

For description of shredder and plant process with options, please refer to section 1 (Foreword) of the proposal document.

[illegible]





## Plant Data and media requirements

- Production per hour and per Year:- 35-45 TPH; 172,350 TPY max production capacity.
- Charging material:- Mixed grades of scrap 0.3-0.75 T/m<sup>3</sup> density.
- Output materials:-
  - Shredded steel scrap density 1.1 T/m<sup>3</sup> average.
  - ASR (Auto shredder residue, waste and non ferrous mix)
  - Scavenged ferrous (Light weight, low quality steel material, high waste content)
  - Armatures (Copper windings, or copper with an attachment to a steel component)
  - Waste water from the shredder (May present as run off from the under mill shaker, but unlikely due to the low quantity of water used). Will most likely evaporate due to the temperature inside the shredder.
  - Waste from the Wet Scrubber (FUTURE UPGRADE ONLY). This once dried can be disposed of with the shredded waste.
  - Exhaust from Wet scrubber contains <20mg/m<sup>3</sup> of remaining particles (FUTURE UPGRADE ONLY).
- Water usage :-
  - Average 90 Ltrs/Hr.....Maximum 150 Ltrs/Hr. (Dependant up on material and waste content)
  - This water is for dust suppression within the shredder and is under manual control.
  - Cooling water for main drive motor, on a circulating system, top up water only.
  - LRS cooling on a closed loop system, top up only.
  - Top up of Wet scrubber settlement tank. (FUTURE UPGRADE ONLY).
- Water usage :- (Cleaning)
  - Plant cleaning, piped to several take off points. This water can be collected from ground water run off, in a lagoon or clean water from the mains.
- Water usage :- (Fire Suppression)
  - C1 conveyor. (In event of fire only)
  - ASR Bunker. (5 minutes per hour for prevention, shredder waste can smoulder, damping down prevents this)
- Noise:-
  - The noise output from the shredder will be around 113db at 1m from the shredder similar to the scrap handling equipment. Sound insulation if required shall be supplied by the buyer. It is extremely important that there is NO pedestrian access around the shredder area during operation within 15m. Picking staff should stay inside the enclosure unless the plant has been stopped.





