

Duo delivers the closest aggregate production plant north of the river to central London for CEMEX UK.

Now officially opened at Dagenham, the latest CEMEX aggregate processing plant is the closest aggregate production north of the river to central London. The processing plant which has been designed and installed by DUO plc can produce 500,000 tonnes per annum with capacity for more, most of which will go into concrete for construction in the capital city.

The whole site took six months to convert into a fully operational wharf with DUO Manufacturing completely upgrading the ship to shore system.

Ship to shore:

All sea dredged aggregate is delivered by a marine chartered ship which has a 10,500 tonne capacity with the ability to discharge at 2000tph.

The brief therefore called for the supply of a 2000tph ship discharging system with associated conveyors feeding the marine aggregate to stockpile for the processing plant.

Duo Manufacturing subsequently designed and manufactured a ship discharging system incorporating a powered traverse feed hopper which was mounted on the existing rails. The sea dredged material is fed onto a short jetty conveyor which delivers the material to the end of the jetty where it is then transferred to a 207-metre long ship to shore conveyor, where material is then fed onto a radial stockpiling conveyor.

Dudley Lloyd – Director - Duo Manufacturing, commented, “Installation of the ship to shore and the barge loading conveyors was not a straight forward job for us as we were required to design and manufacture the conveyor gantry sections so that they landed exactly on the existing concrete pontoons, all of which was completed satisfactorily.”

DUO Manufacturing also supplied a 400tph barge loading system which consisted of a feed hopper with associated conveyor to the jetty and a radial barge loading conveyor.

Belt weighers were also supplied for the ship to shore and barge loading conveyors.

As well as the design, manufacture and installation DUO Manufacturing were also tasked with the removal of all the existing ship to shore equipment.

The washing plant:

With a brief to provide end products of a concrete sand, 10mm and 20mm, with the +20mm being crushed in a closed circuit, DUO designed and installed an **innovative** 250tph plant that incorporates the Terex Washing Systems (TWS) Aggresand 165 Processing System which features a rinsing screen, sand plant, stockpilers and all associated pipework and electrics on one modular chassis.

DUO also supplied a water and silt management system and a re-circulatory system which feeds a crusher to reduce the oversize gravel to -20mm.

Luke Talbot – MD at DUO, commented, "The Terex® AggreSand system combines aggregate washing and screening with sand processing on a modular chassis which was the ideal for the Dagenham operation. It brings together tried and trusted cohesive solutions utilising Terex Washing Systems components in an innovative modular design, setting itself apart from other washing systems in the marketplace."

The aggregate washing process:

Stockpiled material is fed into 9m³ feed hopper which features a remote control tipping grid. Material is then fed onto an inclined conveyor which delivers the material to the first processing stage of the Terex® Aggresand 165 - a 4.8m x 1.5m triple deck rinsing screen.

Utilizing individually controlled spray bars on each deck, the two bearing screen is fitted with polyurethane modular media on all three decks. The top deck acts as a protection deck removing any material above 20mm which is delivered to the crusher feed conveyor.

The middle deck is a 10-20mm passing deck while the bottom deck produces 0-10mm and the required sand. Integral to the chassis are two conveyors which deliver the 10mm and 10-20 gravel to stockpile respectively.

Re-circulatory crusher feed system:

With oversize material delivered off the primary rinsing screen this is fed up the inclined crusher feed conveyor and delivered into a surge bin and feeder which delivers the oversize into a TC1000 cone crusher. After crushing this is then fed back onto the rinsing screen for further processing.

Sand plant:

Sand is then delivered to the 200tph sand plant for processing. This consists of a 4.3 x 1.8 sand dewatering screen, one 250/200 Linatex centrifugal pump and two G4-660mm

cyclones which produce the clean in specification concrete sand which is then delivered to a radial sand stocking conveyor.

The sand plant features:

- Polyurethane modules and side protection bars
- Moulded central division plate (double grade only)
- Rubber lined cyclones
- Ceramic lined inlet bends
- Rubber lined underflow boxes - c/w quick release lid
- Rubber lined blending box
- 5m (18') dirty water discharge height
- Rubber lined catch box for screen underflow
- Spray bar in catch box
- Polyethylene wear board in discharge chute
- Adjustable discharge blending chute – double grade only
- Pressure gauge to monitor cyclone inlet pressure
- High specification cyclone inlet hoses c/w flanges

Plant Control:

The whole plant is safely controlled by a 'cutting edge' control panel which features:

- Robust full colour graphic HMI (Human Machine Interface)
- Automated Start / Stop sequence of all plant items
- Automated sequence shutdown on fault detection
- On-screen display of all key Parameters inc:
 - Cyclone feed pressure
 - Hydraulic oil level and temperature
 - All motors load currents and voltages
- Radio control of:
 - Plant Start/Stop
 - Sand Conveyor Radial Drive
 - Tipping Grid Raise/Lower
 - Plant Lighting On/Off

The water and silt management system:

The water treatment plant at Dagenham receives dirty water from the washing plant where it clarifies and recycles the water and concentrates the sludge which is done by the addition of

a polymer. The whole process involves conditioning the dirty water from the cyclone overflow involving a prepared flocculent solution which once prepared is directed into the central feed shaft. At this stage a flocculent controller takes a sample and measures the settling speed.

This information is transferred to the PLC which automatically adjusts the flocculent dosing pump's flow (according to the settings entered during the commissioning stage) in order to optimise the flocculation efficiency and consumption. After each measure, the glass tube is automatically rinsed. (Samples taken with a vacuum system avoid the use of a pump which would distort the measure by breaking the 'flocs'). The optic cells also determine the turbidity of the recycled water and therefore adjust the coagulant dosing accordingly.

Sludge concentration and evacuation:

The sludge settles quickly at the bottom of the thickener where it is concentrated and gathered into the pumping cone due to the slow movement of the scraper. The sludge is then drawn by a pump located alongside the thickener tank. The sludge pumping cycles are controlled according to the measure of the resisting torque applied on the scraper and interpreted by the PLC. This gives reliable information about the quantity and consistency of the sludge at the bottom of the thickener and also offers a safety in case of "building up" inside the thickener. If an overload is detected by the inverter, the scraper is automatically and fully lifted to its upper position and then progressively lowered down to dilute the sludge.

The recycled overflowing waters are discharged into the water storage tank, where the plant feed water pump installed alongside the tank sends it back to the washing plant.

The technical room and static bridge:

The whole plant is controlled by the PLC with touch screen to display the synoptic and to give access to the settings. The main switch and control panel are located inside the technical room which is sited on the static bridge. This room also contains the flocculent preparation and dosing unit, the flocculation controller and the main switch and control panel, as well as the scraper driving unit and fresh water box.

David Whitby, CEMEX Unit Manager, commented, "The new fully automated water treatment system at Dagenham supplied by DUO has stopped the need to landfill silt and eliminate any waste that is produced from production. Having used many different water treatment systems in my 30 years of wharf production I have been so impressed with the ease of use and the elimination of any waste from production."

DUO is the official dealer for TWS in England and Wales and can offer a wide range of wash plants and water management solutions will help to revolutionize the washing market on a global level. This demonstrates TWS commitment to providing outstanding innovative products, customer support and expertise in the field to meet customers' individual needs, which is achieved through our global dealer network as well as our dedicated team of engineers, applications, sales, and marketing and aftersales technicians.