Sustainability Report 2013

FLSmidth

Contents

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About this report

The 2013 Sustainability Report describes the FLSmidth Group's efforts in relation to Corporate Social Responsibility (CSR) and includes the FLSmidth Communication on Progress to the United Nations Global Compact.

The scope of this report is the entire FLSmidth Group. The case stories in this report have been selected because they represent the areas in which we have made significant progress during 2013 regarding the company's sustainability efforts. The first large part of the report describes progress within the FLSmidth focus areas, which are closely related to our business conduct. The second part of the report consists of case stories about our technological and innovative progress, supporting our vision of delivering technology that create sustainable value for our customers and thereby also for their societies and the environment.

The FLSmidth Sustainability Report is aligned with our Annual Report, which is targeted at investors, and is therefore structured according to the company divisions. The consequence of adopting a divisional structure as opposed to a market structure is that some of the case studies in this report are placed within the division where they organisationally belong although they could also have been grouped with a different industry. The reason is that many of our product and research activities relate to more than one industry, which underlines our strategy of being a One Source supplier to both the cement and mineral industries.

The reporting period is 1 January 2013 to 31 December 2013.


LED HEADLAMP

FLSmidth
An overview of 2013

2013 was characterised by several important developments for FLSmidth, both in the market and within the organisation, and those directly linked to our Corporate Social Responsibility (CSR) efforts are the subject of this 2013 Sustainability Report. Perhaps the most prominent among them has been renewed emphasis on cultivating a company-wide culture of safety. To bring this about, management has placed safety firmly at the top of FLSmidth's agenda in every business and social context.

This section introduces key changes within our organisation and highlights some of the most important milestones we have achieved during the year.


FLSmidth

New leadership

In May 2013, FLSmidth welcomed Thomas Schulz as the new Group CEO. Under his leadership, safety – already a priority for FLSmidth – has been revitalised as a decisive aspect of our business. Ambitious new targets have been set, and the organisation is committed to achieving ever higher levels of excellence in safety across functions and geographies.

The appointment of the new CEO has also brought changes to the organisation at Group Executive level. A new position of Group Executive Vice President of Human Resources, with Virve Meesak in the role, places Human Resources at the table with Group Executive Management. The move is designed to further strengthen FLSmidth's people management and performance culture.

While new leadership is always accompanied by new perspectives and fresh focus areas, our company's longstanding commitment to responsible and sustainable business conduct stands firm. In fact, this commitment has never been stronger – or more important to ensuring the long-term success of the company.

The safety and people management facets of our business was not the only areas strengthened at FLSmidth during the past year. A general health check of the group has taken place, with the aim of ensuring that the success built during the first 130 years of existence will continue well into the future (for more information, see Interim Report Q2 2013 on flsmidth.com).

That success, we believe, will be a direct consequence of uniting the group, and of embracing and emphasising FLSmidth's strong corporate culture and heritage. This culture rests upon the company's three corporate values – competence, responsibility, and co-operation – and they have proven their worth over more than a century and connect directly to today's safety and social responsibility agendas.

Our values make it the clear duty of all FLSmidth employees to take responsibility to cooperate with each other and with our business partners, and to make full use of existing competencies while continually working to acquire new ones.

Part of the work to ensure FLSmidth's future prospects has required organisational adjustments to fit the current market situation and reductions in the workforce during 2013. Letting valued, and competent people go is a tough decision, and entails a certain responsibility for their welfare. The company has done its utmost to ensure that these former employees leave under the best possible conditions, enabling them to move to new phases of their careers and lives.

The 2013 report at a glance

The word "sustainable" takes centre stage in FLSmidth's statement of its strategic intent *"…our customers' preferred full-service provider of sustainable minerals and cement technology".* But it doesn't rest there. FLSmidth's commitment to sustainability has long translated into actions both at global and local levels in both behaviour, technology and solutions development. In fact, last year's sustainability report included a large amount of information and case studies that clearly demonstrate how this intent has evolved into sustainable initiatives and programmes.

The 2013 Sustainability Report continues this approach, including updates on last year's case studies where relevant, and presenting new studies that show the extent of FLSmidth's commitment. Progress made in relation to FLSmidth's technologies and solutions is included in the business division sections of this report.

FLSmidth also continues to report on a consistent set of focus areas determined to be vital to the company. Under each of these sections, we follow up on progress made toward the targets listed in the 2012 report.

2013 highlights

Welcome to the 2013 Sustainability Report. This report is FLSmidth's annual update on the progress we make in relation to our sustainability and Corporate Social Responsibility initiatives demonstrating our continuous commitment to the UN Global Compact.

Before anything else, we start with safety. It is our united responsibility, which means that it is the responsibility of each and every one of FLSmidth's employees to facilitate healthy and safe working conditions for our colleagues and for those who use our products and services. We are committed to excellence in safety by ingraining a health, safety and environment mindset into our culture and, above all, by always keeping safety as our top priority.

We can still improve our safety competence, confirmed by the number of accidents and injuries during 2013. It is, therefore, also with the deepest regret that we must report 2 fatal accidents during 2013. Such accidents are tragic and unacceptable, and they show that ensuring safe working conditions is an area that demands our outmost attention – no matter what we do and where we do it. We have to learn from them, and to ensure that they are not repeated.

To build a strong safety culture and to improve on our safety competence, we have launched a number of initiatives throughout 2013. We launched a new Health, Safety and Environment (HSE) policy that communicates our ambition of excellence in safety. In support of the new policy, we held a "Safety Week" to make sure that everyone working at FLSmidth is aware of safety as our top priority, and to increase employee safety competence throughout the organisation.

Ensuring that safety stays on top of mind is a part of the FLSmidth commitment to CSR and builds on our company culture of being a responsible employer, corporate citizen, and a reliable business partner. FLSmidth is a Danish company with a global outlook and our company culture is built on a strong heritage and a set of values that urge us to take care of each other and to be resistant to unethical business practices. With these values as our guiding principles, CSR will continue to be on top of our business agenda and thereby ensuring that responsible business practice is integrated into the way we think, behave, and lead. This strong set of values is of utmost importance to FLSmidth and to our stakeholders because we as a company are selling our competences with a focus centred on our people.

Developing through changing times

2013 was a year of many changes for FLSmidth and our employees, and a year full of preparations for the future. Part of that preparation has been to ensure that FLSmidth meets the needs of its stakeholders, and that we run our business with particular focus on sustainable business conduct.

By "sustainable", we mean operating in a way that provides our own company, our customers and the world around us with the possibility of quality in life and business - and in a way that also secure the needs of future generations. We believe we can do that by focusing our efforts in the areas where we make a real impact, such as delivering technology and services that focus on health, safety and the environment, and by acting as a reliable partner and a responsible employer.

The environment as a product driver

Climate change and environmental concerns are high on the agenda for FLSmidth and the industries with which we work. Consequently, our focus on research and product development is an essential element of ensuring that we continue to deliver technology that helps to minimise the environmental impact from the processes and production it forms part of in the cement and minerals industries. At the same time, this technology must be safe for the people who build it and for those who use it.

This report will take you through a number of cases where we show how we live our vision and strategy of being "…our customers' preferred full-service provider of sustainable minerals and cement technologies" to build our next 130 years of business.

Thomas Schulz
Group CEO, FLSmidth & Co. A/S

Thomas Schulz
Group CEO

7.6 hours of safety training per employee (5.7 hours per employee in 2012)

LTIFR = 3.9 (4.7 in 2012)

First ever women mentoring programme

464 employees trained in Responsible Sourcing e-learning (885 in 2012)

First batch of 19 students pass the certificate course at FLSmidth supported Community College in India

2 fatalities (1 in 2012)

10.5% female managers (9.2% in 2012)

83,000 tonnes CO_2 (82,000 tonnes in 2012)

FLSmidth facts

Who we are

FLSmidth is a leading supplier of equipment and services to the global cement and minerals industries. FLSmidth supplies everything from single machinery to complete cement plants and mineral processing facilities, including services before, during and after construction.

Our vision is to be our customers' preferred full service provider of sustainable minerals and cement technologies.

FLSmidth offers world-class products, facilities and systems, backed by tailored consultancy and support services. Our wealth of knowledge and resources means that we are able to provide one source solutions for even the most challenging requirements, worldwide.

FLSmidth invests heavily in developing new solutions to meet the important future energy and emissions challenges of our customers.

FLSmidth has over the past 130 years developed a business culture based on three fundamental values: competence, responsibility and cooperation.

What we do

To our global customers in the minerals and cement industries, FLSmidth supplies everything from engineering, single machines and complete processing plants, to maintenance, support services and operation of processing facilities. Our core strengths are our market-leading product range, our ability to implement, manage and maintain projects, and our unmatched operation of minerals and cement processing plants, worldwide.

Through years of innovation and experience, FLSmidth has developed a vast global pool of specialist engineering resources that is unique within our market. We focus on copper, gold, coal, iron ore, fertiliser minerals and cement, and are a one source supplier of products, solutions and services for these industries.

We offer comprehensive, flexible and global services. With offices in more than 50 countries and service centres in our primary regions, we are on site to help customers with every stage of their operational processes, from strategic planning to overcoming everyday challenges, as well as facility lifecycle management.

FLSmidth in numbers

More than 130 years of FLSmidth history

15,317 employees worldwide

Presence in more than 50 countries

Revenue of EUR 3,610 million in 2013

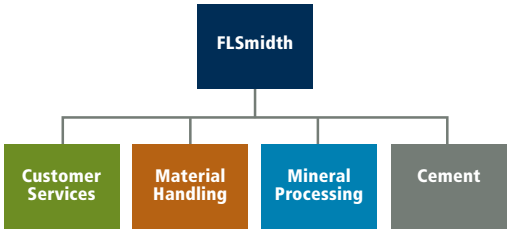
How we are organised

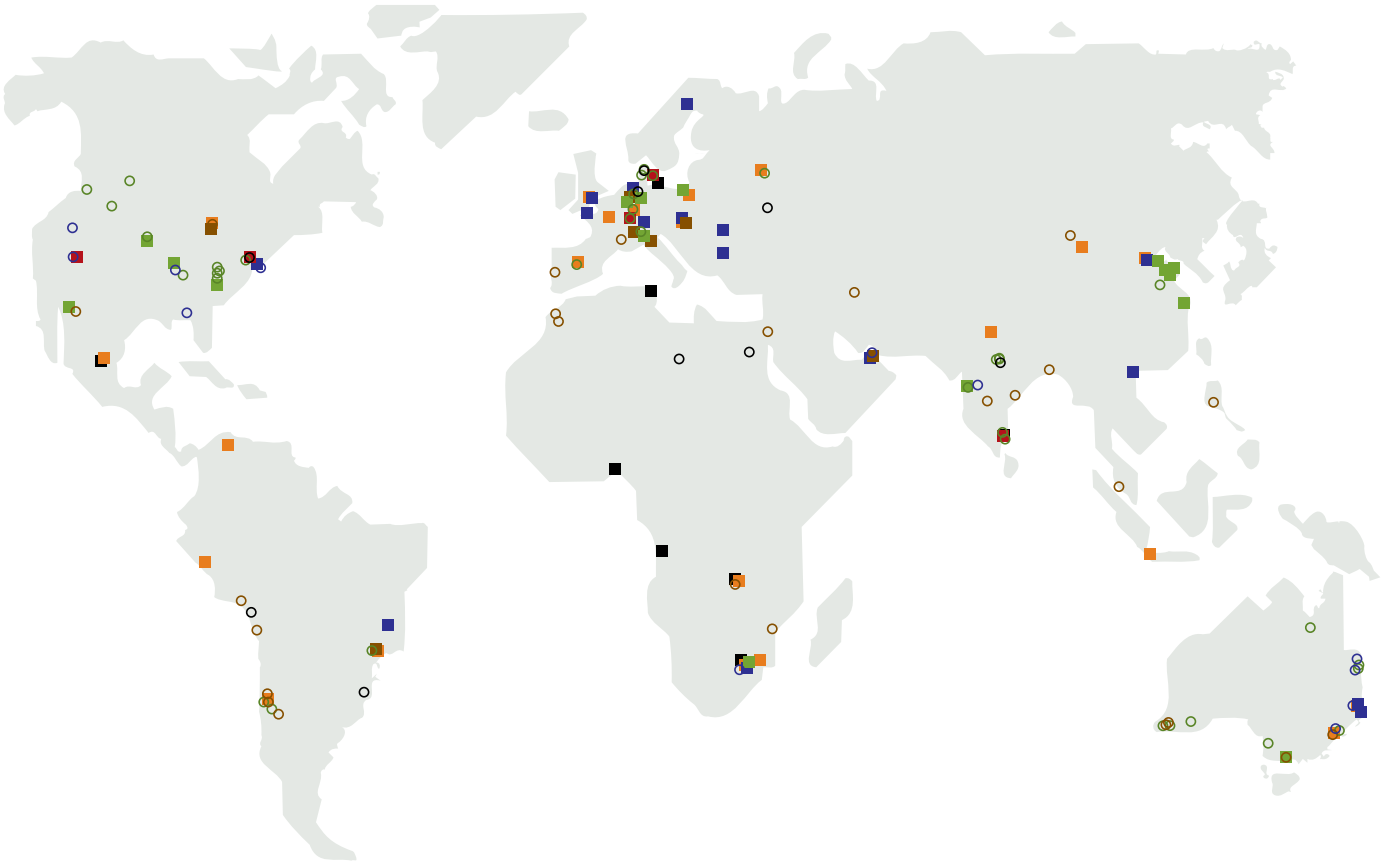
FLSmidth is present in more than 50 countries and has major project and technology centres in Denmark, the USA, Germany and India. The company is headquartered in Valby, Denmark, and employs 15,317 people worldwide.

FLSmidth is divided into four divisions: Customer Services, Material Handling, Mineral Processing and Cement.

☐ **Main office - legal entity**
○ **Business locations**

- **Centre office**
- **Country office**
- **Product office**
- **Sales/service office/service Supercenter**
- **Manufacturing/foundry/warehouse**
- **R&D/test centre, O&M office/O&M site, IT services**





EUR 56 million invested in research and development in 2013

10.5% of all managers are women

Our approach in short

At FLSmidth, we have built on 130 years of history in our approach to sustainable business conduct, also referred to as Corporate Social Responsibility.

Fundamental values

> Competence

> Responsibility

> Cooperation

Vision

We will be our customers' preferred full service provider of sustainable minerals and cement technologies.

Definitions

Corporate Social Responsibility (CSR): The term covers our selected focus areas, defining our approach to responsible business behaviour and sustainable business development from the perspective of our own company and from the industries we operate within.

Sustainable technology: Our approach to research and product development, with the highest attention to environmental challenges related to energy consumption, emissions levels and water scarcity.