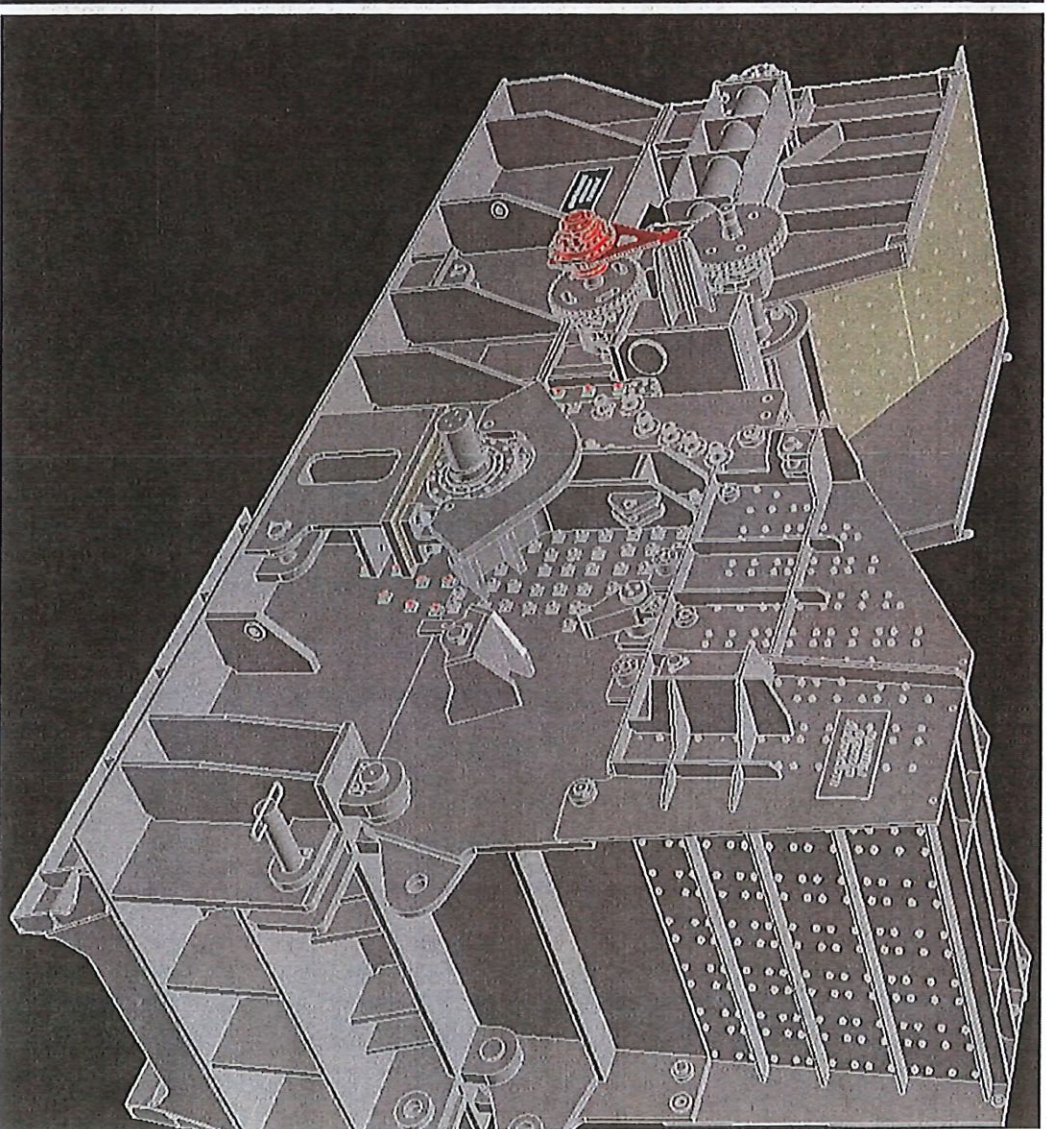
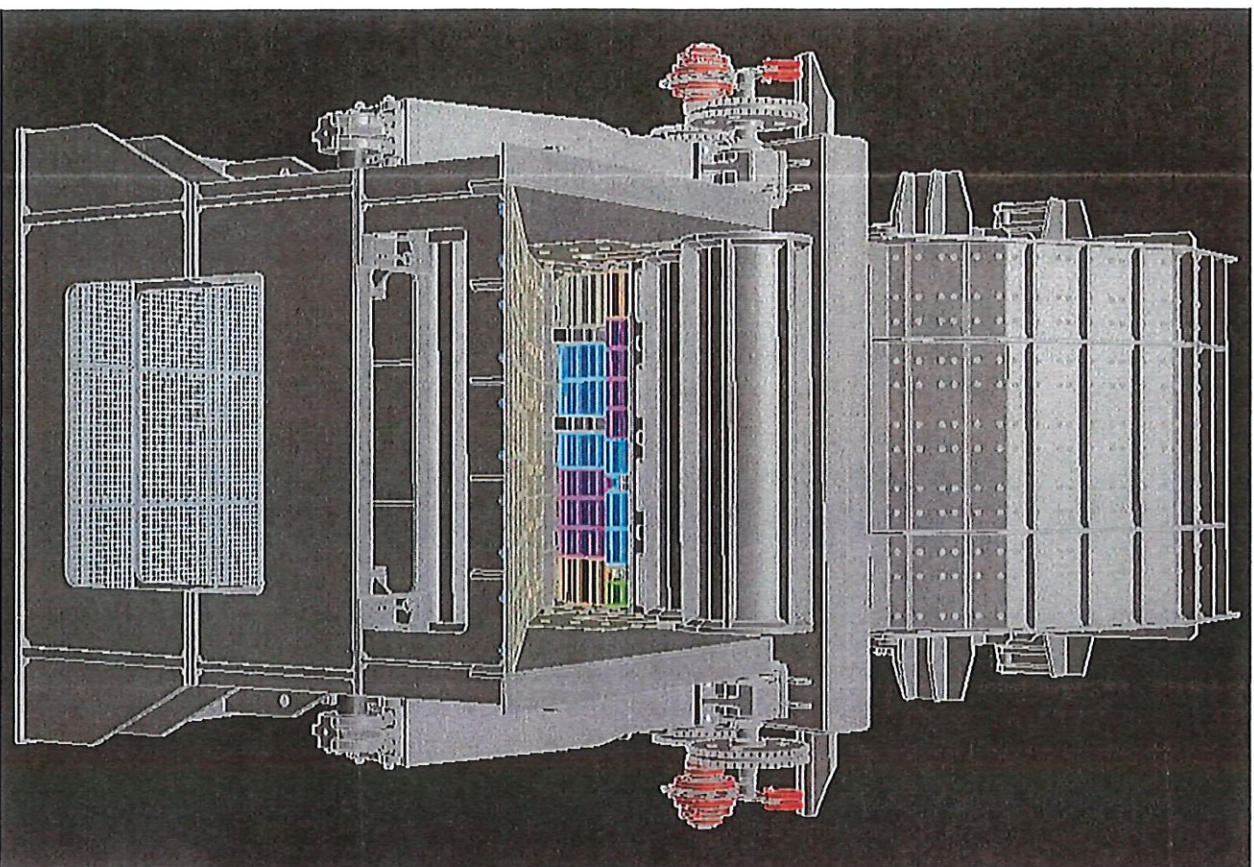
## Explanation of the plant

