

Crushing Technology



Background

About FLSmidth

FLSmidth is your One Source for mining and minerals processing equipment and services. Utilizing the latest in technology, resources, and materials, our engineered solutions provide you with the ideal design, equipment, and process support for your systems.

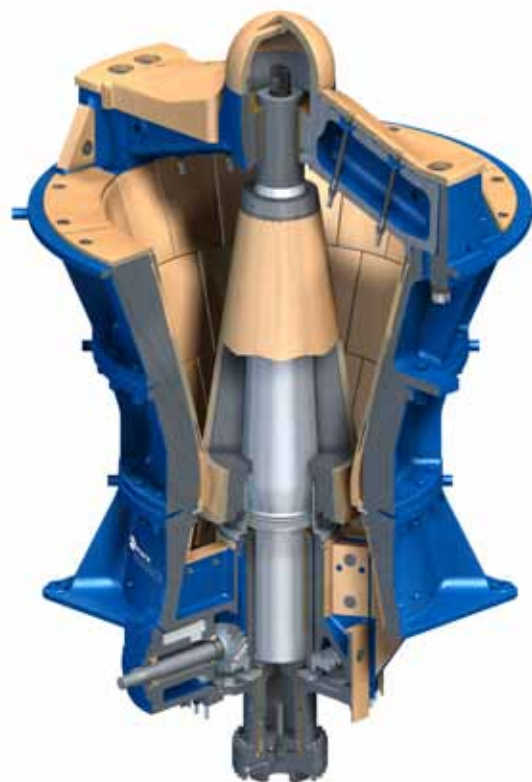
Behind our organization is Denmark-based FLSmidth, an international group of companies delivering equipment, systems, and high technology engineering services for the cement and minerals industries. This dedicated focus and international scope provide FLSmidth a solid foundation. When you select FLSmidth as your partner, you bring this solid foundation and support to your business.

FLSmidth has over a century of experience in crushing. As a world-class supplier of crushing equipment for the mining, cement and aggregate industries, FLSmidth offers crushing products and technology with proven names like Fuller-Traylor, Vecor, ABON, and Buffalo and is supported by one of the world's largest crusher reference lists, which includes many "world firsts".

Crushing equipment supplied by FLSmidth has its origins dating back to the Fuller Company, based in Bethlehem, Pennsylvania, USA. They have been a leading supplier of crushers under the Traylor brand name since 1905.

FLSmidth offers Automated Control Systems designed to maximize performance and monitor and protect the crusher.

FLSmidth has the engineering expertise and capability to design and implement process control systems of every size, up to and including systems for total plant.



Primary Gyratory Crusher



Primary Sizer Tooth Layout



FLSmidth Control Room



Gyratory Crushers

Gyratory crushers are primary crushers and receive blasted material from the mine or quarry.

FLSmidth's Fuller-Traylor brand gyratory crushers are based on over 100 years experience in serving many industries worldwide. FLSmidth primary and secondary gyratory crushers incorporate the latest technologies to create high-capacity, reliable machines suited to most primary compression crushing applications. Each crusher is custom designed to suit each specific application.

Machines are available for surface or underground installations (in standard or split-shell configurations), for stationary, portable or semi-portable operations, and for applications in climates that range from tropical to arctic.

FLSmidth holds a leading position in crushing technology with thousands of crushers installed since the



inception of the Traylor brand. These gyratory crushers have been operating successfully in some of the world's harshest conditions for 50+ years. This long operating life can be attributed to the robust design that FLSmidth still utilizes to this day.

The basic concept behind the Gyratory Crusher remains the same as it did during its inception, but the machine is entirely updated to address today's advanced technology, safety concerns, and operation schedules.