Strategy

It is FLSmidth's CSR strategy to have our CSR initiatives linked with and supportive of our business strategies. We keep on strengthening our CSR efforts with the aim of creating value for our stakeholders e.g. by continuously improving our health, safety and environment (HSE) competences, delivering sustainable technology, and by respecting and developing people.

The FLSmidth CSR Board

The CSR Board was established in 2010 and has quarterly discussions about our strategy and development opportunities.

The members of the CSR Board are:

- Thomas Schulz, Group CEO
- Virve Elisabeth Meesak, Group Executive Vice President, Global Human Resources
- Olli Haavisto, Senior Vice President Group Supply Chain & Quality
- Ole Bak, Senior Vice President O&M
- Pernille Friis Andersen, Head of Corporate Communications & Investor Relations
- Jeppe Kromann Haarsted, Global Compliance Manager
- Ann-Katrine Havris Lundgaard, Group CSR Manager

The FLSmidth CSR Policy

Based on FLSmidth's over 130 years of existence and our corporate values – competence, responsibility and co-operation – the company has formed a culture around respecting the individuals and helping to protect societies and the environment. The history and commitment to being a responsible company provided the framework for the FLSmidth CSR policy, published in 2008.

Wherever we operate around the globe, FLSmidth is committed to supporting our employees and partner companies. We always strive to adhere to a set of policies, including the Code of Business Conduct, Human Resources Policy incl. Diversity Policy on Gender and HSE Policy, which have laid the foundation for our CSR policy and practice.

At FLSmidth, we aim to align CSR with business operations as part of our global business strategy. Having signed the UN Global Compact in November 2008, FLSmidth committed itself to supporting the United Nations' ten principles regarding human rights, labour, environment, and anti-corruption as well as reporting on progress made.

Materiality

The objective of FLSmidth's CSR activities is to align and support the business strategy and therefore it is essential that a given CSR activity is material to our business. Some areas have been material to the company for many years and some are becoming increasingly relevant, either due to changes in our business or due to changes in the world around us. Dialogue with our stakeholders keeps our focus on the most relevant areas where we as a company have an impact, directly or indirectly (see below – Stakeholder dialogue illustration).

Work related injuries and fatalities are key challenges to our industries and it is a topic of utmost importance to FLSmidth. Safe working conditions is an imperative focus area, however, it also holds great challenges which is why we are focusing on continuously improve our competences both in relation to healthy and safe working conditions for our employees and also for those who use our products and services.

In the same way, issues such as energy consumption, emissions, and water scarcity – with a specific focus on how to reduce the use of natural resources – are global drivers that influence our industries and our company. The focus on how to reduce the environmental impact from operations is consequently high on our innovation agenda. The environmental footprint of our own operations has increased as the number of operating entities has grown over the years, and this is currently an area where improvements will be made.

With around 15,000 people employed globally, ensuring good and safe working conditions is of utmost importance to FLSmidth and to our stakeholders. This is relevant to secure the future success of the company, and only by acting responsibly, developing people and offering them equal opportunities, are we able to be an employer of choice and secure the right talent.

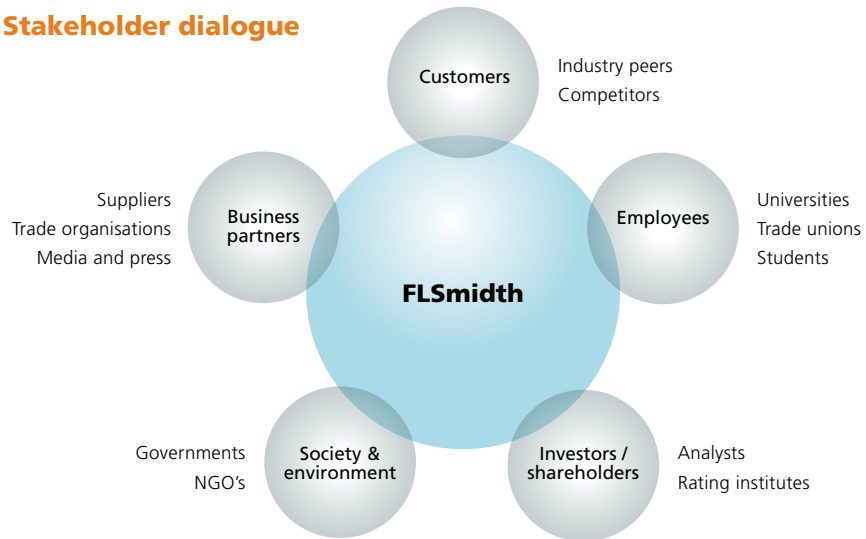
Being in compliance – legally and ethically – is essential to FLSmidth, because corrupt business practices is damaging to our business and the societies we operate in. With around 8,000 equipment suppliers globally, minimising supply chain related risks is important both in relation to HSE, human rights, and ethical business conduct standards, and also in relation to improving the quality of supply.

Stakeholder dialogue

FLSmidth serves a large variety of stakeholders with many different interests and agendas. Ultimately, engaging with our stakeholders helps us make sustainable decisions and solutions. At FLSmidth, we define our stakeholders based on whether they are affected in some way by our activities and operations, be it as customer, employee, investor, business partner or society in general.

FLSmidth pursues a strategy of continuous and open dialogue with its stakeholders in order to enhance transparency and trust while maintaining a high standard of sustainable approaches to operations and partnerships. For more information and examples of stakeholder dialogue, see flsmidth.com.

Stakeholder dialogue



Health, safety and environment

Excellence in safety

Health, safety and environment is our united responsibility. A healthy and safe working environment is our obligation to each other. When we work with colleagues and with our customers we should do it the safest way possible, because the safest way helps us to protect each other.

– Thomas Schulz, Group CEO

A new HSE Policy

In 2013, FLSmidth adopted a new health, safety and environment (HSE) policy, reflecting the essential role of HSE in ensuring a sustainable FLSmidth for many years to come. The new policy has increased focus on our core values of competence, cooperation and responsibility, and will lead the way for a continually safer and more environmentally responsible company.

The new policy states that FLSmidth is committed to excellence in safety by integrating an HSE mind-set into the company's culture and, above all, by maintaining safety as a top priority. It is FLSmidth's responsibility to facilitate healthy and safe working conditions not only for its employees, but also for those who use the company's products and services. Customers expect and rely on the company to deliver excellence – also when it comes to safety. FLSmidth believes that complying with health, safety and environmental standards and seeking best practices in everyday work also forms the best basis for a productive environment and the highest possible quality.

The policy's core principles are as follows:
Safety above all – all injuries and unhealthy conditions can be prevented
Competence and Cooperation – the key is to know how to work safely, and to share this with colleagues
Environment – know the environmental risk and deliver HSE-quality products

As a global engineering company, competence is at the core of everything FLSmidth does. Its central role in the company's culture enables FLSmidth to deliver quality products and services, also in terms of HSE capabilities. Therefore, the company continuously invests in ensuring high safety competences among its employees through training.

Aiming for zero injuries

FLSmidth has reviewed its target for the lost time injury frequency rate (LTIFR) i.e. injuries with lost working time, and maintains the short-term target of 3.0 for 2015. The decision to continue Cembrit as a business means that, with the current safety level, we cannot expect to be able to improve the target more in the short term. However, the 2015 target should be seen only as a milestone on the way to zero injuries, which is the ultimate goal set under our new HSE policy. With the policy in place, and its broad communication during 2013, the next phase of our HSE programme roll-out can now begin. From 2014, the HSE programme will include implementation of our HSE management system worldwide. The roll-out will include special focus on improving internal reporting of all incidents – a pre-requisite for incorporating higher levels of HSE competence within the organisation. The ambition is to develop a stronger HSE culture, where safety is a natural part of what we do every day.

"Let's join forces" – and improve our safety competences

In 2013, Group Executive Management decided that FLSmidth should host an annual event focused on safety. This event, called

Safety Week, should take place at all FLSmidth locations and include activities involving all employees. It is clear that the engagement of all employees is key to this new initiative. If all employees become safety agents we can move our safety culture to a new and higher level.

The first Safety Week took place in 2013, and was dedicated to general safety training with focus on our new HSE policy, first aid, and relevant local safety activities. To help motivate our employees, campaign material was developed that not only described the new HSE policy, but also supported the event with information regarding causes of injuries and how to avoid them. The slogan of the week was "let's join forces".

Employees in more than 20 countries participated in the events held during the safety week. Feedback received during the week showed that it was a good opportunity to keep extra focus on safety and that many employees received knowledge that can be used both at work and at home.

Increased focus on production units

During 2012 and 2013, FLSmidth grew through acquisitions and, correspondingly, the amount of in-house production units has increased significantly. In order to support the relatively higher number of in-house production units at FLSmidth, an internal HSE audit programme has been launched by the Group HSE department. The goal of the audit programme is to promote and ensure better HSE conditions for all in-house production by sharing best practices and developing HSE competencies within each unit. The focus of the programme is on helping each unit to identify high-risk and unhealthy work conditions including general accident risks, machine safety, electrical safety, noise, and emissions. In addition, housekeeping, use of personal protection equipment and general safety awareness and HSE management are assessed.

Therefore, during 2013, 28 HSE audits were conducted globally by Group HSE staff and our regional HSE managers, resulting in audit reports and action plans.

Each audit comprises both the physical and the management part: facilities, equipment and internal workshop layout; and the HSE management system. The outcome of the audit is a report containing all major findings as well as an action plan with descriptions of all necessary improvements required in order to comply with legal requirements as well as internal FLSmidth standards.

To ensure continual HSE improvements and to promote HSE on the local agenda and motivate our production units to always think safety, annual audits at our locations will be continued in 2014. With many minor, specialised production facilities, there is a need for sharing best practice and ensuring that employee safety becomes a top priority.

Fatalities and injuries in 2013

Sadly, in 2013, FLSmidth was hit by two tragic accidents that cost two of our employees their lives. In one of these unfortunate incidences, a staff driver died following a traffic accident in Africa in connection with an FLSmidth operation. Traffic continues to be a particular hazard in many countries, and FLSmidth will maintain focus on this by ensuring recruitment of the right drivers, providing continuous training in safe driving, and making sure that the right vehicle is chosen for the transport.

Lost Time Injury Frequency Rate (LTIFR)

	2011	2012	2013
Customer Services	1.7	4.3	4.3
Material Handling	3.3	3.4	5.1
Mineral Processing	3.3	8.7	5.2
Cement	3.7	2.3	1.7
Group	n.a.	0.3	0.1
Cembrit	28.8	21.8	17.2
FLSmidth	**4.2**	**4.7**	**3.9**

The second fatality occurred at one of FLSmidth's Supercenters, where a worker lost his life after an accident during screen maintenance. The accident should never have happened, and a general need for improved HSE competence and management has been identified at the location. FLSmidth is making every effort to ensure that the specific job instruction is revised, that the general HSE management system is also revised and implemented, and perhaps most importantly that the safety culture at the location is strengthened.

As part of driving a strong safety culture, it has been decided that participants in the cash incentive plan for 2014, will have a personal safety target supporting the overall group safety target – and in case of any fatality, the safety bonus will be zero for all participants at all levels.

Utilising safety synergies

Pfister India

Transweigh India (now Pfister India) is a production facility acquired in October 2011 by FLSmidth. The company employed 300 employees at the time, all of whom, following the acquisition, were to be covered by FLSmidth's HSE standard. However, a number of challenges were identified after the acquisition, including aging equipment, poorly maintained facilities and very little space. These factors were regarded as crucial obstacles to reaching a satisfying HSE standard at the Transweigh site.

In spite of an ongoing effort to improve working conditions at the former Transweigh facilities, the way forward to ensure better health, safety and environment (HSE) conditions appeared when the opportunity came to move production facilities to FLSmidth's existing Bawal Haryana site outside New Delhi.

Moving the production facilities made it possible to get synergies from the modern production facilities at Bawal. The workshop benefits from the already established safety organisation, with an HSE staff to conduct training and implement health and safety procedures, and to monitor HSE conditions. Together with the most up-to-date technical installations, far better conditions were created to prevent injuries.

Upgrading workshop safety

An engineering workshop is home to a variety of potentially hazardous machines, including lathes, grinders, milling machines, and older semi-automatic equipment. Typically, this type of machinery has a long working life, and requires periodic upgrading - including ongoing incorporation of any new improvements in safety protection.

FLSmidth works to develop the safety of such facilities by focusing on knowledge of the risks, and on making sure that this knowledge is transferred to workshop users via appropriate instructions and training. Because, as simple as it may sound, greater competence in safety equals better safety.

For example, at FLSmidth Australia's Bassandean, Perth, manufacturing facility, some of the workshop's machinery was either aged, or had been imported without living up to Australian and best practice standards.

Local workshop supervisors, assisted by the local HSE officer, took the initiative to make sure that the machines were upgraded to appropriate safety standards. The first machine to receive upgrade attention was an older powered roller. A risk assessment was conducted and the results compared against Australian regulations for this kind of equipment. The result formed the foundation for upgrading the machine so that it could fully comply with today's requirements. At the same time, general instructions for the use of the powered roller machine were compiled, with particular focus on safety.

Initiatives like these lay the foundation for improvements needed in the long term to ensure that all of FLSmidth's machines and equipment comply with the company's HSE standards in addition to current local regulations.

2013 – A positive trend in injuries

In general, FLSmidth experienced a positive development in number of reported injuries in 2013. After a negative development in 2012, mainly due to acquisition of companies, the trend for 2013 is again back on the right track with a reduction in total number of injuries. The most significant improvements have been seen at Cembrit and in the Mineral Processing division which were the areas with the highest numbers in 2012 (see page 16). With respect to the lost time injury frequency rate (LTIFR), the overall result for 2013 was 3.9 and thus below the 2011 result. It is a positive development towards our aim of zero injuries. However, we will need to enforce continuous efforts and strong initiatives to reach that target.