- The proposed plant is a DCR1827 shredder with a main drive of 1380Hp. The machine is for the reduction and liberation of mixed metal scrap into high quality separated metals appropriate for recycling in to new steel products.
- The production capabilities of this plant will be 35-45 Tonnes per Hour, with an average utilisation around 95% per day. (Utilisation can be aided by good general house keeping, by making sure interface build ups are cleaned at the end of each working shift).
- The plant features several material out fall points, including a shredded ferrous scrap stock pile, a bunker for ASR (Auto shredder residue, or similar material), a bunker for Ferrous material scavenged from the ASR, and a bunker for copper windings which may be recovered at the second drum magnet.
- The plant is foreseen for the future installation of an optional air system. When it is included, then an extra waste material is produced, in the form of slurry from the wet scrubber. This material is primarily made up of mud, (water and dust particles), but may also include ferrite particles and other materials broken down by the shredder. Once contained inside the slurry the material can be dried out and disposed of. The material exhausted back to atmosphere from the wet scrubber is primarily steam but may still contain small quantities of dust at around 20mg/m<sup>3</sup>.
- Water can be introduced into the shredder chamber as a means for controlling dust emissions at the throat of the shredder, water can also prevent a build up of dust inside the shredder, (Aluminium dust in particular can lead to explosions). Unlike other manufacturers, Danieli have full control of all water used, high pressure nozzles burst water into the shredder chamber at an interval from 5 seconds to second depending upon the level of dust the operator can see. This allows the system to be very efficient in terms of water usage. A probable figure for average water usage at the shredder would be 150 Ltrs/Hour.
- Water can also be piped around the plant to be tapped as required for cleaning the plant and preventing blockages, this water can come from a lagoon or the mains system, and is only used when required.
- Dust suppression is also advisable at the ASR bunker, as the material stored within can be subject to smouldering and flash fires. Dampening for a period of 5 minutes every hour can prevent fires from happening, and also significantly reduce airborne dust around the site.
- Staff required to operate the plant would number as follows, 1 plant driver for loading the tilt table, 1 shredder operator, 4-6 picking personnel, and a front end loader driver for bunker organisation, loading product etc. Naturally if more than 1 daily shift is to be utilised then these quantities of staff are multiplied.
- Maintenance personnel would include a foreman, a crane operator and 3 workmen inside the shredder, who are experienced fitters. In general, the picking staff are responsible for the upkeep of the plant in operation mode, and any blockages to conveyors which occur can be cleared by these staff. Emergency stop buttons and pull cords are fitted around the plant for the immediate stoppage of the plant, so build ups can be avoided and action taken.





