



Sims Smethwick_Operating Techniques_Appendix 4 Shredder Process Description V4

A dry shredding process (with 'smart water' injection) hammer mill fragmentiser, LYNXS 6000HP electric operated, continuous operation, 200 tonnes per hr capacity for treating non-hazardous (5.4 A (1) b) (iv)) & hazardous wastes for recovery (5.3 A (1) a) (ii)). Re Hazardous waste for recovery the actual daily treatment capacity for 5.3 A (1) a) (ii) is likely to be in region of approx. 200 tonnes based on current feed materials.

Additionally, the site permit restricts annual throughput to 374,999 for installation activities and 74,999 for non-installation waste activities.

The metal shredding plant and downstream plant and processes are specifically designed, commissioned and operated to be fit for purpose, considering physical hazards and including an assessment of the environmental risks and emissions from the plant and processes.

Feed stock is loaded into the fragmentiser plant via a hydraulic mobile crane fitted with scrap handling grab. All feed materials are placed onto the horizontal loading section of the infeed conveyor. The uppermost section of the Infeed Conveyor is provided with rubber curtains that extend over the infeed chute of the scrap shredder, plus a retractable mesh cage, to prevent uncontrolled ejection of high velocity fragments from the infeed chute of the shredder.

Feed materials fall by gravity from the head section of the infeed conveyor into the infeed chute of the Fragmentiser. A pair of hydraulically driven rollers control the ingress of feed material into the shredding chamber of the Fragmentiser.

The Fragmentiser is a top and bottom discharge Hammer mill. A cylindrical sixteen hammer rotor is driven at approximately 500rpm by a 6,000HP electric motor, within a heavily fabricated steel enclosure. A vibration isolation system (comprising spring dampeners) is fitted between the concrete stanchions (on which the fragmentiser is mounted) and the fragmentiser itself.

The shredding chamber of the fragmentiser is fitted with sizing grids and an ejection door for the safe removal of un-shreddable materials. A PLC controlled 'smart water' injection system is fitted for suppression of dust particles from within the fragmentiser. This system is adjustable and can be operated at >100% capacity in the event of a fire. Additionally, a separate dousing system can be operated in an emergency which floods the shredder exit belt with water.

Dust is further controlled by the 'First Air System' which draws airflow directly from the shredder hood (upper part of the shredder body), thus pulling all the very light dust particulates produced inside the shredder enclosure. This airflow (with its particulates) first passes through a cyclone, where the heaviest particulates are separated. These solids drop to the bottom of the cyclone, through a rotary air lock, and into dirt bay D1 via a short conveyor. The airflow then continues through a venturi pipe, where it is subjected to a first water spray, and from there to a plenum

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chamber where it is subjected to a second set of water sprays. All remaining particulates are thus captured in the water flow which then passes to the 'de-watering' section of the First Air System. Here, the solids are removed from suspension by a rotating de-watering screen, and the water re-circulated. The solids are discharged onto a conveyor to a second dirt bay. The airflow – now cleaned of particulates – passes through the fan and exhausts to atmosphere via stack designated A2. This stack is fitted with emission sampling points.

Scrap material entering the Fragmentiser is fragmented by rotating hammers and continues circulating in the shredder enclosure until small enough to leave by either the top or bottom sizing grids. Shredded material is then collated from the top and bottom grids onto a discharge shaker, and then onto conveyor C1. This material is then conveyed to 'Second Air System' to be separated into its constituent elements.

The shredded material falls by gravity from the top of C1 into a cascade box against an upward flow of air. ASR shredder waste is thus removed by this airflow. The ASR waste solids are separated from the airflow by a cyclone fitted with rotary air lock and is then sized into two size fractions by the waste trommel and drop into two waste bays. These two waste bays are covered and fitted with water sprays. Any very light metals pulled off by the air system are recovered by ferrous magnets (steel) and an eddy current separator (aluminium). The airflow then recirculates via the fan back to the cascade box.

The heavy materials not collected by the airflow (metals and heavy wastes) are then presented via shakers to two rotary magnets, which lift the ferrous metal onto conveyors. The ferrous flow is split into two, and passes through the picking station, where any remaining fluff attachments are removed, and copper armatures are picked. The finished ferrous product is then stockpiled via a radial stacking conveyor. The two rotary magnets are covered by an enclosure which is fitted with its own (mini) dust collection system. A fan pulls air from the magnet's enclosure, together with any particulates, and separates these particulates via a small cyclone / scrubber unit. This air system discharges to atmosphere via A1.

The non-magnetic material not picked by the rotary magnets drops onto secondary conveyors, passes a further scavenge magnet to check for any missed ferrous material, and then to the Non-Ferrous Residue (NFR) bay.

There is an appropriate regular inspection and maintenance programme covering all plant and equipment. This includes protective equipment such as water injection and cyclone systems, curtains and covers which are required to minimise fugitive releases.

Treatment of hazardous waste in shredder Installation (Section 5.3 A (1) a) (ii)) and treatment of non-hazardous waste in shredder installation (Section 5.4 A (1) b) (iv)

Treatment of hazardous waste for example pre-treated SMW / Pre-treated SMW residues, will undergo the same process as the treatment of non-hazardous waste, which was detailed above. Hazardous wastes are stored and processed separately to batches of non-hazardous waste.

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