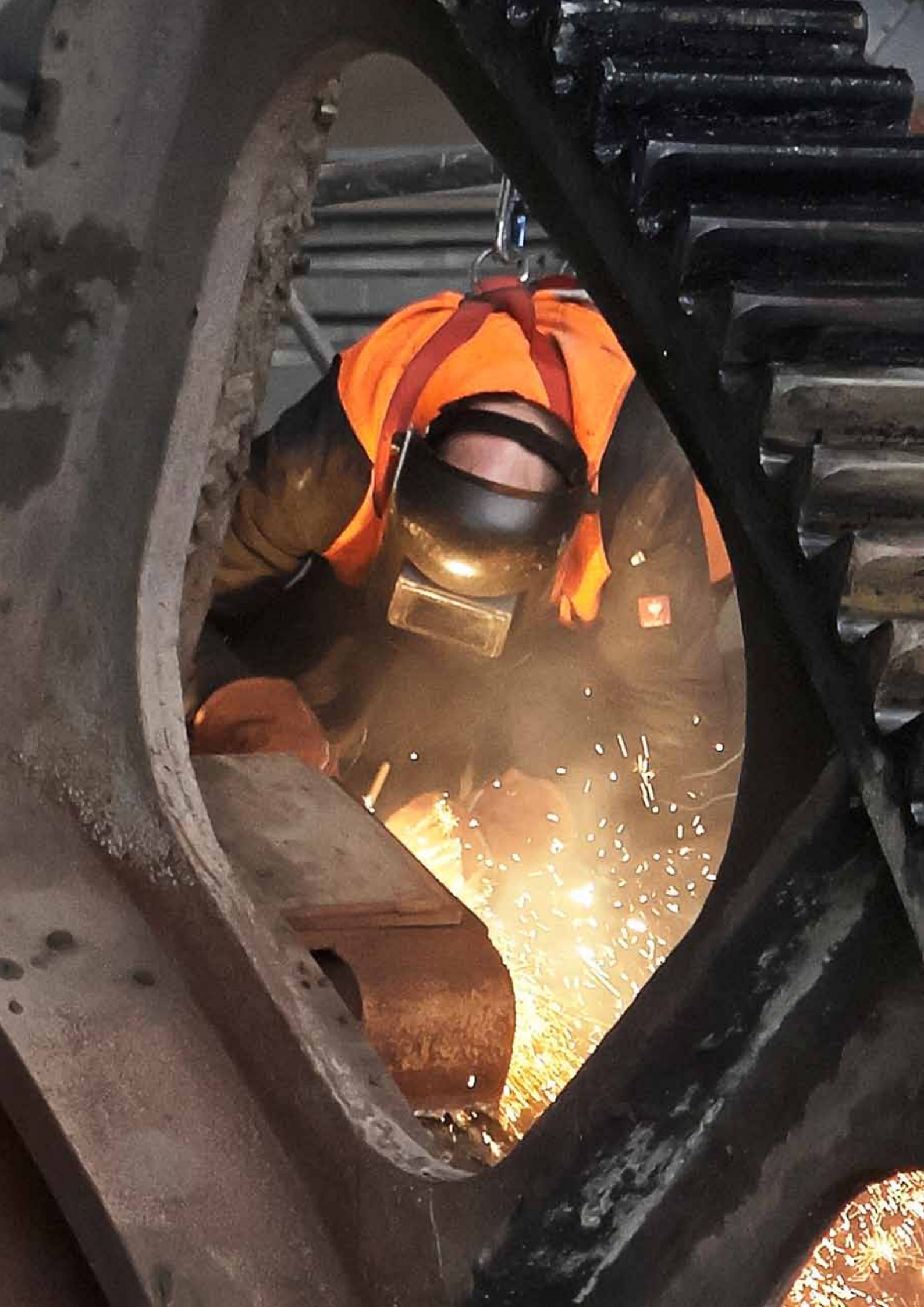
Since many locations are rather small and fortunately only experience few injuries, it can be a challenge to improve the culture of learning from injuries. Therefore, it is important that the respective locations include "near miss" and hazards reporting in the continuous effort of learning and making improvements. Consequently, that type of reporting is one of the initiatives for 2014 - both in terms of number and in severity of the incidents seen in connection with our own manufacturing sites but also in relation to operations at our customer sites.

Safety data:

	2011 REPORT	2012 REPORT	2013 REPORT
Safety training hours per employee	2.5	5.7	7.6

Follow up on targets and initiatives:

TARGETS AND INITIATIVES	2013 ACTIVITIES	2014 TARGETS
HSE certified O&M sites	3 O&M locations were certified in 2013. Two in Egypt and one in Chile according to ISO 14001 and OHSAS 18001	Certifying 1-2 O&M locations
Safety target into managers cash incentives	Targets for training and near miss reporting have now been included in managers' incentives	A safety target will be included in the cash incentive plans for all participants. In case of any fatality in 2014, the safety bonus will be zero for all participants at all levels.
Group HSE audits at FLSmidth locations	28 audits conducted in 12 different countries worldwide	Conduct one HSE audit of each production site every year. Approximately 30-35 audits in 2014 to be conducted by the Group Safety organisation
General safety awareness	"Safety Week" was conducted and majority of employees were engaged in safety events.	To keep safety on "top of mind", the safety week will be made an annual event, next time in 2014. All employees will participate in general safety training and other safety events
HSE policy, living the policy	New policy published in 2013 and communicated trough the common global company event "Safety Week"	Focus on growing internal safety competence through learnings from near miss. Using the HSE policy as starting point for creating of more internal HSE awareness
HSE management	Development of group operating HSE policies	Roll out minimum requirements for HSE management in 2014 in terms of operating policies



Compliance

A framework for excellence

The Code of Business Conduct enshrines the FLSmidth Group's commitment to business ethics, integrity, credibility and the preservation of our long term reputation, defining what is expected of the FLSmidth Group's directors, executives, officers and employees at all levels in one globally applicable framework.

– FLSmidth Code of Conduct

Stepping up compliance

In 2012, FLSmidth established the basics of a compliance regime. A comprehensive Code of Business Conduct was developed and a dedicated Compliance Department was established. Now, FLSmidth is ready to raise its compliance efforts to the next level.

The new Group Executive Management has increased its involvement in compliance, and its individual members act as change agents throughout the organisation. This has resulted in a number of concrete initiatives as described below.

Assessing corruption risk

In 2013, FLSmidth conducted a global, company-wide corruption risk assessment. This assessment included in-depth interviews with more than 100 key employees from some 35 countries. The results of the risk assessment will guide future compliance initiatives, not only in terms of priorities, but also by helping to ensure that policies properly address the challenges faced by employees every day. Among many other things, the risk assessment's results illustrated the need for strengthening controls, and underlined the importance of third-party due diligence. The assessment also demonstrated the need to better explain how anti-corruption policies and rules apply in practice. As a result, a pocketbook is being developed as a guide to the Code of Business Conduct, explaining the rules in plain language and including questions and answers.

Speak up

An increase in the number of corruption concerns and requests for guidance raised internally during 2013 has emphasised the need to strengthen FLSmidth's existing speak-up policy, providing a more formalised approach and report intake function.

In response, FLSmidth will in 2014 launch a whistleblower hotline that will enable employees to report any concerns online or by phone in their local language seven days a week, around the clock, and regardless of location.

Of paramount importance to this initiative is the development of a formalised procedure for corporate investigation of reported cases. In our view, one of the most important issues in compliance is to assure employees that the cases they report will be taken seriously, and that investigations are carried out in a professional manner which respects the rights of all involved, whether they are the accused or the reporting party.

Strengthening export controls

Given the nature of our business, FLSmidth buys and sells goods globally, and we are, therefore, used to complying with complex international trade regulations and restrictions. The company ensures, for example, that its goods and services are not being sold to problematic entities anywhere in the world. FLSmidth also takes responsibility for ensuring that the company complies with governmental regulations at national and regional levels.

In order to ensure compliance, it is important to determine whether trade with any of the individuals, companies, organisations or business partners, FLSmidth encounters, is restricted. For this purpose, the company has purchased screening software that allows it to screen potential new customers, suppliers and other trading partners via an online, ad-hoc screening system. If matches occur, the problem can be effectively solved by using alerts and es-


FLSmidth

calations. The system is updated daily and, when warranted, more systematic and frequent screening of the customer and vendor master data can be undertaken.

The next phase of the software will be the incorporation of an automated screening process in which this system will be integrated with our upcoming global ERP system, making screening transaction-based. In a third phase, FLSmidth will implement longer-term strategies for product-specific controls by incorporating export licence determination processes in ERP.

In 2013, FLSmidth conducted the first export control review of an FLSmidth entity. In connection with this review, the company implemented methodologies for performing export control spot checks within the organisation. During the year, the company's global export control processes received a very positive report from the Danish authorities.

Next steps

In 2014, compliance efforts will concentrate on two topics: monitoring and business partners. The implementation of compliance standards at country offices and legal entities within the FLSmidth Group will be monitored through a number of compliance reviews. Moreover the company will significantly develop and strengthen due diligence procedures for third parties such as agents and distributors.

Follow up on targets and initiatives:

TARGETS AND INITIATIVES	2013 ACTIVITIES	2014 TARGETS
Increasing awareness and understanding of the rules	Ongoing in-person dilemma training for employees	Publication of a handbook explaining the Code of Business Conduct in plain language
Establishing an internal compliance organisation	Finalisation of the training of trainer sessions globally	Strengthening of the internal compliance organisation
	First compliance review of an FLSmidth entity to help strengthen compliance procedures locally	Compliance review of two to three FLSmidth entities
Encouraging employees to seek advice and speak up	Speak up policy launched	Establishment of a global whistleblower hotline
Training	74% of all current employees (globally) started and/or completed the Code of Business Conduct e-learning course	Extensive in-person training of majority of at-risk employees
Export control process	Technical implementation of our screening software	Rollout of the software within FLSmidth Group activities
	Re-design of the export control processes	Implementation within the organisation worldwide
	Roll-out the export control policy and training & education of the organisation	Continue the training of the nominated export control employees and the export control awareness in the organisation

Respecting people and diversity

People at the core

The competencies of our employees are of strategic importance to us, and we strive to help our employees to reach their full potential, excellent performance and success. To this end, we spend considerable resources on continuing education and training of our employees, enabling the individual employee to continuously increase his or her employability and value to FLSmidth.

– FLSmidth HR Policy

People are the foundation of our company. Consequently, employee considerations play an important part in FLSmidth's sustainability focus – either as a separate topic or as an integral part of related topics.

By incorporating a working environment that supports the well-being of employees while fostering their development, FLSmidth believes it is on the right path as an employer. There are, of course, also areas that will need to be improved upon, and processes that can be optimised. But progress is constantly being made towards ensuring the best working conditions and development opportunities for all employees.

HR moves up

In 2013, the HR area at FLSmidth, which encompasses employees, their working conditions, and employee development and performance was strengthened. The area received a seat in Group Executive Management when Virve Meesak, FLSmidth's new Executive VP, Human Resources, joined the company in September 2013. This development reflects the important role that people play at FLSmidth, and it acknowledges that only when developing, training and leading its people will the company be able to achieve its business objectives.

Global leadership development

FLSmidth considers leadership to be key to the creation of long-lasting and sustainable results for all stakeholders. Leadership sets the standards for performance, defines and shapes the culture, and determines the future of the company.

To date, apart from a number of group level initiatives, leadership development has mainly been conducted as a regional or local matter. Going forward, the execution of group strategy, implementation of an ambitious efficiency programme, and the general enhancement of FLSmidth's performance culture call for a more common, globally aligned approach to leadership and leadership development.

In the beginning of 2014, FLSmidth will be launching a global leadership development initiative that reaches out to participants at all locations.

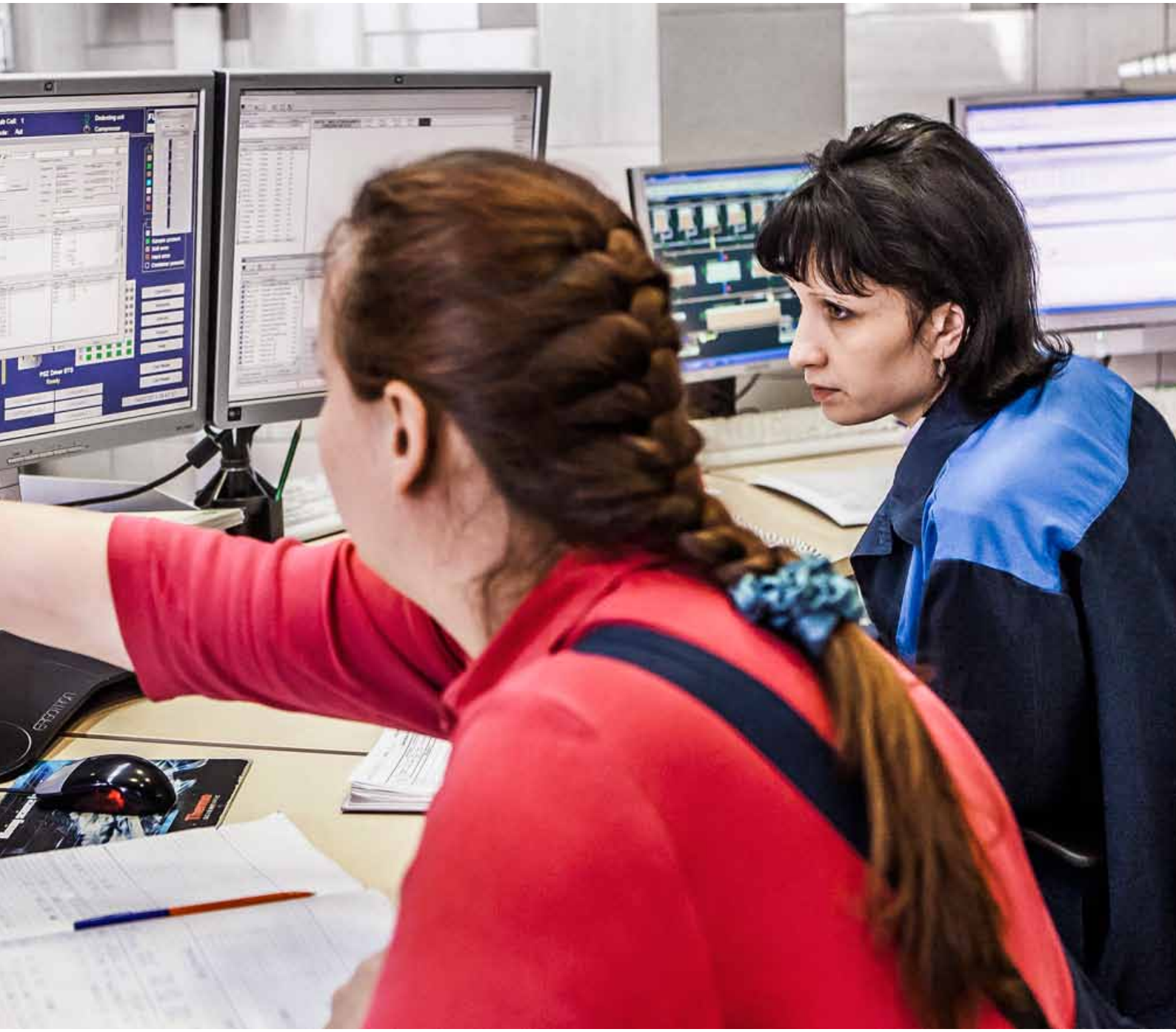
A Leadership Pipeline Transition-based concept has been chosen as the backbone for a common approach to leadership, acknowledging that leadership in different roles adds value in different ways, and requires different skills, allocation of time and work values.