## DCR Range of Heavy Duty Continuous Scrap Shredder

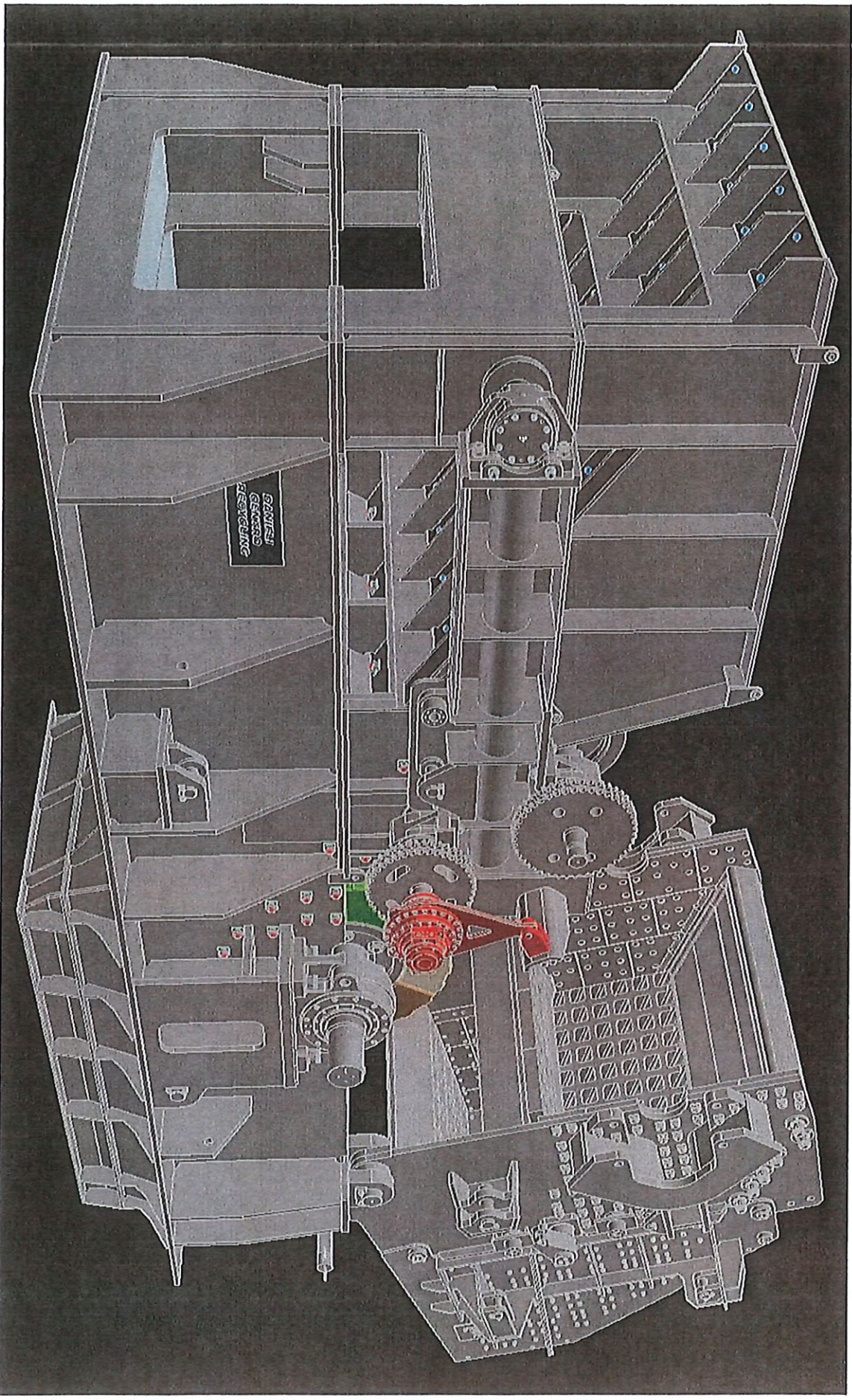


- (Above) The DCR1827, from 35-45T/Hr depending on drive.
- (Left) View down the DCR1827 throat, showing the shredder rotor





