

Buzzi Unicem USA Festus, MO at a Glance

By Brad A. Williams



Figure 1. Buzzi Unicem USA Festus Plant

In 1963 two extensive construction projects began in the mid-Mississippi River Valley. The Gateway Arch construction began in the heart of St. Louis and the Festus Cement Plant construction began at a location 35 Miles south of St. Louis known as Selma, MO. Selma, MO was selected for its abundant and high quality limestone reserves. In 1965 both projects were completed and “The Arch” stands as a symbol of the city of St. Louis being known as the “Gateway to the West” while River Cement has been providing cement to the St. Louis region and areas up and down the our major US river ways for the past 46yrs.



Commissioned in 1965 the Festus Cement Plant was equipped with, at that time, the nation's largest long dry cement kiln, a 3000HP ball mill for raw meal production, and a 4000HP ball mill for grinding cement. This state-of-the-art plant had a capacity of 564K tons of cement per year. The clinker was produced utilizing a 560 x 16 x 17 ½ ft Allis-Chalmers long dry kiln with a rating of 1,700 tons per day. Foresight went into the initial construction of plant. During this construction provisions were made with the infrastructure for a second production line of similar size. Also, the quarry, clinker storage, and shipping department were constructed with capacity to support two production lines.

Soon after commissioning in 1965 it became apparent that the demand for cement within the market of the Festus Plant was more than the plant could produce. In 1968 a second production line was commissioned, increasing the plant's capacity to 1.15M tons of cement per year. This line included a second long dry kiln and two more ball mills to support this thriving market. The plant was operated with the same basic configuration and equipment for the next 40 years with small modifications made to increase the efficiency and capacity of the plant to 1.4M tons per year of cement.

Prior to the recent down turn in the economy, cement demand had been on a steady rise in the United States. Due to this increased demand, in 2005, the decision was made to increase the production

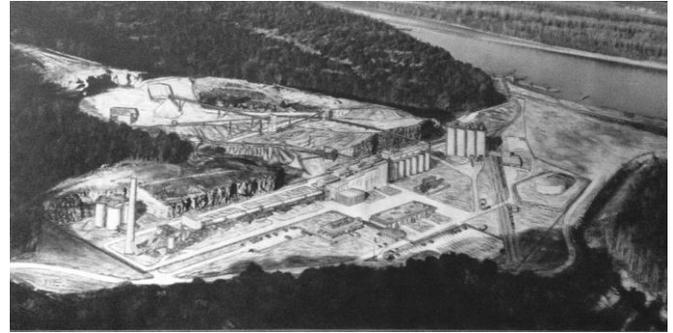


Figure 2. Festus Single line Plant



Figure 3. Festus Two Line Plant

capabilities and operating efficiency of Buzzi Unicem USA's Festus Cement Plant. So began the daunting task of expanding the existing plant without interrupting manufacturing operations. The key to the success of this project would be in the construction of the new equipment and modification of existing equipment while still being able to support the needs of our Buzzi Unicem USA customers. The project took advantage of both planned and unplanned equipment outages from 2007 to 2009 to perform the required work. The final result was a one week shutdown of the

old kiln lines to tie-in the remaining firing system for the new line after which time cure-out of the refractory began.

Prior to the initial start-up of the new kiln line several preliminary projects had to be completed. In April 2008 the new barge loading system was commissioned utilizing a Buemer tube belt system to load all cement barges and fill the plant's cement dome storage. The new loading system doubled the barge loading capacities while reducing specific power consumption.

Following the start-up of the barge loading system the new Loesche 53.3+3 Finish Mill was commissioned in July of 2008. The 190mtph vertical mill was started 1 year prior to the kiln start-up. This mill was immediately put into operation to support the existing plant's cement grinding needs due to its more efficient operation versus the existing ball mills. The plant was able to refine the operation of the new finish mill while the existing plant operated. This was very beneficial to the smooth operational transition while starting the larger capacity new kiln line. The system employs an automated control system developed within the Buzzi Unicem organization to maximize the mills performance. Also installed with the new finish mill system were an on-line cement analyzer (COSMA) model C351, by FCT ACTech and Sympatec MYTOS-VIBRI Module Particle-Size Analyzer MT089 , by Sympatec, Inc.. All three finish mills are utilized to support the increased capacity of the new plant operation.