The leadership development initiative, under the heading of "Leadership Transition Training", is structured around three programmes:

- Leading others
- Leading leaders
- Leading a business unit or group function

All of the programmes focus on the individual manager's job objectives, and the related core skills required to achieve high performance in the role together with his or her team.

A total of 23 training sessions in different locations have been planned with 460 participants in total. The first of these will be launched in the first quarter of 2014. Training will be carried out



in close cooperation between FLSmidth's HR function and an external supplier, with the objective of building an internal capacity for training in the future.

The leadership development initiative planned for 2014 is just the first step in a wider strategy to build a global and systematic approach to leadership in FLSmidth. When fully implemented, the strategy will make it possible to integrate leadership assessment, succession planning and development initiatives.

Reviewing compliance

As a company that is represented in many countries around the world, following up on policies and working procedures requires constant vigilance. To support this vigilance, FLSmidth conducts a compliance review every second year, reviewing employment conditions, working standards and regulations, including health and safety, as well as other CSR-related initiatives and policies.

In 2013, the company conducted the latest compliance review. All legal entities were asked to complete questionnaires to gather relevant data about human resources, health and safety, overall CSR approach, and code of business conduct. The questionnaires were completed in the third quarter of 2013, and an assessment of the responses has subsequently been conducted. Where needed, direct follow-up with a business unit has been undertaken to ensure that corrective action plans are initiated and implemented.

The review's human resources section focuses on specific areas where constant compliance awareness is of key importance to FLSmidth's business. Such areas include, but are not limited to, intellectual property rights, confidentiality clauses, taxation, and working hours. Also reviewed is compliance with corporate policies governing, for example, social media or close personal relationships. These efforts are aimed at ensuring the integrity of the business by removing conflicts of interest and other inappropriate influences on decision-making. The compliance review also intends to make sure that employees' rights to equal opportunities and fair treatment are adequately implemented.

Human rights

"The FLSmidth Group embraces and respects internationally recognised human rights and seeks to avoid complicity in human rights violations".

- The FLSmidth Human Rights Policy

When it comes to human rights due diligence, FLSmidth already has several policies and working procedures in place. For example, human rights are already dealt with as part of existing programmes covering health, safety and environment (HSE), responsible sourcing, human resources, business ethics (compliance programme). All of these topics are addressed in separate sections in this report.

FLSmidth's stated objective is to align with the UN Guiding Principles on Business and Human Rights and the OECD Guidelines for Multinational Enterprises.

A number of activities have been initiated to reach this objective, starting with a review, conducted in 2012, of the company's approach to integrating human rights management and due diligence processes into its working procedures.

The 2012 review brought an overview of the areas where FLSmidth has an impact, and helped to shed light on potential risks of being implicated in human rights violations. Further, the review laid the foundation for work conducted throughout 2013 and which will continue in 2014-2015.

To set the foundation for a revitalised effort and to ensure that everyone at FLSmidth is aware of our responsibilities as a business, a separate Human Rights Policy has been published. The policy underlines the company's commitment to respect human rights in all its operations. It lays out the responsibilities for operations and projects, ensuring the mitigation of risks related to company activities to avoid becoming complicit in human rights violations.

In early 2014, the policy is communicated to all business leaders at FLSmidth. To follow up on the policy's implementation, assessment tools and leadership training will be the focus of 2014.

Gender equality

A diverse workforce has always been an essential part of the FLSmidth culture – and something the company believes is a requirement for meeting customers' needs. Supporting and demonstrating respect for a diverse and equally represented workforce is imperative to FLSmidth's leadership approach, and it is an integrated part of its business system.

With specific focus on gender diversity, a number of initiatives were announced and implemented during 2013. The FLSmidth Board of Directors announced a separate target of reaching 25% female members of the Board of Directors by 2016. When setting the target and by the end of 2013, the amount of women on the Board of Directors was 16.6%.

For the remaining management team and management levels, the FLSmidth Board of Directors and Group Executive Management already in 2011 announced a company target for part of the diversity agenda on gender: By the end of 2014, at the latest, the aim is to achieve a minimum of 10% female managers globally. When setting that target, FLSmidth had 7.2% female managers globally and by the end of 2013, there were 10.5% female managers, thus the target of minimum 10% female managers by 2014 had been reached.

A new target for female managers will be evaluated by the Board of Directors and the Group Executive Management in early 2014 and will subsequently be communicated.

In 2013, a new policy on gender diversity was launched to support the overall objective of increasing the amount of female managers and enlarging the pipeline of female employees and candidates for managerial positions.

This new policy explains FLSmidth's commitment to gender diversity at all management levels and includes procedures and initiatives that will lead the company to reaching the target of increasing the amount of female managers and employees in general.

Awareness of target and following up on progress towards the target is one side of the increased focus on gender equality. Part of the equation is also to understand the major reasons why, currently, women are not more heavily represented in the management group. Linked to this is the question of why FLSmidth struggles to attract more female candidates for its managerial positions.

One of the initiatives to support the gender equality agenda that were introduced in 2013, is the first-ever FLSmidth Women Mentoring Programme which was launched at the office in Valby, Denmark in June 2013.

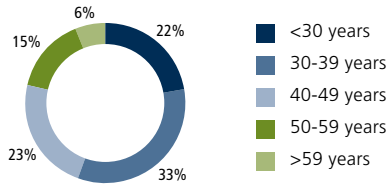
Mentoring programmes in general are not a new development to FLSmidth and are used in various forms and locations, but it is the first time to work with a group of female mentees separately.

Among the main objectives of this programme is to create a space where female employees can express their ambitions, be challenged in their views, and learn from their assigned mentors and from their peers. At the same time, FLSmidth, as a company, gains an opportunity to learn more about how female employees view their career opportunities in the company, and what real or perceived obstacles may stand in the way for achieving greater gender diversity in the management group. When the programme was kicked off in Denmark, 20 local female participants were selected and matched with an internal mentor.

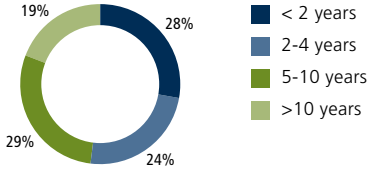
Once the 12-month pilot programme is over, the aim is to transfer the programme to other locations, enabling the organisation to benefit from the knowledge gained, and providing a continuously improving tool to drive the gender equality agenda on a global scale.

Human resources data

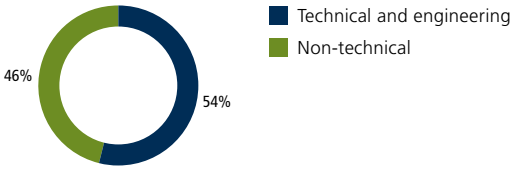
Age distribution



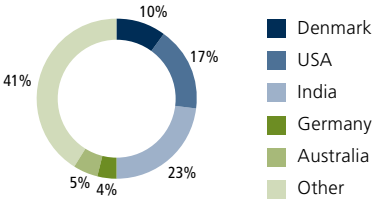
Length of service



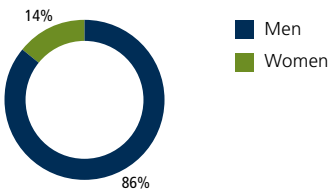
Job function



Geographical distribution



Gender



Follow up on targets and initiatives:

TARGETS AND INITIATIVES	2013 ACTIVITIES	2014 TARGETS
Employee development initiatives	Performance management concept refined to provide clearer link to expectations of employees in different roles. 86% of employees slotted into role profiles that define expectations in terms of level of accountability, responsibility and competency. A process and tool to enable all employees has been the Performance Development Reviews (PDRs). Performance management training and supporting materials have been developed for the launch of PDR 2014	All employees to receive a Performance and Development Review (PDR). All managers and employees new to PDR to receive training. Each entity to consider their level of maturity in conducting performance management, identify development activities and track progress
	Process defined for reporting total amount of training days for all employees	Continue to report on total amount of training days and make corrective actions when required
	Training for specialists, project managers and managers defined, designed and/or delivered based on audit of needs. For example, there were 13 deliveries of Module 1.1 of the Cross-functional training for specialists, involving 248 specialists in six delivery hubs, where the average quality was rated as 5.32 on a 6-point scale. Another example is that leadership transition training was defined and designed for delivery in regional hubs in 2014	Continue conducting training to support the specialist, project manager, and manager career-paths in more countries
Employee survey	There was a follow-up on action plans throughout the year, corrective actions were taken as appropriate and support was provided to address corporate focus areas when required	Continue to follow-up on action plans. Evaluate whether it is appropriate to conduct a new survey in 2014 and if so, what type of survey to use
Compliance review	Compliance review conducted for all legal entities. Responses have been evaluated and corrective action plans have been developed when needed	Continue working with corrective action plans
Diversity	A new Diversity Policy on Gender was published and communicated to all business entities. The policy is published on the external FLSmidth website	Follow up on the implementation of the new gender diversity policy and the requirements set out in the policy
	The FLSmidth Board of Directors announced a target of 25% female members of the Board of Directors by 2016 (in 2013, 16.6% female members)	
	Several pilot projects to increase the number of female managers and employees were initiated in Denmark. Those projects are the FLSmidth Women Mentoring Programme and a project related to our employer branding profile in Denmark	Continue working with the FLSmidth Women Mentoring Programme in Denmark and the employer branding project. Use the learning points to implement similar projects in a number of other locations
	The number of female managers increased from 9.2% in 2012 to 10.5% in 2013 (total for all management levels) and thereby, the company target of minimum 10% female managers in 2014, was achieved.	Continue following up on the number of female managers and keep reporting on the numbers for both Board of Directors and management. Evaluate and communicate a new target for female managers.

Responsible sourcing

Improving through dialogue

FLSmidth's approach to responsible sourcing is to include social, environmental and ethical aspects into its procedures for evaluating and qualifying its suppliers, and into ongoing relations between FLSmidth and its suppliers. This means that FLSmidth is working to ensure that its suppliers appreciate and respect FLSmidth's commitment to sustainability and CSR.

– FLSmidth Code of Supplier Conduct

Sustainability of new suppliers

FLSmidth's "One source" strategy sparked an opportunity to review the process of assessing and approving new suppliers around the world. The review paved the way to setting new standards for such processes, and forms part of the FLSmidth Responsible Sourcing initiative.

The process review concluded that new suppliers should be assessed and approved in a standardised way across all FLSmidth entities. It also concluded that assessing new suppliers purely with regard to their quality management system (QMS) and technical capabilities yielded partial value; in fact, suppliers need to be assessed in a more holistic manner if they are to be considered sustainable for business.

To act upon these two key conclusions from the review, a multicultural, cross-functional team was charged with implementing necessary changes. Due to the efforts of the team, FLSmidth now has a standardised supplier assessment and approval process that has been successfully implemented across FLSmidth's major entities, including China, India, Europe and the USA, with over 30 supplier assessors appointed and trained to support this new global process.

A new part of the process is now included for assessment and approval of new suppliers, which is an analysis of the risks involved in forming a specific business partnership. It is not only the quality management systems and technical capabilities of the supplier, but also their commercial standing, their product realisation methodologies and their attitude towards sustainability.

Sustainability within the supply base is critical to the ongoing success of the FLSmidth Responsible Sourcing Initiative. Approximately 50% of the elements studied during an on-site assessment of a new supplier are dedicated to sustainability, including human rights, forced labour, freedom of association, child labour, discrimination, corruption, safety and the environmental aspects.

Evaluating existing suppliers

For FLSmidth, incorporating sustainable business principles into the supplier assessments is important because the renewed focus on areas such as HSE standards among suppliers, is used as a foundation for fostering a closer relationship with the existing supply base.

In 2011, FLSmidth initiated a project to address sustainability in the supply chain, a project that has now reached a turning point. The evaluation of existing suppliers in relation to human rights, labour rights, environmental and anti-corruption issues has been a learning experience for all parties involved.

As FLSmidth entered into a dialogue with suppliers about sustainability, the company gained valuable new insights. One of the most important of these insights was that a clear majority of suppliers were already in compliance with FLSmidth's own principles on sustainable business conduct.


FLSMIDTH

The FLSmidth supply base is truly global, and evaluations have been carried out at major technology centres in locations from Valby, Denmark to Chennai, India. Given this wide geographic distribution, large variance in the evaluations and the answers to the self-assessment questionnaire was expected. But this was not the case. A clear trend among the answers that FLSmidth received from the suppliers was that suppliers are governed by strict regulations in the countries where they are located. Suppliers generally live up to these regulations, thereby also complying with FLSmidth's own requirements for responsible business conduct, according to the self-assessment questionnaire.

Another important learning was that if a supplier emphasises health, safety and environment (HSE), this emphasis is often reflected in the quality of the products supplied. This underlines FLSmidth's own belief about the effects of HSE on long-term business viability, and is further evidence that, for today's companies, quality and sustainability go hand in hand. In future, new suppliers to FLSmidth will also be evaluated on how well they perform in HSE aspects.

The sustainability dialogue with FLSmidth's supply base has also revealed that the company's suppliers are keen to learn more about sustainable business conduct. For many of them, focusing on sustainable business practices beyond compliance with regulation is a relatively new area, and therefore also a learning process, but FLSmidth has found a general willingness to progress and to improve performance.

Follow up on targets and initiatives:

TARGETS AND INITIATIVES	2013 ACTIVITIES	2014 TARGETS
Training of employees in Responsible Sourcing procedures	Class-room training of relevant employees was conducted in two new locations 464 employees have taken the Responsible Sourcing e-learning course in 2013 (885 in 2012)	Train more employees in connection with continuous implementation of the Responsible Sourcing procedures
Implementation of CSR assessment procedure for existing suppliers, including sending out the CSR self assessment survey to new suppliers	Implementation of procedures in one additional location Conducting CSR self assessment with additional 28 suppliers Evaluated 520 supplier assessments in total (year 2012 and 2013)	Continue conducting CSR assessments of existing suppliers Review if changes are needed to the CSR assessment procedures for existing suppliers
Introducing new global procedure for approval of new suppliers	Procedure for approval of new suppliers has been rolled out in major entities CSR requirements were included in the entry requirements for potential new suppliers 30 train-the-trainers have been trained in the new FLSmidth standard for supplier assessment	Continue implementation of the new global procedure including training of targeted groups

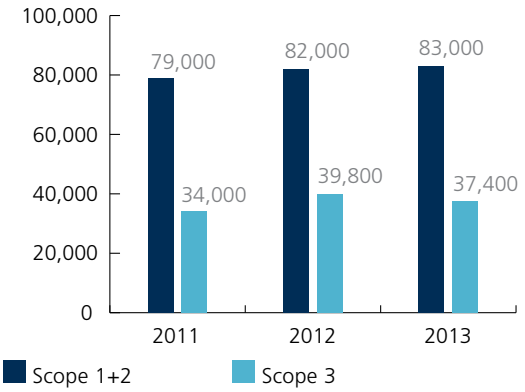
Environmental impact

Increased environmental focus with synergies

In 2013, FLSmidth adopted the new health, safety and environment (HSE) policy, which replaced the previous Environmental policy. Before developing this new HSE policy, it was assessed that there are many potential synergy effects from combining health & safety with environment in a joined policy, especially in relation to implementation and execution of the policy. One example of these synergies is the great number of similarities in management systems and reporting for the two areas.