## DCR Range of Heavy Duty Continuous Scrap Shredder

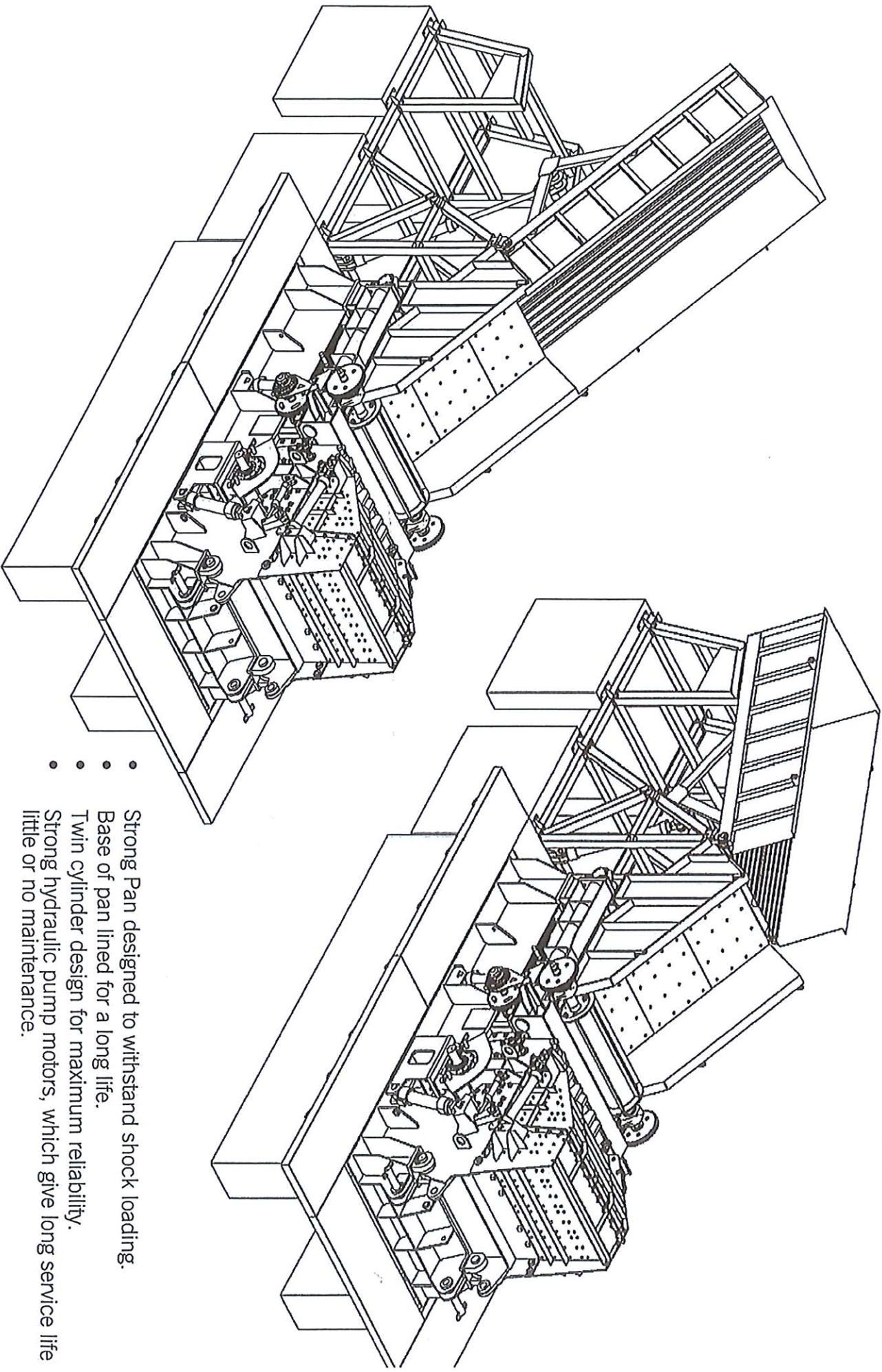


- View showing the DCR1827 open for rotor-maintenance. Shredder opens a full 75° allowing unhindered access for the hammer pin puller and crane.





## Infeed Tilt Table



- Strong Pan designed to withstand shock loading.
- Base of pan lined for a long life.
- Twin cylinder design for maximum reliability.
- Strong hydraulic pump motors, which give long service life little or no maintenance.