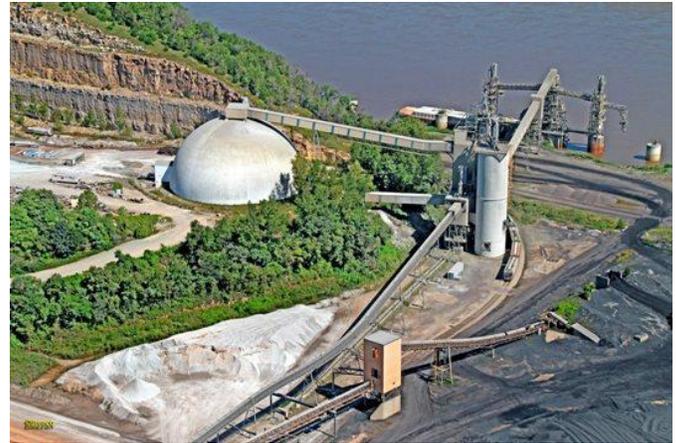


Figure 4. Barge Loading



Figure 5. Loesche Finish Mill

In March of 2009 the newly constructed raw material storage and handling system was commissioned. The new system included modifications to our existing secondary crushing system to increase the rock production and material sizing from 1" to 6". The new production is fed and stored in a limestone dome equipped with a Bedeschi Stacker/Reclaimer. A new

additives system was also commissioned at this time. The system includes a Buzzi designed Clay Stacker/Reclaimer, 5 additive silos and a crusher. Proportioning of these raw materials to our raw mill is controlled by Process Solutions software that is being supplied x-ray data from a CB Omni 2 Cross Belt Online Elemental Analyzer, By Thermo Fisher Scientific .

Once all of the Festus Plant support equipment had been commissioned and construction of the new pyro-processing system was completed the new kiln and raw mill lines were commissioned in July 2009. A Loesche 60.6 Vertical Raw Mill was tasked with supplying kiln feed to a KHD Kiln/Preheater system to produce clinker that was then cooled utilizing an IKN clinker cooler.

The Raw Mill rated at 540mtph was successfully commissioned 1 week prior to the kiln firing utilizing supplemental heat. During this time the mill production provided kiln feed to support production on the old kilns. The mill has the ability to support the new plant needs while being operated in both 6 roll configuration or 4 roll configuration providing increased plant reliability. Experience has proven that this flexibility is also useful when performing major maintenance on individual roll assemblies. To further enhance reliability, the drive systems for the raw and finish mills are the same model reducer and motor.

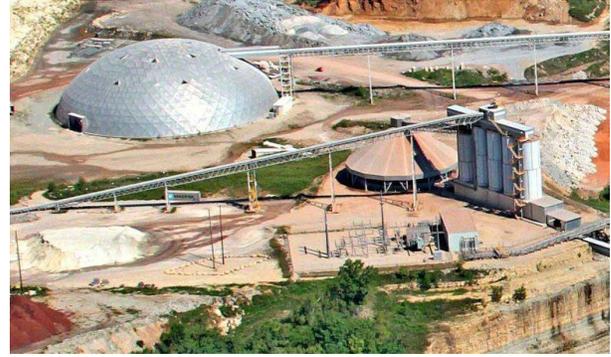


Figure 6. New Raw Materials Storage



Figure 7. Loesche 60.6 Raw Mill

The raw mill is also configured with a unique “push-pull” arrangement whereby in the event of a failure of a major raw mill drive component, the spare reducer-motor assembly can be jacked into position beneath the mill.

The process gas system linking the pyroprocessing system and raw grinding system features a unique cone valve design which modulates dual cone valves to control outlet gas temperature and inlet pressure of the raw mill. The same valves are also used as shut off gates to isolate the raw mill for service.

The pyroprocessing system features a KHD 5.4m x 65m kiln is fed by a dual string 5 stage preheater/precalciner. The KHD PRZ 7650/5 PH is specially designed for increased retention time for firing 100% petroleum coke on the calciner. The system was designed for 7000mtpd with a guaranteed rating of 6440mtpd. Clinker from the kiln is cooled utilizing a 7100mtpd rated IKN Pendulum Cooler equipped with dual hydraulic drives and a 5 roll crusher to perform final sizing of any oversized clinker. An FCT (COSMA) on line XRD Analyzer is utilized to continuously monitor clinker quality prior to transport to the finish grinding department.

Induced draft throughout all the operating systems is performed utilizing Boldrocchi fans while de-dusting is performed through Redecam Bagfilters.

To power the new facility, a new 138 KV outdoor substation was installed along with a new 138 KV power feed. Primary distribution within the facility is 138 KV.

The control system employs a Siemens PCS7 distributed control system. All motor control centers utilize Simcode module to transmit detailed motor operating data to

the control system via Profibus DP communications protocol.

The Buzzi Unicem USA's Festus project and operations teams had a very challenging task utilizing multiple major equipment manufacturer's designs to building a plant that would withstand the test of time. The Festus Plant was not conceived and built turn-key utilizing one manufacturing supplier. Each individual piece of equipment were selected for its superior design and engineering to create a unique plant to lead Buzzi Unicem into the future.



Figure 8. KHD/IKN Pyroprocessing System