The introduction of a new HSE policy has brought increased focus on having the appropriate environmental management setup. Consequently, in FLSmidth we are currently in the process of developing a global environmental management system (EMS). The expectations are that we will be able to increase our reporting scope next year to include more environmental indicators than CO_2 emissions e.g. waste, water and energy usage.

Consolidation of activities from 2011 report – 2013 report



FLSmidth's carbon footprint in 2013 amounted to 83,000 tonnes CO_2 reported from scope 1 and scope 2. The figures from 2013 show an increase of 1% compared to 2012, but a decrease in the amount of CO_2 per employee. 34,625 tonnes CO_2 is derived from Cembrit's production of fibre cement, which in 2012 amounted to 39,325 tonnes CO_2.

CO_2 footprint compared with business growth:

	2011 CDP REPORT	2012 CDP REPORT	2013 CDP REPORT
Tonnes of CO_2 scope 1+2	79,000	82,000	83,000
CO_2 scope 1+2 in relation to total revenue	3.6	3.3	3.1
CO_2 scope 1+2 in relation to number of employees	6.0	5.5	5.4
CO_2 scope 3 (business travel)	34,000	39,800	37,400
CO_2 scope 3 in relation to total revenue	1.5	1.6	1.4
CO_2 scope 3 in relation to number of employees	2.6	2.6	2.4


FLSMIDTH

Customer Services

Supporting sustainable operations

FLSmidth's Customer Services division continues to improve training, health, and safety. This creates better organisations that can run plants with fewer people, greater professionalism, and lower attrition rates.

Operation & Maintenance

Wadi El Nile Cement Company

In April 2010, FLSmidth signed an Operation & Maintenance (O&M) agreement with Wadi El Nile Cement Company (WNCC), taking full responsibility for the production and maintenance of the latter's 6,000 tpd cement plant at Benisuef, Egypt. The scope included staffing with all technical and managerial personnel, daily operations, and sourcing of spare parts and consumables.

FLSmidth's competencies and best practices have been applied throughout the production line from the raw material crusher to cement dispatch. Currently, some 250 technicians and engineers are employed at the plant, which has just ended its second year of production. The alliance with Wadi El Nile has been a success in terms of environmental performance, despite significant challenges in Egypt.

When entering into an O&M agreement, contractual performance targets are set with the customer. If annual targets are not met, a penalty is incurred. On the other hand, if targets are exceeded, typically in the form of higher production or lower energy consumption, a bonus is released.

The 2012-2013 period has been a challenging one for Egypt. Besides political unrest, the country has experienced a general shortage of gas which has impaired many industries, including the cement industry.

When scarce gas supply affects production lines, output levels decline or, at worst, reduce to zero when fuel supplies cease. Furthermore, when the fuel supply is re-established, the process of heating up and ramping up production requires additional energy, negatively impacting energy KPIs (Key Performance Indicators).

Despite the gas shortage, however, FLSmidth was able to consume less energy than the targets stipulated in the fuel and power contract.

Performance like this – even in the face of challenges beyond FLSmidth's control – is a result of the optimisation process that has been ongoing since the company assumed O&M responsibility at WNCC.

The optimisation process focuses on three key areas:

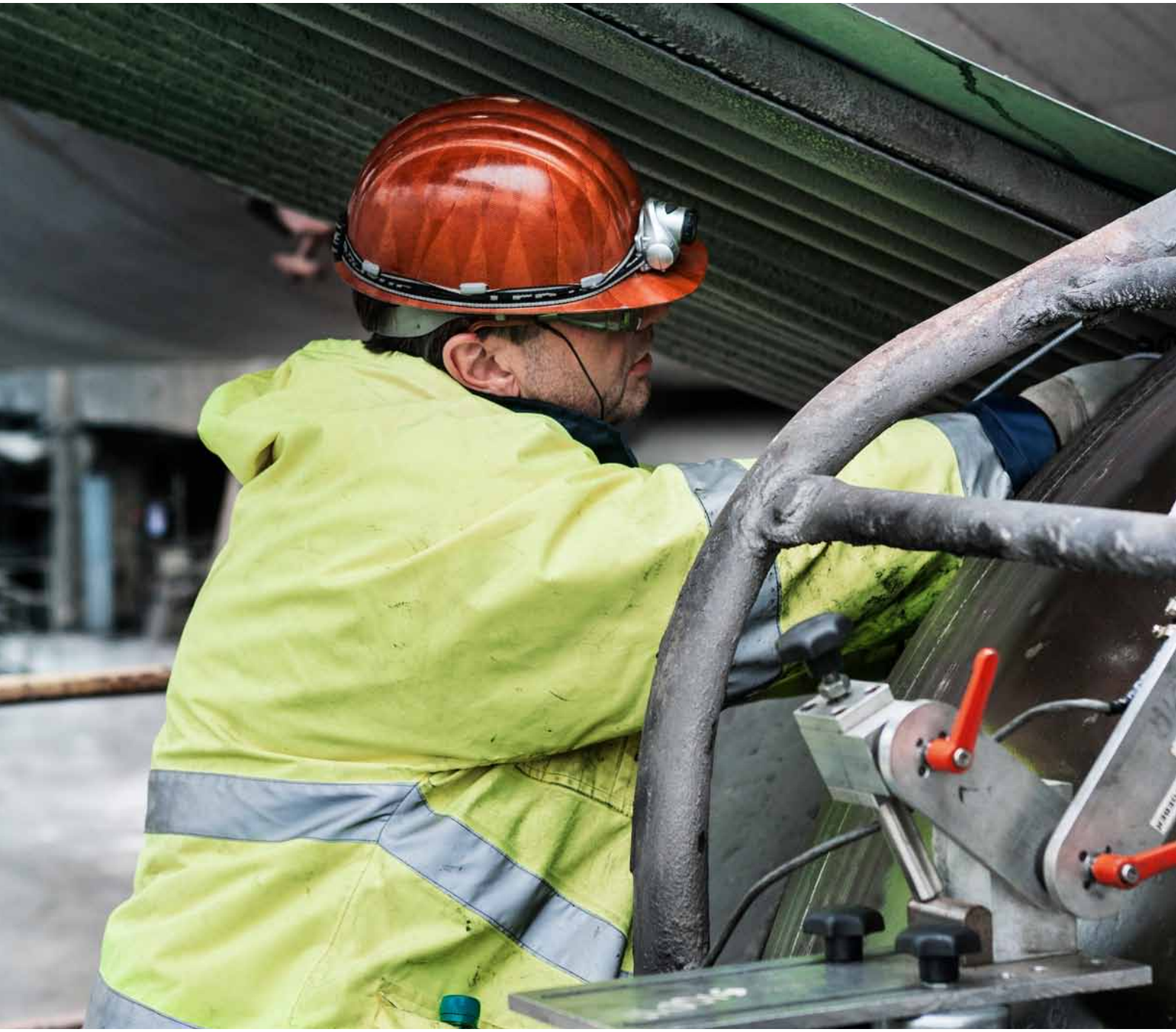
- Train and develop the competencies of the plant technical and managerial staff. Technical and leadership courses have been planned and implemented via FLSmidth Institute
- Enhance the chemical composition and burnability of raw materials by utilising the expertise of quality control departments and FLSmidth R&D
- Fine-tune and improve the performance of plant assets in terms of throughput and energy consumption.

The optimisation process and the more sustainable O&M solutions, demonstrate both FLSmidth's commitment, and its ability to deliver on that commitment.

National Cement Company

National Cement Company (NCC), based in Cairo, Egypt, is a leading local manufacturer. As of January, 2014, 18 months of the seven-year O&M agreement signed with the company on 25 June 2012, have passed.

When entering into the contract, FLSmidth expected to meet challenges on several fronts: Safety, environmental impact, capacity build-up, and reaching suitable production levels. At the time,



FLSmidth had approximately three years of experience of performing O&M services at other plants in Egypt, and has applied that experience to ensure a proven business system and operational procedures for NCC.

Since then, special attention has been given to the important aspect of safety so as to reduce incidents involving injury to an acceptable level, and to live up to global FLSmidth standards. Extensive training has been conducted in order to proactively curb the high LTIFR (Lost Time Injuries Frequency Rate) among plant employees.

Bringing the plant's equipment into reliable operating condition – a key requirement for meeting O&M targets, including sustainability KPIs – necessitated heightened levels of activity in all plant departments. Personnel, mainly from FLSmidth but also from NCC, performed a wide variety of tasks often working to demanding deadlines. Despite this added pressure on the working environment, FLSmidth managed to maintain the LTIFR level in the initial phase and, in a relatively short time, reduce it for our employees.

An upgrade project including FLSmidth equipment is presently being implemented for one of the NCC production lines. Once completed, the second production line will be similarly upgraded, raising production capacity from 2 x 3,800 tpd of clinker to 2 x 5,200 tpd. In parallel, FLSmidth O&M is implementing a refurbishment project addressing equipment which is outside the scope of the upgrade project. With the two projects completed, plant reliability will increase and both production and environmental performance will significantly improve.

Developing stakeholder competencies

With more than 130 years of cement industry experience, and spurred on by FLSmidth's corporate value of acknowledging and adopting responsibility in relation to its stakeholders, FLSmidth recognises that it has an opportunity to positively develop talents amongst its stakeholders.

The Helwan partnership

In 2007, when the first O&M contract was signed, demand for engineers in the industry was growing steadily. Few new engineers, however, were graduating, leaving an unfilled employment opportunity for the local workforce. To close this skills gap, FLSmidth initiated a public-private partnership with the Helwan University in Egypt. The aim of the partnership was to improve the quality and quantity of graduates interested in working in the cement industry. When the project kicked off, the cement industry was growing steadily and the future for qualified engineers looked promising. It was therefore clear that educating qualified engineers for the cement industry would benefit the industry in general, FLSmidth and the community.

Three years later, the project is still moving forward and ties are strengthening. To date, 33 engineers have graduated from the Helwan University partnership programme. Of these:

- 11 students have been hired by FLSmidth. 4 in production, 3 in electrical, 3 in mechanical and 1 in material management.
- 9 are still in the military
- 10 are working in related industries like Orascom, middle east engineering & contract, power system project, electricity company etc.
- 3 are in between jobs.

On 5 December, 2013, the promotional event of the Cement Engineering Postgraduate Diploma sponsored by DANIDA at Helwan University was launched.

The Cement Engineering Postgraduate diploma degree will start the next academic year February, 2014, with minimum 16 students.

Vellore Institute and the Indian Society of Technical Education

In 2012, a partnership was formed between FLSmidth Institute, Vellore Institute for Technology (VIT), and the Indian Society of Technical Education (ISTE), enabling us to grasp the opportunity to ensure sufficient skilled labour for FLSmidth's projects in India while simultaneously empowering the local workforce.

In July, 2013, all 19 individuals from the first batch of community college students successfully passed the Certificate Course in industrial technology. Of these 19 students, 10 had expressed interest in joining FLSmidth's Operation and Maintenance site, and seven have been employed by Coastal Gujarat Power Limited (CGPL), Mundra in Gujarat. More are expected to join the site early in 2014. Other students, having developed new skills and confidence through this partnership, have enrolled in graduate-level courses and are expressing interest in pursuing further education.

All students were meticulously evaluated, passing both a written and an oral examination, including two papers on mechanical and electrical disciplines followed by an oral exam on the content of the industrial internship.

In addition to the chance to develop their technical skills, the students also received a basic course in English communication. Before enrolling in the course, they were only able to speak their native tongue. After graduation, the students were able to converse in English – a great accomplishment and another valuable skill for their future.

The second batch of community college students, numbering 10 in all, began their studies in August, 2013, and are currently in the process of developing their skills. With the benefit of the first year's

experiences, FLSmidth Institute and its two educational institution partners have been able to fine-tune and improve the programme. Student feedback contributed strongly to this improvement process. Currently, FLSmidth Institute is striving to extend the community college programme to address a range of requirements from the community, the industry, and our customers.

Supplementary Cementitious Materials

Low-cost, minimal greenhouse gas and high productivity

Global demand for cement is expected to double by 2050, presenting a clear environmental challenge. In response, FLSmidth and customers have a responsibility to develop alternative cement types that can be produced with lower CO_2 emissions and lower clinker content. Only with such alternatives will it be possible to meet the market's needs without increasing greenhouse gas emissions.

Given FLSmidth's vision of being its customers' preferred supplier of sustainable minerals and cement technologies, rising to this challenge is a natural cornerstone of our endeavours.

One of the alternatives for the cement industry is known as Supplementary Cementitious Materials (SCMs). This term encompasses materials with cement-like properties that can be used to replace clinker in cement. Some of the most common SCMs are natural and synthetic pozzolan, fly ash and slag. SCMs can improve the environmental impact of cement production without compromising product quality, while lowering costs into the bargain.

Clay is a widespread resource in the world, and it can be used in the production of synthetic pozzolan. FLSmidth has developed a new flash calciner system for producing SCMs based on calcined clay, which has unique benefits compared with other technology options. With advantages such as improved design, minimal moving parts, and improved process control, the calciner system lowers energy consumption and plant maintenance costs compared with traditional kiln technology, simultaneously ensuring a more uniform product with higher reactivity and thus allowing a larger potential substitution degree in the final cement.

New ideas – put into practice

Transforming ideas into practice – and cooperating with a broad range of stakeholders – reflects the company's fundamental values. These principles are perhaps nowhere more fittingly applied than in the development of SCMs.

While the cement industry is used to mixing traditional chemistry with high-tech equipment, doing things in new ways – and particularly with new ingredients – can raise concerns such as: Will the proportions of the cement still be the same? Is the colour the same? What about product quality in early strengths of blended cements? What investments are required for first-movers?

Putting such concerns at ease is a necessary step along the way to transforming the idea of SCMs into widespread commercial practice. Despite continuing strong interest in several cement markets the first sale of an industrial scale calcination plant for SCM manufacturing is yet to come.

To this end FLSmidth is heading a research and development project under the Danish National Advanced Technology Foundation

along with two universities and a cement producer as partners. In parallel with this project, FLSmidth has built a number of facilities to produce calcined clay. The smallest of these is a bench-top calciner. The largest, located at the company's R&D centre, is a three-storey-high pilot plant with all the necessary production capacity for large-scale concrete testing.