## Other Advantage

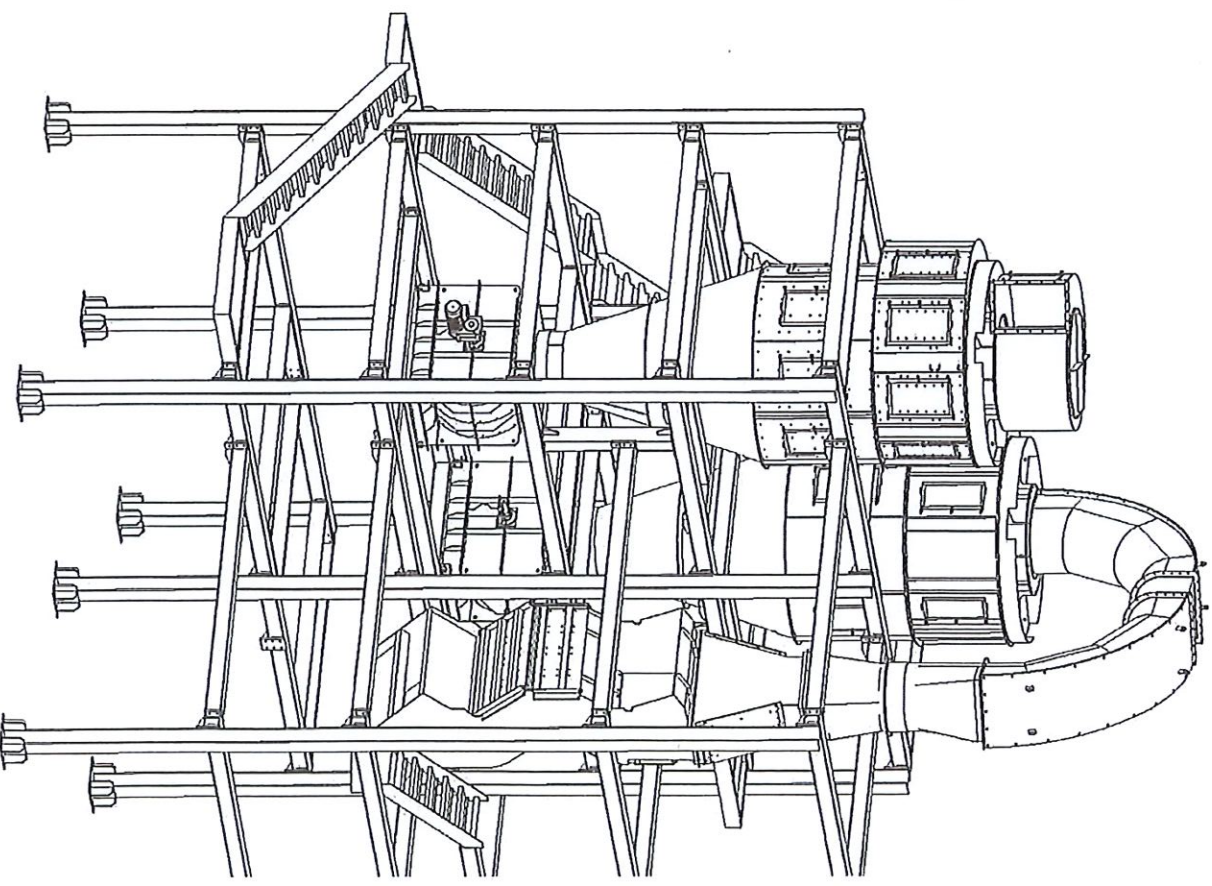
- Drive protection feature, automatically de-couples shredder drive in a stall condition. Protecting the drive from serious damage.
- Hydraulic coupling and damping of the rotor to the drive, by means of a variable fill fluid coupling.
- Fast acting reject door, for quick removal of unshreddable items which may damage the hammers and grids if not removed effectively.
- Integrated shredder control system, allows energy efficiency with maximum shredder utilisation.
- Plant management system which allows the user control over the whole plant, real time telemetry (trends) with integrated alarms and reports, runtime and downtime logging, production rate and total Tonnes display.
- Fully integrated safety protocols and maintenance management capabilities.
- New design of undermill transfer device allows constant delivery of material to the downstream with no material build up. Strongly built to resist explosions.
- Very well specified maintenance crane, will allow lifting in of the top grid, and decoupling of the rotor in preparation for grid changes.





## High Capacity Air Cleaning System - Future Expansion

- In order to give a more saleable, and pure ferrous product a cleaning air system can be included into the plant.
- The suction from a large fan, with draws light fraction waste which is banded free inside the triple drop cascade.
- Ordinarily this waste is then removed from the air stream by a cyclonic separator, which is fully lined in order to reduce wear.
- The fan is adjustable to suit the waste content which may be apparent across the range of feed stock material being shredded.
- It is always possible that small fraction or lightweight metallics can be withdrawn from the cascade also, this is not desirable, if this is the case the fan can be turned down to reduce the suction.
- If the cleanliness of the shredded scrap is paramount, then turning down the fan is not the right solution, it would be advantageous in this case to include a drop out box, (as shown connected to the cascade). This allows the best cleaning of the ferrous heavy shredded material, but allows the user to reclaim the light metallics from the waste stream, saving wear in the cyclone as a beneficial result.

