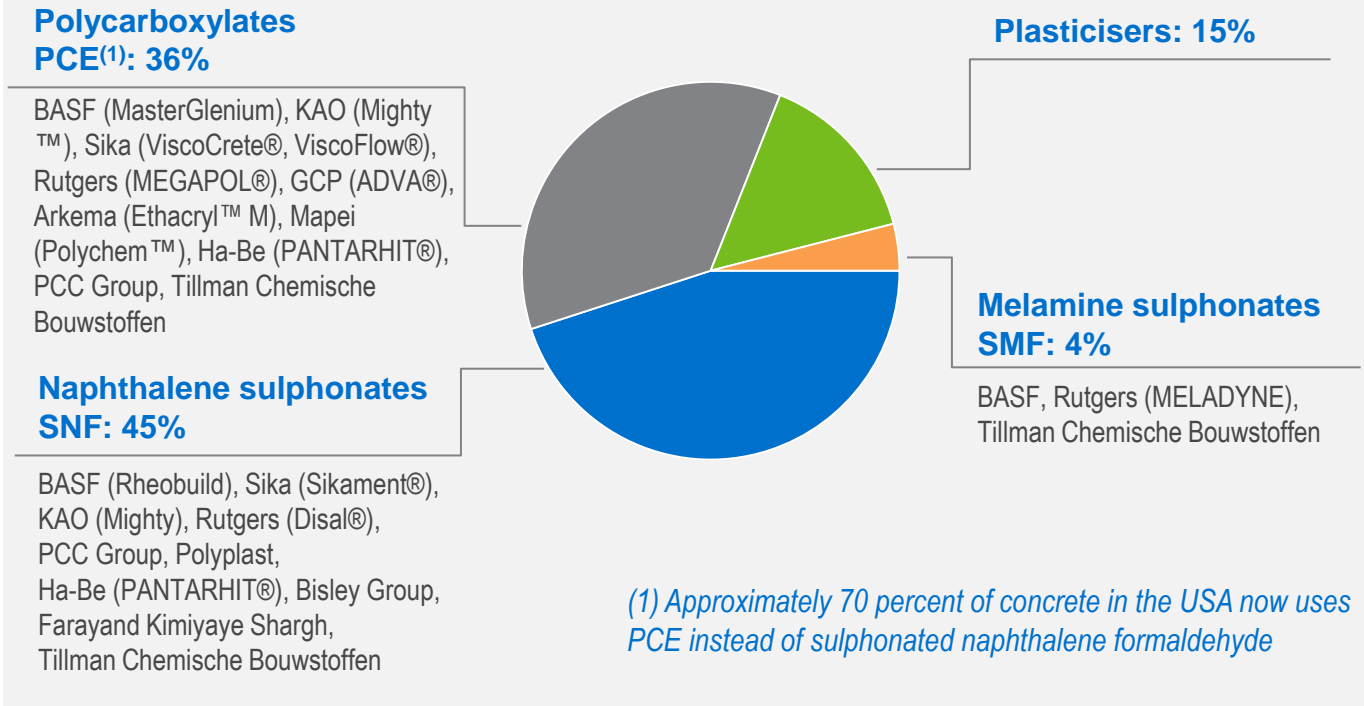
() London's Crossrail™ construction would not have been possible without the addition of superplasticiser admixtures sourced from Sika, Chryso, Ha-Be and other SP producers.*

⁽¹⁾ Data from Council on Tall Buildings and Urban Habitat

⁽²⁾ China now produces more than 10 times the volumes of concrete than the US

4 The largest SP producers are BASF, Sika and Saint-Gobain – all specialising in high performance admixtures.

Global demand by type and example SP producers



BASF is one of the few admixtures producers which is also backward integrated into the key raw materials – providing some cost benefits and mitigating the risk of any supply disruptions.

Superplasticiser value chain and producer integration

	Raw Materials /Monomers	Superplasticisers	Admixture Formulation	Concrete
		●	●	
	●	●	●	
		●	●	
		●	●	
	●	●		
		●	●	
		●		
			●	●
		●	●	
				●
				●
		●	●	●
		●	●	

To capitalise on changes in construction techniques and the growth in emerging markets, producers are acquiring assets to improve their product portfolios / technologies and to expand their operating footprint and distribution channels

Examples of consolidation activity:

- A resolution of a 4-year long battle for Saint-Gobain's control over Sika in May 2018, could drive further consolidation, with Sika free to explore acquisitions.⁽¹⁾
- Sika made a binding offer to buy its French rival Parex in January 2019. Once the deal closes, Sika can leverage Parex's expertise in the manufacture of mortar and its strong position in distribution channels.
- The Chryso Group has also been acquiring European players (including distributors):
 - Euromodal, a Portuguese family-owned manufacturer of construction chemicals (October 2018).
 - Chemtec Admixtures Limited – expanding its admixture business in Ireland (October 2018).
 - Italian RUREDIL S.p.a., which included concrete admixtures, cement additives, technical mortars, accessories for precast systems, fibres, products for decorative concrete and restoration (June 2018).

Although the market has seen consolidation in recent years, it remains somewhat fragmented with several active smaller players and multiple further deals to be done

⁽¹⁾ A potentially hostile takeover resulted in Sika maintaining its independence and Saint-Gobain owning 10 percent share of the company (FT, May 2018).