Concerns regarding the early strength of blended cements are being addressed by another research project. Fortunately for our customers, this is already beginning to show promising results. Research shows that the performance of blended cements with calcined clay is comparable to, and even better than that of other blended cements using, for example, fly ash.

Contrary to traditional SCM systems, FLSmidth's flash calciner system is able to produce a grey and black product – something that has been demonstrated to several customers with great success.

To address the most pressing concerns with SCM technologies, FLSmidth has developed a mobile SCM plant, with a capacity of 5 tpd, that can easily be fitted into three 40-foot containers and shipped to customer sites. The mobile plant is fully integrated and self-sustainable. With its simple setup and operation, it is easy to integrate into the customer's production. An obvious advantage of the system is that it allows customers to gain hands-on experience of the new technology, to start using locally available raw materials and to prove the impact on their final product to their customers.

Controllable environments for greater safety

FLSmidth Supercenters and Service Centres

For FLSmidth, safety is about preventing injuries, compliance with applicable laws and regulations, and continuous improvement related to safe processes and policies. All of these elements contribute to conducting business in a manner which endeavours to maintain a safe working environment for our employees, as well as for others visiting or working at the company's service facilities.

Increasingly, FLSmidth's customers are finding it imperative that their operations, and those of their suppliers, are conducted in a manner that can be considered safe. By doing so, they maintain a "social licence to operate". As a supplier to the cement industry for the past 130 years, FLSmidth has built a long tradition of focusing on safety in all of its operations. The recent opening of several large service centres around globe strives to uphold that tradition.

The new Supercenters are designed to shift specific customer service tasks that otherwise would have been performed at the customer's site to a geographically close location. There are many advantages to this approach, one of which is the potential to create safer working conditions at a purpose-built facility that are inherently more controllable than those of a working industrial site. At present, the Supercenter concept is still relatively new, and we are carefully monitoring safety conditions and key indicators to maximise practices around, for example, the safe transport and handling of customer equipment arriving for repair.

To date, Supercenters have opened in the following locations: Santiago and Antofagasta, Chile; Perth, Australia; Arequipa, Peru; Delmas, South Africa; and Tucson, United States. An additional centre is planned for the South Gobi Desert area of Mongolia in the near future.

During the inauguration event, held at FLSmidth's Delmas, South Africa Supercenter facility, Romy Martin, Director of FLSmidth's service centre programme remarked: "Applying and living safe methods and practices is of paramount importance in all that we do. While preparing for this event today and others like it, my first question is always: 'What more can we do to ensure that everyone is safe?' This theme will run through everything you will experience today and onward into our continuing operations."

The company is especially proud that, during the 270,000 man-hours it took to construct the Delmas facility, no lost-time injuries occurred and the facility's impressive safety record has continued since opening its doors for operations. FLSmidth will continue to work towards bringing this exemplary level of safety to all existing and planned Supercenters.

Unfortunately in October, FLSmidth experienced a fatal accident at their Santiago, Chile service centre facility. Special care and counselling has been given to the young victim's family and other colleagues who were present in this facility, on that day. A full investigation is ongoing, and FLSmidth intends to implement all specific corrective actions associated with this incident, at all of its service centre locations.

Material Handling

Achieving a sustainable advantage

Key business challenges for today's mining and mineral processing industry include reduced ore quality, deeper ore bodies and tighter environmental constraints on existing and greenfield mining operations. These trends increase the need for material handling,and mineral processing equipment, since more material must be moved and processed per ton of finished product – all with lower emissions and reduced water consumption.

Reducing plant emissions

FLSmidth's air pollution control experts are committed to helping customers reduce emissions by developing and refining innovative clean air technologies. These technologies enable customer plants to operate at maximum capacity while complying with regulations, protecting employees and protecting the surrounding environment.

The ability to develop such technologies is primarily due to the fact that FLSmidth can draw upon the largest R&D facility in the industry, as well as the experience and insights gained from an extensive installed base of over 8,000 installations worldwide. These assets enable the company to quickly move from idea over prototype to final product, and they streamline development of a commercial solution that can minimise customers' impact on the environment.

FLSmidth's unique competence in air pollution control is reflected in its products:

- The use of Computerised Fluid Dynamics (CFD) to design filters for the best possible performance
- Advanced gas and dust distribution systems resulting in a significant decrease in the amount of compressed air required to clean filter bags – reducing power consumption and extending filter bag lifetime
- New, optimised and modular filter solutions, DuoClean™ DC2 and DC8 filters for higher efficiency, reduced transportation costs and reduced capital investment
- The market's fastest high-voltage controllers for optimum utilisation of electrical power
- The unique Coromax® pulse system for capturing fine particulate matter harmful to people from coal-fired power plants and sinter machines in the iron and steel industry
- Advanced gas suspension absorber, the FLS®-GSA for efficient removal of SO_2, HCl, mercury, dioxins and furans
- The CataMax™ catalytic solution, which extensively reduces emission of dust and organic hazardous pollutants
- Long bag technology that sets a new industry standard and reduces equipment footprint and weight.

Coromax® pulse systems reduce emissions in China

FLSmidth has a clearly stated duty, driven by its values, to act responsibly toward the company's stakeholders. As the preferred supplier of sustainable technologies, therefore, the company has a responsibility toward its customers to help them comply with strict environmental regulations.

Most recently, but not for the first time, FLSmidth has had the opportunity to live up to that responsibility in China, where the country's coal-fired power plants are now required to comply with tougher new regulations governing emissions.

The customer is the Shenzhen Energy Company, one of the main power generation companies based in Shenzhen, Guangdong. FLSmidth will install a total of 36 Coromax® pulse systems at the company's Shajiao and Mawan power plants, which will enable it to meet the new emissions requirements. The new high voltage supplies will replace the existing DC power supplies on electrostatic precipitators (ESP) to improve the efficiency of removing even fine dust particles.

With the Coromax® pulse system, both harmful fine particulate emissions and power consumption will be reduced substantially, even in high-resistivity dust applications. Now in their fourth generation, these compact systems have been shown to reduce ESP dust outlet emissions by up to 50%, cutting power consump-

tion by up to 30% in high-resistivity dust applications. In fact, Coromax® technology is one of the few technologies available that can effectively fulfil the demands of the new Chinese legislation.

CataMax™ catalytic solution – a new and proven technology for cement plants

In early 2012, FLSmidth launched a state-of-the-art technology for air pollution control. The new solution introduces one-step pollution control for the cement industry, enabling customers to reduce their Total Hydrocarbons (THC) emissions, and especially Organic Hazardous Air Pollutants (OHAPs), below the required limits of the American National Emission Standards for Hazardous Air Pollutant regulation. This development is of particular interest in the USA, where NESHAP (National Emission Standards for Hazardous Air Pollutants) regulations outline stringent requirements for the emission of hydrocarbon components from cement plants.

Over the past year, FLSmidth has worked intensively to test a solution that can live up to these requirements. Today, the CataMax™ catalytic solution is commercially available, and triple pilot tests at two different cement plants have proven its efficacy.

Rather than replacing a plant's main filter, the CataMax™ catalytic solution is an add-on installed by FLSmidth during, for example, a regular maintenance shut-down.

SMARTpaq™ solution reduces emission in the pulp and paper industry

Today, electrostatic precipitators (ESPs) are the most commonly used type of air pollution control equipment for the pulp and paper industry. At the same time, however, many recovery boiler ESP plants acknowledge the need and opportunity to achieve further emission reductions.

One such plant, located in Indonesia, recently took steps to address this opportunity, awarding FLSmidth an order for a SMARTpaq™ ESP upgrade.

A SMARTpaq™ upgrade consists of three elements: anti-sneakage plates, specially designed electrodes and 3-phase high voltage supplies. The solution advances emission performance for our customers by:

- Eliminating sneakage of dust past the collection system, ensuring 100% utilisation of the installed collecting area
- Providing optimised capture of dust particles, significantly improving electrode performance
- Optimising power consumption to improve dust collection (a smooth high voltage curve shape allows a significant increase in the average voltage applied to collect the fine particles).

The SMARTpaq™ solution is a flexible solution that allows pulp and paper plants to upgrade ESP recovery boilers with a relatively short time for installation, bringing improved sustainability within easier reach.

Right-sizing mechanical components

Over the years, FLSmidth has built strong customer relationships, a result of the company's focus on getting closer to the customers. These now enable us to improve our products' environmental performance together with our customers, while making the products even safer to handle. Sizing of mechanical components is an important project now underway at FLSmidth's Wadgassen facility that contributes to these aims, and which demonstrates clear benefits from our customer relationships.

When it comes to improving the efficiency of machinery, both in terms of production performance and sustainability indicators, determining the right sizing for each component can yield useful gains. Arriving at the appropriate scale and improving efficiency can significantly improve safety, reduce costs and ease management for our customers. Equipment such as stackers, reclaimers, and belt conveyers are sized based on long term experience and assumptions.

Any sizing project benefits from close customer cooperation, enabling FLSmidth to monitor the performance of machinery in different real-world applications around the globe, and providing valuable input for improvements. Typically, such projects also require a large degree of cooperation and sharing of knowhow within FLSmidth, too.

The Material Handling division has been charged with developing a measurement-validated sizing approach for the company's equipment under difficult operating conditions such as extreme cold.

At this stage, the basic measurements of power consumption, torque movements and forces have been recorded and are presently being evaluated. Initial insights into machinery behaviour have been gained, and values for friction factors have been determined. These results will enable FLSmidth's designers to size the company's machines to be more competitive, and to further develop its products to handle higher capacities with improved safety design and lower risk for customers.

More efficient waste material removal

The removal of waste material presents huge costs for most large-scale open pit mines. And, as the mine grows, so does the cost of hauling overburden from deep inside the pit to waste dumps above.

FLSmidth® dual truck mobile sizer

FLSmidth's Dual Truck Mobile Sizer (DTMS) is the world's first fully mobile truck dump station – and it assists open pit mines to reduce both costs and emissions.

In a typical open pit mine, an entire fleet of large haul trucks is needed to transport waste material from each excavation bench. With every new level dug, the mine deepens and trucks need to travel further to reach waste dumps at the surface. Vehicle emissions climb, as do vehicle maintenance, fuel consumption, tire usage, spare parts requirements and so on.

The DTMS is unique in that it interfaces directly with rear dump trucks. It works in a similar way to a large, mobile, shovel-fed sizing station, but with the added benefit of truck haulage to ensure flexibility and efficiency. Additionally, using a shiftable face conveyor and a mobile overland hopper, a mine can achieve a highly mobile system, and a considerable reduction in its fleet of haulage trucks.

Obviously, keeping the number of trucks to a minimum greatly reduces exhaust emissions. Furthermore, the system ensures that the majority of hauls are carried out on a flat grade within the pit. This brings emissions levels down even further as trucks use far more fuel when hauling on an incline. Depending on configurations, the electric drives of the entire system can produce anywhere from a 40 to 80% reduction in carbon emissions compared with the typical diesel engines of a haul truck fleet.

A complete DTMS system brings major operational savings and reductions in emissions to open pit mines. Moreover with a reduced fleet of trucks servicing multiple benches, mines can achieve a more flexible, mobile and productive operation.

The NTECL Project: Transporting more material over difficult and environmentally sensitive terrain

India implemented a five-year plan to remedy its issue with power deficits – which are over 20% at times of peak demand – and in an effort to meet the power requirements, the country's National Thermal Power Corporation (NTCP) adopted a multi-pronged growth strategy to set up joint ventures with state electricity board power stations.

NTECL is such a project and coal for the power station is received from the Ennore port and conveyed to the plant, crossing creeks, fishing habitats, sea backwaters and a main railway line that connects two major cities. The specifications drawn up for the coal conveying system had options to traverse the 4.5km stretch by trough, totally enclosed conveyor or by pipe.

The conveying system was conceived in order to unload coal from capsize and panamax vessels and transport it to the power station in line with an unloading of 4,000 tph to the crusher house located inside the plant. This warranted an efficient system with a reduced environmental footprint.

FLSmidth initiative

Overcoming challenges that were unthinkable even 10 years ago became a reality in 2006 when the pipe conveyor concept was introduced in India. Through FLSmidth's collaboration with the client and high level of expertise, meeting the Indian power industry's need for efficient mega power projects with greener development paths and reduced CO_2 emissions was easily achievable.

FLSmidth was the frontrunner in this project, standing out against competition from conventional conveyor and pipe conveyor companies. The company's track record of installing efficient pipe conveyors around the world helped to secure this project.

Engineering excellence

After the order was placed, there were challenges and critiques from many Indian industries that opposed the introduction of pipe conveyors, since trough conveyors had been the preferred method for many years.

FLSmidth overcame all challenges, illustrating its engineering capabilities at the design, testing and construction stages. Every component of the system was critically examined based on application and was sourced from globally renowned suppliers to ensure a reliable operating system. Close cooperation with FLSmidth's global engineering and technology teams made this possible.

FLSmidth used a number of engineering tools, such as computational simulation techniques for belt design and the testing of the belt at FLSmidth's Wadgassen location for collapsibility and stiffness. Drive controls were custom-built and variable frequency driven for a smooth start-up sequence to ensure the success of this system.

The entire conveyor system was checked for dynamic analysis and audited for all critical components. This included a discrete element model for designing chutes at transfer points to achieve the life expectancy of the belt and smooth material flow. The system was also provided with adequate safety interlocks to prevent surge loads from the preceding system for smooth operation and an accident-free working zone.

Project execution

During execution, FLSmidth adopted several unique approaches, not only in design but also in construction, fabrication and belt installation. These included pulling the belt and installing the entire length in one go by pre-splicing for full length, which saved more than three months on the schedule. Construction activities had faced many challenges from the start, including casting foundations in seawater-logged areas, crossing local fishing hamlets and protecting existing vegetation

The entire project was handled locally by the FLSmidth India team, and the project was trial commissioned in 2013.

The NTECL Pipe Conveyor Project is a classic example of FLSmidth's engineering excellence and its innovative approach and quality execution. This forerunner approach has created a global benchmark resulting in demand for environmentally clean material handling systems.

By opting to use a pipe conveyor, NTECL gained optimal power consumption per ton of coal conveyed, upheld land requirements and created a dust-free environment. This system was commissioned in 2013, just as global ports began looking for the faster turnaround of ships.

Mineral Processing

Delivering tomorrow's solutions

The challenges of FLSmidth's customers are our opportunities, naturally shaping the solutions we offer. Miners face a range of challenges, including safety, increasing raw material and energy costs, decreasing head grades, complex mineralogy, water scarcity, difficult environmental permitting, increasing project capex requirements, and the retirement of industry experience. We have sustainable solutions to meet these challenges.