Special Features

- **High Capacity throughputs by providing longer crushing chambers, with low overall machine height**
- **Shells that can be split vertically or horizontally**
- **Split ring contact oil seal for virtually no oil consumption**
- **Massive shafts with generous journals to resist the intense forces generated in the crushing chamber**
- **Heavy walled shell castings utilise extensive ribbing**
- **Thick mantles and concaves which afford longer operating life and lower maintenance**
- **Large tapered roller counter shaft bearings**
- **High service factors**
- **Circulating of lubrication oil**
- **Large lubrication oil reservoirs**
- **Bar type spider**



Installation at Bogoso, Ghana



Installation of Primary Gyrator

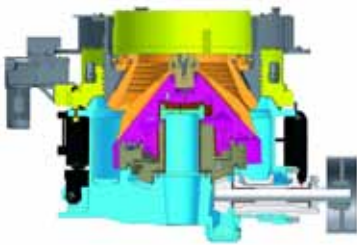


Main Shaft being installed

Cone Crushers

Features & Benefits

- **Extra heavy duty design for extended life**
- **Automated crusher control package**
- **Hydraulic power unit**
- **Package lube system (air or water cooled)**
- **Innovative hydraulic tramp release system**
- **Heavy duty 2-speed electric adjustments drive motor**
- **User-friendly touch screen display for crusher operations, diagnostics and vitals monitoring**



FLSmidth brought together a team of the most experienced and innovative individuals in crusher design and technology to develop the Raptor High Performance Cone Crusher - the most advanced cone crusher in the world. FLSmidth has a team of people passionately committed to bringing leading edge crusher design technology coupled with a proactive philosophy on customer service and support.

FLSmidth's Raptor crusher, is the result of extensive research conducted with the most important part of our design team, you, the operators in mind. We gathered valuable input from mining and quarry operations of all sizes from all over the country and integrated your best ideas into the Raptor Cone Crusher. From its extra heavy duty, high-grade steel main frame to its leading edge automated control package, the Raptor was designed to keep you crushing efficiently for decades to come.

Engineered, manufactured and completely quality tested through competent suppliers - FLSmidth is committed to making the Raptor line of crushers a clear choice for aggregate and mining customers.

Utilizing one of the most modern foundry facilities in the world along with advanced CNC machining technology, FLSmidth is able to produce premium component parts that are manufactured to uniquely exacting levels of precision and accuracy.

The Raptor delivers high performance crushing in a rugged, dependable, automated machine.

Installation in West Nyack, USA



Portable installation in Wisconsin



Raptor 1100 Model



Sizers

FLSmidth ABON, has been based in Australia since the company started in the mid 1960's, manufacturing sizing and crushing equipment to an ever widening range of industries in the broad sphere of minerals handling and minerals process activities.

The FLSmidth ABON sizer range utilizes a combination of low roll speed / high torque and tooth profiles to arrive at the specified end product sizes with a minimum of fines

production. Actual size of each machine is built to suit each application.

The FLSmidth ABON manufacturing facility in Melbourne, Australia includes a pilot plant for research and development on various ore types based on the clients requirements.

Secondary Sizer



Pilot Plant Research and Development Facility



Primary Tip Sizer



The FLSmidth ABON product range consists of:

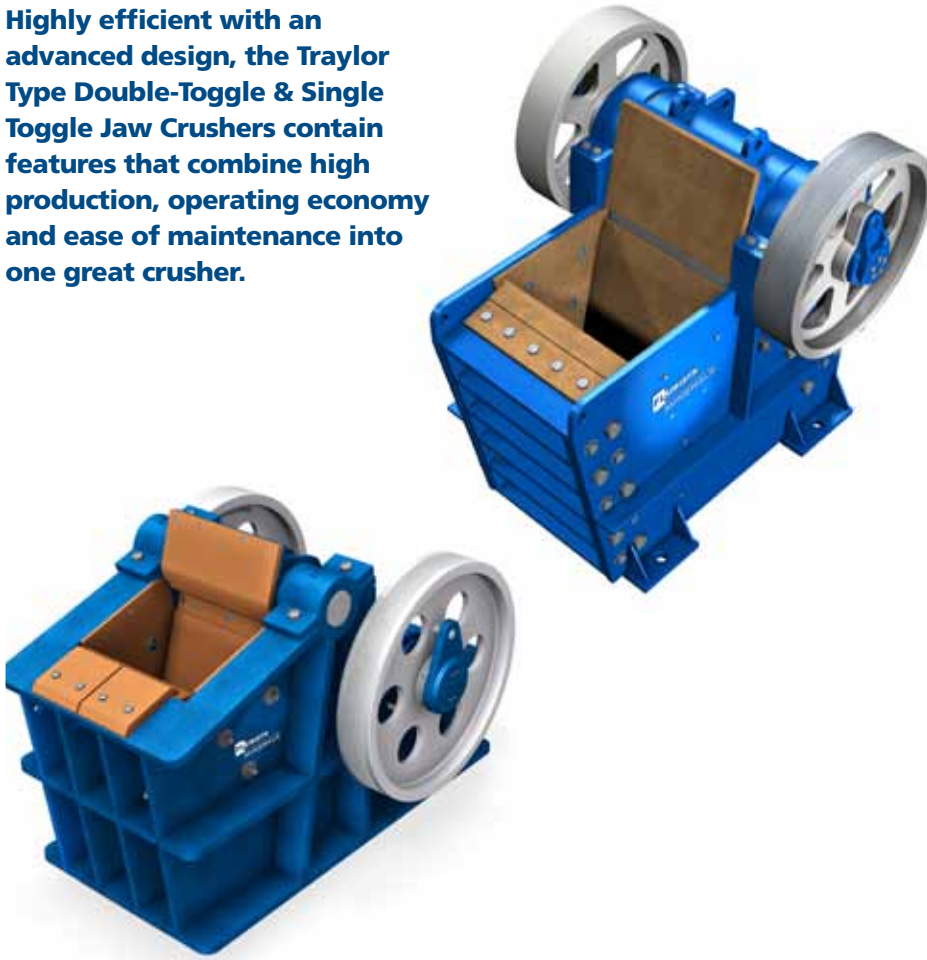
- **Primary low speed sizers/ crushers in twin roll formats for primary ROM reductions in coal, minerals and industrial applications.**
- **Secondary low speed sizers/ crushers for secondary ROM reductions.**
- **Tertiary and Quaternary low speed sizers/crushers in twin and single roll formats for tertiary and quaternary reductions.**
- **Sampling sizers/crushers for laboratory and sampling station size reductions at small tonnages.**

Underground Feeder Sizer Combination



Double-Toggle & Single-Toggle Jaw Crushers

Highly efficient with an advanced design, the Traylor Type Double-Toggle & Single Toggle Jaw Crushers contain features that combine high production, operating economy and ease of maintenance into one great crusher.



A few of the special features are highlighted below

- Curved scientifically proportioned jaw faces, which offer the following advantages:
 - No choking or packing
 - High capacities and low power consumption
 - Finer settings
 - Economy of operation and maintenance
 - Angle of nip progressively decreases as material proceeds towards the lower end of the jaw faces
- Large-capacity, grease-injected, adapter-mounted spherical roller bearings minimise periodic lengthy bearing change out
- Heavy flywheels allow crushing peaks on tough, non-friable ore to be handled easily
- Heavy, thick manganese jaw plates provide extended life prior to change out. This means less downtime and less throwaway
- The frame is fabricated from heavy mild steel plate with reinforcing ribs welded into place. The frame is of immense strength without the inherent weaknesses associated with a cast type frame. The sections are spigot joined in a manner that preserves one piece frame rigidity, when it is necessary to make frames in more than one piece



Typical Mobile Jaw Crushing Plant

Customer Service & Spare Parts

FLSmidth is at the leading edge of crushing technology and ranks as one of the world's largest and most successful crusher suppliers.

Our own competent and professional field service engineers and technicians illustrate our commitment to product excellence and life cycle support, from installation and commissioning of new equipment, to inspections, service contracts and on site change outs as well as the supply of high quality spare parts. FLSmidth will provide you with value added engineering for your minerals processing operation.

Our customers are our most important assets. Once we have designed and installed your processing systems, we do everything possible to provide the tools to ensure that those systems continue to operate at optimum levels, all the time. It is by no means a radical concept.

Spare parts are available 24 hours per day, 7 days per week and repairs and rebuilds are undertaken at our facilities.

Technical Services

- Erection and commissioning
- Operations and maintenance
- Expert services
- Technical assistance
- Training

Products & Parts

- Original OEM spares
- Product review and improvement
- Life cycle analysis
- Repair
- Retrofits
- Rebuilds

Engineering Services

- Equipment audits
- Process audits
- Testing
- Erection supervision
- Training

Operations and Maintenance

- Mill management
- Plant maintenance
- Asset management
- Plant operations



Centralized Crusher Lubrication System



Servicing and Spares



Heavy Duty Cast Steel Sections



Crusher Manganese Liners

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