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Let's talk:

#grey2green in China -

Innovations for more

sustainability in cement

production

In 2020, China produced around 2.4 billion tons of cement, which corresponds to around 55% of global production. At the same time, China

is stepping up its efforts to protect the environment and climate. The cement industry is undergoing a transformation process towards more sustainable production. thyssenkrupp Cement Technologies has practical and economical technologies and solutions - this is what the polysius® brand stands for. In an interview with China Cement Network, Dr. Björn Olaf Assmann, CEO of thyssenkrupp Industrial Solutions (China), explains the major challenges facing the Chinese and international cement industry and outlines the contribution thyssenkrupp can make to mastering them.

**In people's traditional impression, cement plant is synonymous with heavy pollution. In your opinion, what role should cement play in the process of human sustainable development? What are the contents of green development of cement industry?**

Indeed, the traditional production process has a significant impact on the environment. Looking several years back, cement production was connected to pollutions in many ways: dust emissions, NOx emissions and the enormous CO2 footprint. But we can see the responsibility the cement industry is taking towards a sustainable way of cement production. By installation of highly efficient filter systems, many cement plants setting now very high standards in terms of dust-free production. Recently, the reduction of NOx emissions has become very important for the entire cement industry. From my point of view, the cement industry is already taking their responsibility towards a sustainable production of cement.

We as a supplier to the cement industry anticipated the green development trend very early already. And the transformation to sustainable cement manufacturing can be observed in different areas. On one side the optimization of production technologies towards higher efficiency, in reducing the consumption of resources, of fuel and power consumption for cement production. Secondly, the increasing use of alternative materials – like calcined clays – to substitute clinker as the major contributor for CO2 emissions in cement manufacturing.

**Recently, domestic coal prices have been rising. The price of cement with coal as the main fuel has also risen with the tide. thyssenkrupp has been deeply engaged in the cement industry for more than 160 years. What help can you provide to the cement industry in this regard?**

The process of cement manufacturing is known to be high in demand of fuel – like coal - and of electrical power. Therefore, the reduction of fuel and power consumption is playing a key role for the green development of cement industry. Through a variety of alternative fuel solutions, thyssenkrupp helps cement manufacturers realize the whole process chain of "turning waste into energy" in one stop, with a substitution rate of up to 100%, which can greatly reduce the operation cost and the impact of cement production on the environment. For example, our prepol®- SC technology uses Refuse Derived Fuel (RDF), domestic waste and even hazardous waste to replace coal and improve combustion efficiency, which can be described as "turning waste into treasure" in the real sense.

In principle, the prepol<sup>®</sup>-SC is a robust and efficient combustion grate, which is composed of multiple static and non-moving fire-resistant steps, so the system is named "stepped combustion furnace". On the combustion grate, waste can burn at high temperature for more than 1000 seconds, while the longest combustion time of ordinary decomposition furnace combustion technology is only 7 seconds. When the calorific value is the same, the carbon emission intensity of alternative fuels is lower than that of traditional fossil fuels. The use of alternative fuels is also regarded as an important measure to reduce carbon dioxide emission, and can help customers save fuel costs, so as to truly realize cost reduction, efficiency increase and green production. And we as thyssenkrupp are proud to have successful references for this technology in China.

**This year is the first year of China's 14th FYP. The government has also issued a series of policies and measures to promote carbon emission reduction. What is thyssenkrupp's vision in continuously promoting the green transformation of the cement industry? What help can be provided for Chinese cement?**

We have a clear vision on how to realize the transformation of cement production. We launched R&D projects and product development towards sustainable cement manufacturing already several years ago. And in 2019 we have officially started to advocate and promote our initiative "#green2green" - grey cement towards green production. Our "#grey2green" initiative contains and even combines all relevant technologies and solutions in terms of alternative fuels, emission reduction, smart manufacturing and reduction of carbon emissions.

In addition to the prepol<sup>®</sup>-SC mentioned above, we can do even more in order to minimize the CO<sub>2</sub>-emissions by using the oxyfuel technology for cement manufacturing. The basic principle behind oxyfuel is the capturing of CO<sub>2</sub> from the exhaust gas of cement manufacturing plants and avoiding to release it into the atmosphere. It is a quite challenging approach as the composition of the exhaust gas has to be prepared in order to capture the cement plant's CO<sub>2</sub> emissions. This is achieved by using pure oxygen instead of air for combustion. In combination with adapted process and equipment design the exhaust gas consists mainly of CO<sub>2</sub>, which enables to separate CO<sub>2</sub> more efficiently. And we are proud of our new polysius<sup>®</sup> pure oxyfuel technology based on pure oxygen as combustion gas and does not rely on complex exhaust gas recirculation with less efficient CO<sub>2</sub> separation. In other words – thyssenkrupp is taking action on providing suitable solutions for reducing carbon emission in cement manufacturing.

Nitrogen oxide abatement is very relevant topic for the cement industry to achieve ultra-low emission of pollutants. CemCat developed the "SCR - Selective Catalytic Reduction denitration technology" for the specific needs of the cement industry. With reduction rate of more than 95%, which can effectively solve the problem of ultra-low emission of nitrogen oxides. As we have more than ten years of experience in design and operation of SCR systems in cement industry, our successful reference cases for SCR in China are underlining our expertise on this technology.

**Smart manufacturing is regarded as a technological revolution facing the future development of the cement industry. What solutions does thyssenkrupp have in this regard?**

Smart manufacturing has indeed promoted the technological development of various industries. For example, with the increasing use of alternative fuels in cement production, it has become particularly important to record data in real time, monitor quality and intervene in the production process immediately when necessary. Accurate data collection and a higher degree of automation ensure

excellent repeatability and avoid errors. thyssenkrupp's polab<sup>®</sup> fully automated laboratory system enables higher sampling representativeness, excellent accuracy in measurement results and high product quality at low production costs, all without human intervention. To date, a number of companies such as CNBM, Anhui Conch and China Resources Cement are integrating our automated laboratory system equipment for the long-term digital strategy of their companies.

**The green transformation of the cement industry has created huge development opportunities for energy conservation and environmental protection, and more and more technical service enterprises have put forward a large number of solutions. Can you talk about the advantages of thyssenkrupp?**

As a brand with more than 160 years of industry experience, one of our advantages is that we have all the knowledge about the cement production process. The production of cement is complex and for sustainable solutions the combination of specific and general expertise is essential. And this enables us to develop solutions which will bring an overall and durable benefit to our customers. We also believe that the big challenge for green transformation needs collaboration in various dimensions. That means we are not only providing solutions to our customers – we see our customers as partners accompanying on the path towards sustainable cement production.



The polysius<sup>®</sup> brand looks back on 160 years of development.