Reducing CO_2 emissions and energy consumption

FLSmidth® Multiple Cassette Preheater

Lime is a mineral utilised in many of today's environmental, chemical and industrial applications including steel manufacturing, construction, and soil stabilisation. It is an additive to asphalt, and a key ingredient for plaster and mortar. Lime is derived from naturally occurring limestone through burning and calcination processes, for which FLSmidth provides specialised pyrometallurgical equipment.

In response to industry pressure for improved performance, better techniques and the reduction of subsequent CO_2 emissions during the pyrometallurgical stages of lime processing, FLSmidth recently developed the Multiple Cassette Preheater (MCP™).

The MCP™ Preheater offers improved heat transfer with reduced power consumption, reduced stone degradation and lower build-up potential. Thanks to the unique geometry of the MCP Preheater, hot gases leaving the burning kiln are drawn equally around the full circumference of each cassette, or chimney, for solids and gas to efficiently interact. Stone is also delivered to the cassettes in a more uniform distribution and in counter-current to the hot kiln gases, increasing the efficiency of preheating and pre-calcining.

"The MCP technology is a novel approach in an industry that has been somewhat stagnant for many years," says Michael Prokesch, FLSmidth Global Manager of Process Design. "The technology is primarily geometry-based and derives from prototype R&D testing at FLSmidth facilities. Test results counter conventional design assumptions, thus enabling radical design changes which have resulted in significant operational improvements."

In short, the MCP Preheater features superior heat transfer and can operate for longer periods of time without requiring maintenance. The MCP Preheater saves 55 kcal/kg of lime produced over FLSmidth's previous preheater model, which is 6%. This equates to approximately 7,000 tons/year less CO_2 emitted for each plant where the equipment is installed. It also saves 4 gigawatt-hours (GWh) of electricity annually per plant, which equals 5%.

"These features make the MCP a vast improvement over previous and competitive models. In addition, the configuration of the MCP cassettes enables us to easily configure preheaters to easily retrofit different kiln sizes and configurations," says Prokesch.

"This technology provides a competitive edge for FLSmidth in the pebble lime industry. It also gives us a state-of-the-art device to consider for new applications that will allow us to develop a strong platform in new areas of pyrometallurgical equipment supply. We are now busy adding new features that will offer further operational benefits to our customers."

600m³ SuperCell™ Flotation Cell

In the mining industry, after material has been through crushers and ball mills, it is pumped into flotation cells whose function is to recover the required product, such as copper or platinum. Installing one larger cell instead of several smaller ones decreases the total cell footprint required to accomplish the same throughput and efficiencies.

What was unthinkable just 10 years ago, has become reality today. Concentrators are now being designed for a capacity of 200,000tpd, and have become the new trend in flotation plant design. Instead of a large number of cells per row, the average concentrator has between five and seven cells.

Economies of scale are forcing flotation cells to keep getting bigger – and more efficient. Until recently, the FLSmidth® 300 series SuperCell™ flotation machine, developed in 2009, was the largest in the world with a capacity of 300-350m³. In 2011, FLSmidth decided to take this product line to the next level and started the development process of a new generation of flotation cells.

FLSmidth has now introduced the revolutionary 600 Series SuperCell™ flotation machine, the new record-holder in competitive size. Its cell volumes of 600-660m³ compensate for increasing concentrator throughputs and subsequent residence time requirements.

The new SuperCell™ flotation machine provides for a larger universal tank that is the largest and most efficient flotation cell available. It also comes with optional mechanisms that can offer lower energy consumption than smaller cells.

Customers are quick to take up new, larger flotation cells. Demand is primarily driven by economic considerations and lower per-cell maintenance requirements, making these enormous machines highly desirable on today's market. Already, in fact, five major mining houses are inquiring about these new cells.

In addition to new, large-throughput plants, these cells are especially attractive in a situation where there is limited room for expansion in existing large-capacity plants.

FLSmidth's row of 5 x 600m³ cells will have an equal residence time to its nearest competitor's row of 6.6 x 500m³ cells, allowing for a comparatively lower cost and footprint, and continuing the company's market leadership.

Each SuperCell™ flotation machine can be supplied with a combination of three rotor-stator configurations:

- Standard
- Low-energy
- High-energy

This ability to customise the SuperCell™ flotation machine's design yields the optimal flotation environment for each customer's applications.

FLSmidth will install and test the first of these new SuperCell™ flotation machine providing the world's largest flotation cell at the Robinson Mine, Robinson Nevada Mining Company, KGHM International. The 600 Series SuperCell™ will be used as a rougher-scavenger in the copper flotation circuit.

Improved safety in maintenance work

FLSmidth® "Top Service" TS Gyratory Crusher

One of the first steps in mineral processing is to crush or reduce rock from the mine into smaller rocks that can be handled more easily throughout the rest of the production process. As the modern world's appetite increases for products created from minerals and mining operations, crushers have had to become larger and more sophisticated in order to handle the massive volumes of rock pouring through them.

Crushers work continuously to feed the plant. When one fails or needs repair, or just regular maintenance, it usually requires not just heavy equipment, but also the placing of workers in precarious situations beneath the crusher to effect its return to normal operation. Time is money, and the costs of halted production can run into millions of dollars while repairs and maintenance are carried out. With the need to quickly get crushers back online to resume feeding the rest of the plant, safety challenges have now become a major concern for mining companies.

To help alleviate some of these concerns, FLSmidth developed the "Top-Service" (TS) line of gyratory crushers. This innovative crusher is engineered from the ground up with safety and maintenance in mind. Its key distinguishing feature – one which differentiates the TS-Gyratory Crusher design from other gyratory crushers – is that the TS machine is designed to be serviced and maintained completely from the top, with the aid of an overhead crane.

During repair or inspection operations, the TS crusher's assemblies are removed from above through the crusher feed opening instead of from below through the discharge bin. The advantage from a safety perspective is that maintenance personnel can access the assemblies without entering the discharge bin. This effectively removes the risk of injury from falling debris, working in confined spaces and eliminating the risk from noxious gasses or harmful dust inhalation.

The design of the TS crusher doesn't just mean easier and safer maintenance, it also translates into more cost-effective and more flexible foundation designs. Plants that take advantage of the design and keep spare part inventories on site are able to swap out the entire assembly in a single shift.

With 24 TS crushers sold and five in operation the advantages of this machine in terms of safety and maintenance are clear. For unscheduled maintenance requirements, the TS-Gyratory Crusher has been shown to save 25 hours of maintenance time per strip down and rebuild operation. Assuming that it usually takes a team of five to work the extra 25 hours and this on average happens three times a year, then the TS crusher saves 375 man-hours. Therefore the personnel has a reduced exposure to the safety hazards of working around heavy equipment, when compared to the equivalent bottom service design machine.

Reducing dust emissions in aluminium processing

Möller® Direct Pot Feeding System

Since the modern aluminium industry began, the world has produced about 800 million tons of the metal, with approximately 73% of it still in use today. With its huge array of uses, and fuelled by growing urban populations, the demand for aluminium is on the increase. FLSmidth provides products to cover more than 50% of the equipment needs of a complete alumina plant, from the bauxite mine to refinery equipment as well as material handling equipment for aluminium smelters.

One part of the alumina process involves smelting of the alumina oxide to extract the aluminium. This is accomplished using a large number of electrolytic cells, often referred to as pots. These pots apply an electrolytic process with an internal cathode and anodes to capture the molten metal.

The filling of pots is a batch process, requiring most smelters to use cranes to fill the raw material into each electrolytic cell from above. The resulting inefficient dumping causes dust emissions, loss of product, and an unclean environment.

To solve this problem and completely eliminate the escape of dust, FLSmidth provides continuous and fully automated alumina feeding technologies incorporating the Möller direct-pot feeding system. Highlights of this technology include low feeding velocity with little wear on equipment, and the elimination of moving control devices. Both features do much to reduce maintenance costs. The use of low pressure fans and blowers further facilitates low energy consumption, and the system is self-regulating, which enables easy operation and immediate oxide delivery.

FLSmidth is currently refurbishing a state-owned aluminium smelter in Venezuela with this advanced pot feeding technology, and will be upgrading a total of 400 electrolytic pots at the site. In 2012, FLSmidth was awarded a contract for a pot feeding system serving 444 pots in the world's longest pot room greenfield installation in Abu Dhabi in the United Arab Emirates, which is presently in the start-up phase.

Tailings management, water recovery, and environmental reclamation

Thickening and filtration

Water scarcity is a growing challenge for the world at large, and for the mining industry, as many ores are mined in remote locations or in arid climates.

The role of water in mineral processing is a crucial one. Rock is crushed into fine particles, then water is added to create a slurry, which is then fed through equipment to extract the valuable ores. Once the metals are recovered from the slurry, every mining operation faces the task of how best to deal with the waste materials, or tailings. The tailings contain substantial amounts of water and need to be treated and dried before the remaining material is placed back into the environment.

FLSmidth continues to develop thickening and filtration technologies that enable mining customers to increase their water recovery, as well as to maximise the dryness of the cake from tailings in the mining process.

To understand how these technologies contribute to sustainable mineral processing, it is necessary to outline the process itself. Once the minerals have been successfully removed from the ore during the processing stages, the tailings are fed into sedimentation tanks, known as tailings thickeners, to settle the remaining solids and separate them from the water used during the process. The tailings are then normally fed into tailing ponds where any excess water is allowed to evaporate or dissipate back into the soil.

A traditional tailings pond takes up a large area of land and requires a great deal of maintenance and monitoring. Such ponds carry a heightened risk for affected water to seep into the groundwater, despite precautions taken to protect the local environment. The large surface area of the pond also means that it will claim a higher percentage of precipitation.

FLSmidth's paste thickener equipment minimises these problems by increasing the underflow solids concentration, and reducing the amount of water sent to the tailings pond. The additionally captured water from FLSmidth's paste-thickening procedures can be re-circulated in the plant.

For even more effective tailings management, FLSmidth pressure filters are installed after the tailings thickeners, increasing the efficiency of squeezing moisture from the remaining tailings to create a filter cake that typically contains less than 15% moisture. Tailings can then be stacked and compacted by FLSmidth conveying and spreading equipment in multiple lifts per pad, taking up less than half of the area of a tailings pond.

"More companies want a dry cake that they can stack," says Todd Wisdom, Director of Filtration Products at FLSmidth. "In response, we have developed the largest automatic filter press in terms of capacity per machine."

FLSmidth's AFP-IV™ minerals pressure filters are installed at the end of the mineral processing line to assist in the recovery of water for re-use in the process. FLSmidth's newly designed Colossal™ filter press has been engineered to be twice as wide as previous filter presses to efficiently capture even more water for recirculation at the plant.

The filtered dry tailings concept means a mine site is able to operate with much less external water compared with similar concentrator plants. Thus, dry stacking has proven to be the safer and more sustainable option, not only for the mine site, but for neighbouring communities too. Local community acceptance is a highly important business factor for mining customers, who often find it difficult to secure water rights for their operations.

The dry stacked tailings have the benefit of being highly reusable, and can be contoured to allow the stacks to blend in with the local landscape. The area can then be replanted with a native seed mixture as operations continue. This supports and speeds up the environmental reclamation process and expedites the re-vegetation of the surrounding landscape. Upon completion, the dry tailings storage pile eventually blends in with the local terrain and surroundings.

When combined, our thickened paste and advanced filtered dry stack tailings technologies make for a far more environmentally friendly mining site.

Harnessing resources in extreme environments

Kazakhmys PLC

When a mining company in Kazakhstan needed fast start-up, efficient operation and reduced environmental impact, it turned to FLSmidth.

The company, Kazakhmys PLC, recently placed a contract to have FLSmidth design a copper concentrator, and to supply all of the process technology for a plant to be built at its Bozshakol copper mine. The mine is 220 kilometres (about 150 miles) north of the capital city of Astana, which has the distinction of being the second coldest capital city in the world.

The extremely cold winter temperatures, often lower than -40°C, require FLSmidth to carefully plan and adapt all plant and equipment designs to cope with this harsh environment. While still challenging, the task is made somewhat easier by our ongoing experience of designing equipment for a mine near the Mongolian city of Ulaanbaatar – the coldest capital city in the world.

FLSmidth won the contract for many reasons, including the company's ability to integrate all of its new and legacy equipment, the ability to provide all engineering disciplines, and access to metallurgical testing and ore characterisation laboratories.

"Our customers can get everything they need directly from FLSmidth, with all services managed under one roof," said Guy Carraux, FLSmidth Global Director, Concentrator Extended Scopes. "That's why the execution schedule can be compressed, saving time and money."

To fill the order, FLSmidth will supply technologies for crushing, milling, flotation, thickening, filtering, cycloning, pumping and automation, as well as regrind mills and material handling conveyors and feeders. Additionally, FLSmidth will procure auxiliary third-party items for the plant on behalf of the customer, and provide erection supervision, start-up and commissioning services.

The copper concentrator will have a capacity of 5 million tons of ore per annum. The equipment provided by FLSmidth will ensure higher energy efficiencies and improved process performance, which translate into reduced environmental impact.

The Atacama Desert

Another example of where FLSmidth helps its customers to conquer and make the most of harsh environments is Chile's Atacama Desert, where new mining projects use seawater instead of fresh water. The driest desert in the world, the Atacama is composed mostly of salt lakes, sand and felsic lava. Because the majority of the Atacama Desert mining projects are located at high altitudes, pumping seawater to the mines is costly and complicated.

A large plant currently under construction in the desert will use FLSmidth's high-density thickener equipment to help dewater tailings. Here we are supplying design and engineering services, as well as process equipment for the copper and molybdenum plant. On completion, the plant is expected to process approximately 105,000 tpd of primary and secondary copper ore. FLSmidth's thickeners will be an important part of the plant's tailings management water conservation system.

Best practices in minerals testing

Our facilities in Salt Lake City, Utah, are designed in accordance with Leadership in Energy & Environmental Design (LEED) standards. The building designs incorporate important features such as energy savings, water efficiency and CO_2 emissions reduction, and improved indoor environmental quality have been considered in the design.

The facility's Minerals Testing & Research Centre treats all laboratory solutions before releasing them into the municipal drainage system and the environment. Any hazardous materials are of cause isolated and properly disposed of through licensed waste handling companies. Our laboratory information management system supports sample receipt, tracking, and final proper disposal of the remaining samples.

Fugitive dust and fumes are a particular challenge in any minerals processing laboratory. In order to protect the FLSmidth employees working in the laboratory, our facility uses a central dust collection system and fume extraction hoods to capture dust and fumes immediately. Selected labs use high vacuum systems to facilitate cleanup and to ensure dust capture in particularly difficult applica-

tions. A number of portable systems are available to control unique dust and fume generating events, when our main systems may prove inadequate.

To minimise the environmental impact even further, FLSmidth has gone beyond a single-tier approach to wastewater management and installed a pre-treatment facility. All lab drains pass through the pre-treatment plant virtually guaranteeing that all liquid leaving our laboratories meets the expectation of the local water treatment authority.

Reducing SO_2 emissions from coal and oil power plants

FLSmidth® FGD Scrubber Blowdown System

Today's electric power plants face the difficult challenge of reducing gas emissions while maintaining safety and profitability. Sulphur dioxide (SO_2) emissions are a natural by-product of coal or oil-fired boilers. To reduce these emissions, Flue Gas Desulphurisation (FGD) was introduced as a way to convert SO_2 contained in the flue gas into gypsum by adding lime or limestone in a wet scrubbing system.

Although the equipment needed to perform gypsum separation is only a small part of the power plant's overall capital investment, FLSmidth's solutions play an important and necessary role in meeting regulatory requirements, simultaneously turning the plant's SO_2 gas emissions into a safe and potentially useful by-product. The final gypsum product can be used in several applications, primarily in the production of wallboard, or as material for cement, roadbase and structural fill. It is also a stable material that is suitable for disposal by landfill.

FLSmidth has led the development of technology for thickening and dewatering SO_2 scrubber sludges since the introduction of FGD. During that time, an extensive database has been compiled, documenting slurries from all major scrubbing processes. FLSmidth continually works with utilities around the world to optimise the performance of both scrubbing and waste handling systems, and to develop more efficient production technologies.

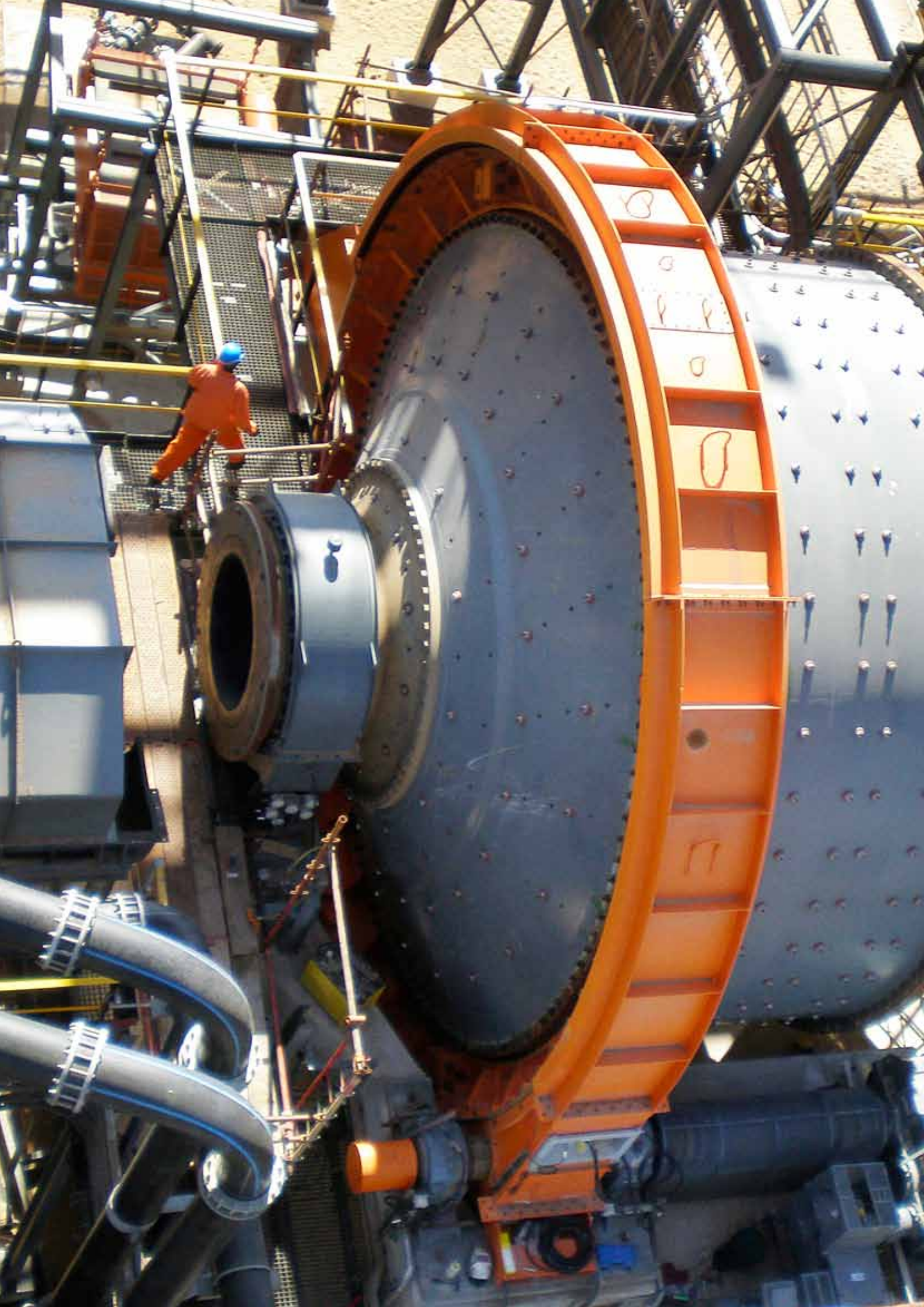
Using less power for water and slurry transport

Krebs® millMAX® pump

As mining companies aim to lessen their environmental impact and build more sustainable plants, they look to FLSmidth for new innovative ways to reduce water and power consumption, increase water conservation, and develop better water recycling techniques. The FLSmidth Krebs® millMAX® Pump is presently being installed at mining installations around the world to help our customers meet these aims.

Pumps are used in all areas of a mining plant. For example, they help to transport slurry through the processing equipment and reroute recycled water for use in other parts of the plant. Because pumps are continually in motion and are a vital part of keeping the plant operating, it is important that everything possible is done to reduce their power consumption while increasing pump wear life.

The patented design and features of the Krebs® millMAX® have been proven to generally improve wear life by 50 to 100%, resulting in substantially less environmental waste. This increase in wear life is achieved together with a reduction in power consumption, generally in the 15 to 20% range. At a readymix plant, the customer noted that it achieved a significant reduction in the use of diesel fuel as a result of the increased efficiency and lower power consumption of its installed millMAX dredge booster pumps.



Cement

Creating a win-win situation

Environmental sustainability is currently a key topic for the cement industry, creating new market opportunities. Production of cement causes emissions, which naturally creates a demand for emission reduction. Energy is also one of the largest costs of running a cement plant. If energy consumption is reduced, both costs and CO_2 emissions are reduceed, too. It's a win-win situation.

Integrating sustainability

During 2013, the three FLSmidth business areas known as Alternative Fuels, Waste Heat Recovery and Supplementary Cementitious Materials (SCM), which had previously been supported by a dedicated Sustainability Development department in the Customer Services division, were broadly integrated into the FLSmidth organisation. All of these areas continue to be important growth drivers in the cement and minerals industries, and their integration is designed to maximise long-term benefits for both FLSmidth and its customers.

Each of the areas represents a key technology, all of which share a common benefit of reducing the CO_2 footprint associated with each ton of product produced. Typically, they also reduce the cost of production, and provide reduced or more flexible dependence on specific sources of energy and natural resources.

Alternative fuels capabilities and experience have been further developed through FLSmidth involvement in a number of projects at cement plants that partly replace fossil fuels with refuse-derived fuel. In addition, two projects are enabling FLSmidth to gain experience with lime kilns that are to be 100% biomass-fired. To date, two Kalina™ Cycle Waste Heat Recovery systems have been supplied – with commissioning in progress.

Through projects like these, FLSmidth has developed and fine-tuned its ability to work with the engineering and commissioning of new energy-efficient technologies installed at cement plants.

R&D developments related to SCM production through flash calcination of clay have made major progress in 2013. However, industrial experience with SCM is still limited to slag grinding, the use of fly ash, and the use of natural pozzolans in cement.

Alternative fuels

As energy costs rise and environmental regulations tighten, alternative fuel co-processing is more relevant than ever. As a provider of sustainable solutions, FLSmidth offers a range of services and support for alternative fuels, plus years of hands-on experience with related equipment.

Arabian Cement Company

Recently, the Arabian Cement Company (ACC) invested in a new project, simply called the Alternative Fuels Project, that will enable one of the kiln lines at its Ramliya plant to be fed with various types of alternative fuels. Waste material from Cairo will be used to generate heat, neatly solving constraining challenges for both ACC and for the city. The Ramliya pyro processes will accept two types of waste, the first being paper, plastic and textiles, and the second sewage sludge from waste water treatment plants.

The Alternative Fuels Project consists of a reception and storage building, a shredder for preparing the fuel, buffer storage, an extraction and conveying system, and finally a dosing system for feeding material into the calciner. The extraction and feeding system is fully automated, and can be operated from a central control room in the same way as other equipment at the plant.

This installation was commissioned in December 2013 and once installed and operating, ACC expects to be able to substitute approximately 20% of the fossil fuel presently used for its production line.

Operation at Ramliya has been outsourced to FLSmidth through an O&M contract. This approach provides ACC with the best possible

assurance that any challenges arising from the use of alternative fuels will have minimal impact on clinker and cement production and quality. At the same time, FLSmidth will monitor emission levels, ensuring that they are as low as possible – and below established limits.

The ACC plant is among the first cement plants in Egypt to begin using alternative fuels on a larger scale, and is expected to demonstrate a win-win case with reductions in the use of fossil fuels, as well as lower production costs.

Waste heat recovery

Soaring fuel and electricity prices, coupled with increasingly adverse effects on the environment, are driving cement producers to explore new, energy-efficient technologies to integrate into their cement plants. Waste Heat Recovery (WHR) is one such technology, turning waste heat from the cement production process into usable electricity.

In 2011, FLSmidth re-initiated the promotion of waste heat recovery projects, enabling our customers to decrease operating costs and reduce dependency on external energy supplies. Since then, we have leveraged close relationships with two of our customers to commission two projects during 2013 – one in Pakistan and one in the United Arab Emirates.

DG Khan

In 2011, FLSmidth obtained an order for a 8.6 MWe waste heat recovery plant with DG Khan in Khairpur, Pakistan. The project utilises both preheater gas and excess clinker cooler air from the FLSmidth-supplied 6,500 tpd clinker production line.

The project encountered multiple challenges, all of which were resolved through the joint efforts of DG Khan and FLSmidth and, in the autumn of 2013, the first generation of power was achieved.

One of these challenges was that the new sub-supplier from the power plant sector was reluctant to visit the site because of the security situation in Pakistan. Perseverance and close cooperation between FLSmidth and DG Khan, however, won the day, ensuring that a competitive and innovative waste heat recovery solution will be up and running as planned.

The gains for the plant's operating budget, and for the environment, will indeed be significant. The resulting fuel-free power production is slightly less than the electricity consumption of the core pyro line. Previously, this electricity was generated using diesel engines. The savings achieved on heavy fuel oil will amount to approximately 14,000 tons of fuel per year.

STAR Cement

Another front runner in sustainable cement production is the STAR cement plant at Ras Al Khaimah in the United Arab Emirates, operating with exceptionally low costs. The plant is an FLSmidth-supplied 6,850 tpd clinker production line.

Commissioning was initiated during late autumn 2013 on STAR Cement's 4.8 MWe waste heat recovery project. The project utilises excess clinker cooler air to make the plant even more energy-efficient. FLSmidth is proud to contribute to the plant's continuous improvement by delivering sustainable cement technologies.

Re-designing for lower impact

Bringing heat exchangers to the next level

Air-to-air heat exchangers are large, heavy machines. In fact, they are so big that they require special shipment from assembly point to site. Using specialised transport is associated with heavier environmental impact, too, compared to conventional transportation in container ships. A task for FLSmidth's designers and engineers, therefore, has been to re-design the company's heat exchanger so that it could be transported using conventional means.

The result is an improved heat exchanger design that comprises pre-assembled modules and fans, making it both easier to transport and faster to install at the site. The modules are designed to fit into conventional 40-foot containers, which improves transportability and lessens environmental impact.

In fact, the lightweight design of the new heat exchanger yields a number of important benefits beyond its reduced impact on the environment. For example, the re-designed heat exchanger is safer to install, since the machine itself consists of far lighter modules than the previous design. Furthermore, smaller modules do not have to be lifted as high in the air, again improving installation safety.

An **overview**

SOCIAL NUMBERS	2011 REPORT	2012 REPORT	2013 REPORT
EMPLOYEES	13,204	15,900	15,317
GENDER – % FEMALE EMPLOYEES	16	15	14
GENDER – % FEMALE MANAGERS	7.2	9.2	10.5
EMPLOYEE ENGAGEMENT (satisfaction rate)	71	72	N/A
SAFETY – LTIFR	4.2	4.7	3.9
SAFETY TRAINING HOURS (per employee)	2.5	5.7	7.6
FLSMIDTH SITES AUDITED (HSE AUDIT)	-	12	28

ENVIRONMENTAL NUMBERS	2011 REPORT	2012 REPORT	2013 REPORT
SCOPE 1 – CO_2 (TONNES)	23,000	27,550	24,050
SCOPE 2 – CO_2 (TONNES)	55,900	54,450	58,950
SCOPE 3 – CO_2 (TONNES)	34,000	39,800	37,400

ECONOMIC NUMBERS (EURm)	2011 REPORT	2012 REPORT	2013 REPORT
REVENUE	2,952	3,338	3,610
PROFIT FOR THE YEAR	193	175	(105)

UN GLOBAL COMPACT	
Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights	HSE section page 14 People section page 24 Responsible sourcing section page 30
Principle 2: Make sure that they are not complicit in human rights abuses	HSE section page14 People section page 24 Responsible sourcing section page 30
Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining	People section page 24 Responsible sourcing section page 30
Principle 4: The elimination of all forms of forced and compulsory labour	People section page 24 Responsible sourcing section page 30
Principle 5: The effective abolition of child labour	People section page 24 Responsible sourcing section page 30
Principle 6: The elimination of discrimination in respect of employment and occupation	People section page 24 Responsible sourcing section page 30
Principle 7: Businesses should support a precautionary approach to environmental challenges	Customer Services section page 36 Material Handling section page 42 Mineral Processing section page 48 Cement section page 56 Environmental impact section page 34
Principle 8: Undertake initiatives to promote greater environmental responsibility	Customer Services section page 36 Material Handling section page 42 Mineral Processing section page 48 Cement section page 56 Environmental impact section page 34
Principle 9: Encourage the development and diffusion of environmentally friendly technologies	Customer Services section page 36 Material Handling section page 42 Mineral Processing section page 48 Cement section page 56 Environmental impact section page 34
Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery	Responsible sourcing section page 30 Compliance section page 20

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