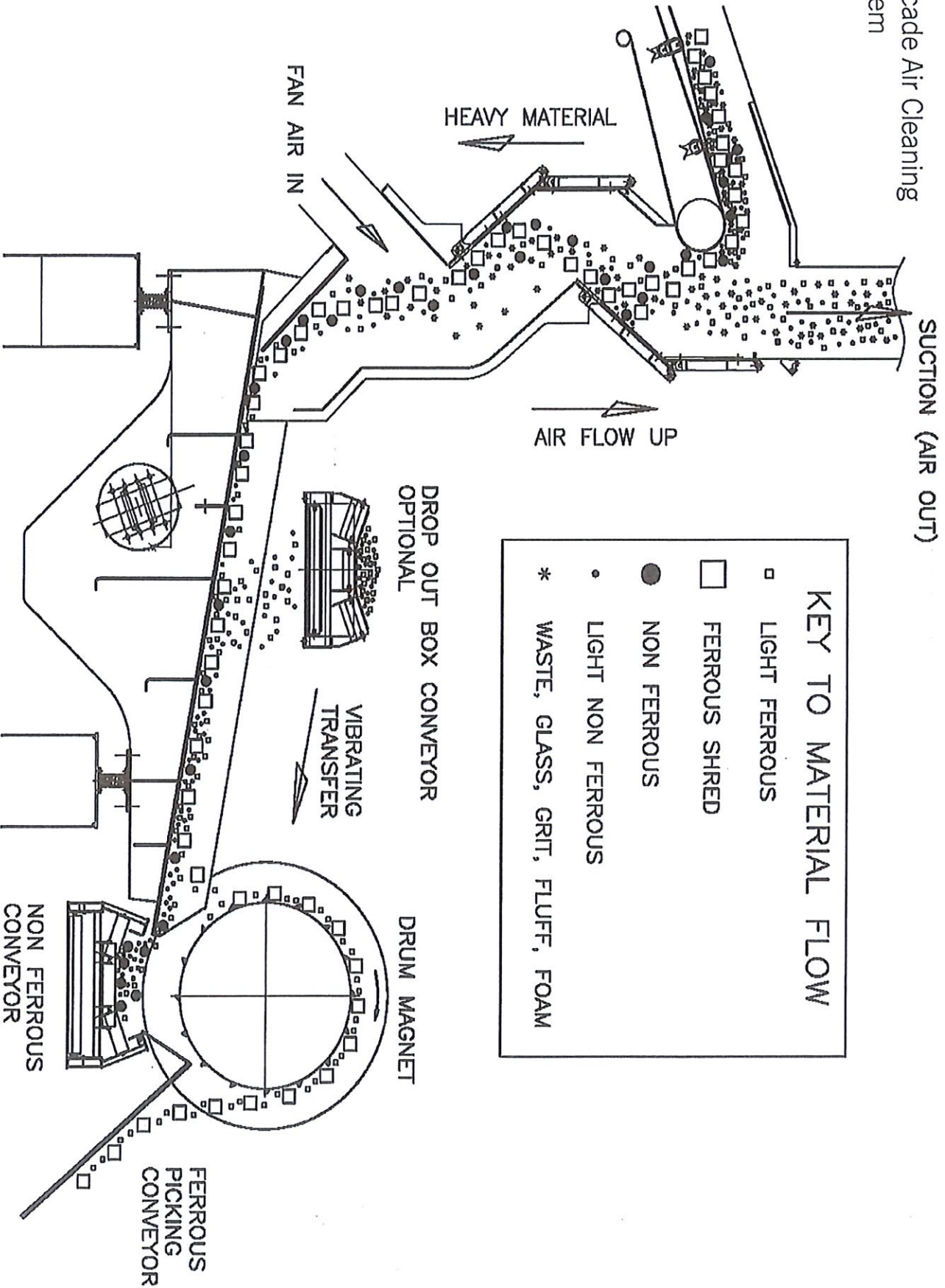






## Air Cleaning Illustrated – Future expansion

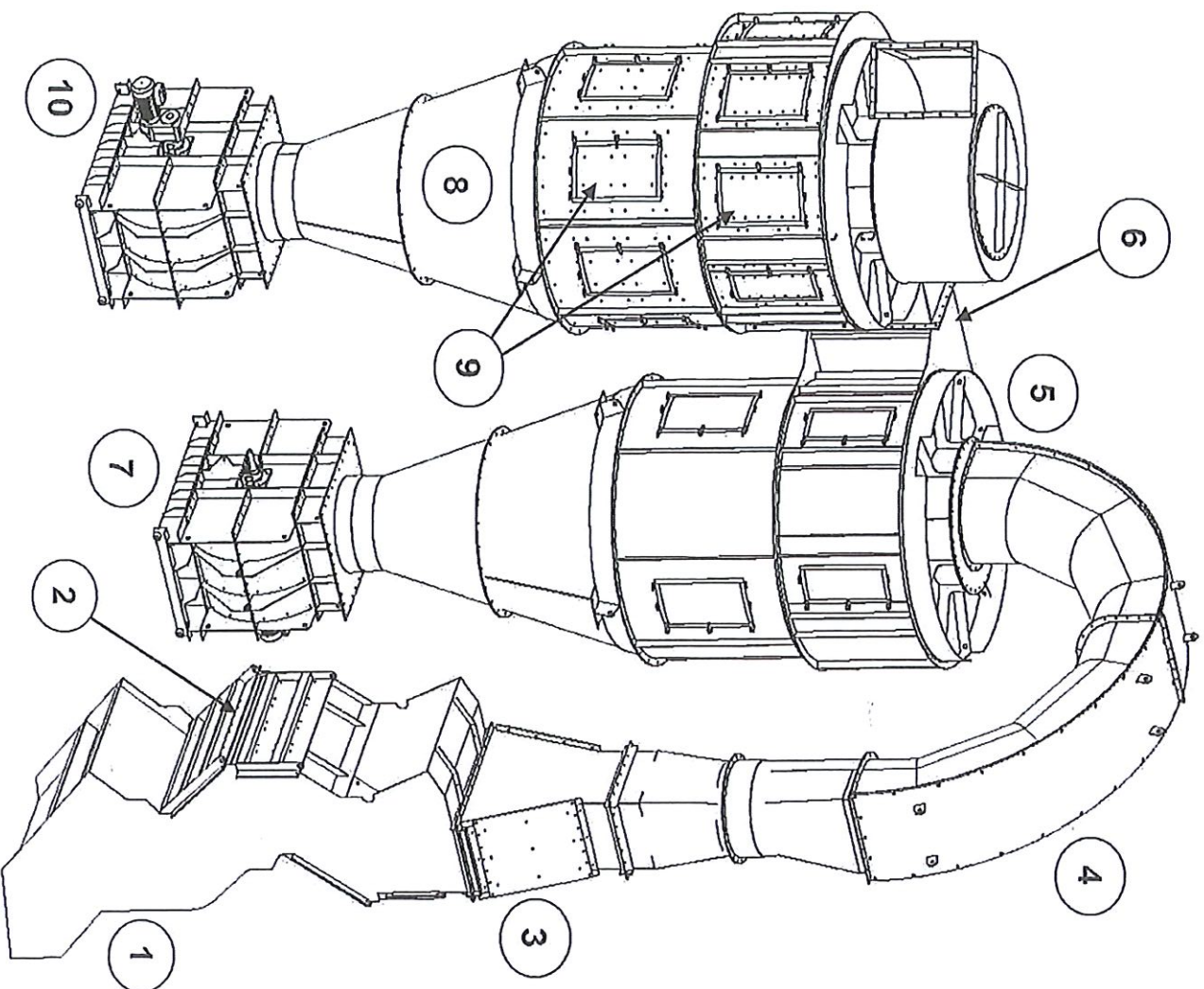
- Cascade Air Cleaning System







## Main Air System Components – Future Expansion



1. Triple Drop Cascade Unit
2. Cascade access hatch
3. Suction cone with double access hatches.
4. Smooth ducting bends, which allow a more refined flow with less eddies, and hence less internal wear
5. Drop out box inlet tube
6. Drop out box Outlet with access hatches.
7. Drop out box rotary Valve, forms an effective seal against air leakages, maintaining system efficiency.
8. High through put, cyclone, for the collection and separation of dust, fluff, and small foam pieces.
9. Cyclone body is fully accessible, there is no need to clean from the inside.
10. Cyclone rotary valve, deposits waste for transport to storage bunker, whilst maintaining an air tight seal.

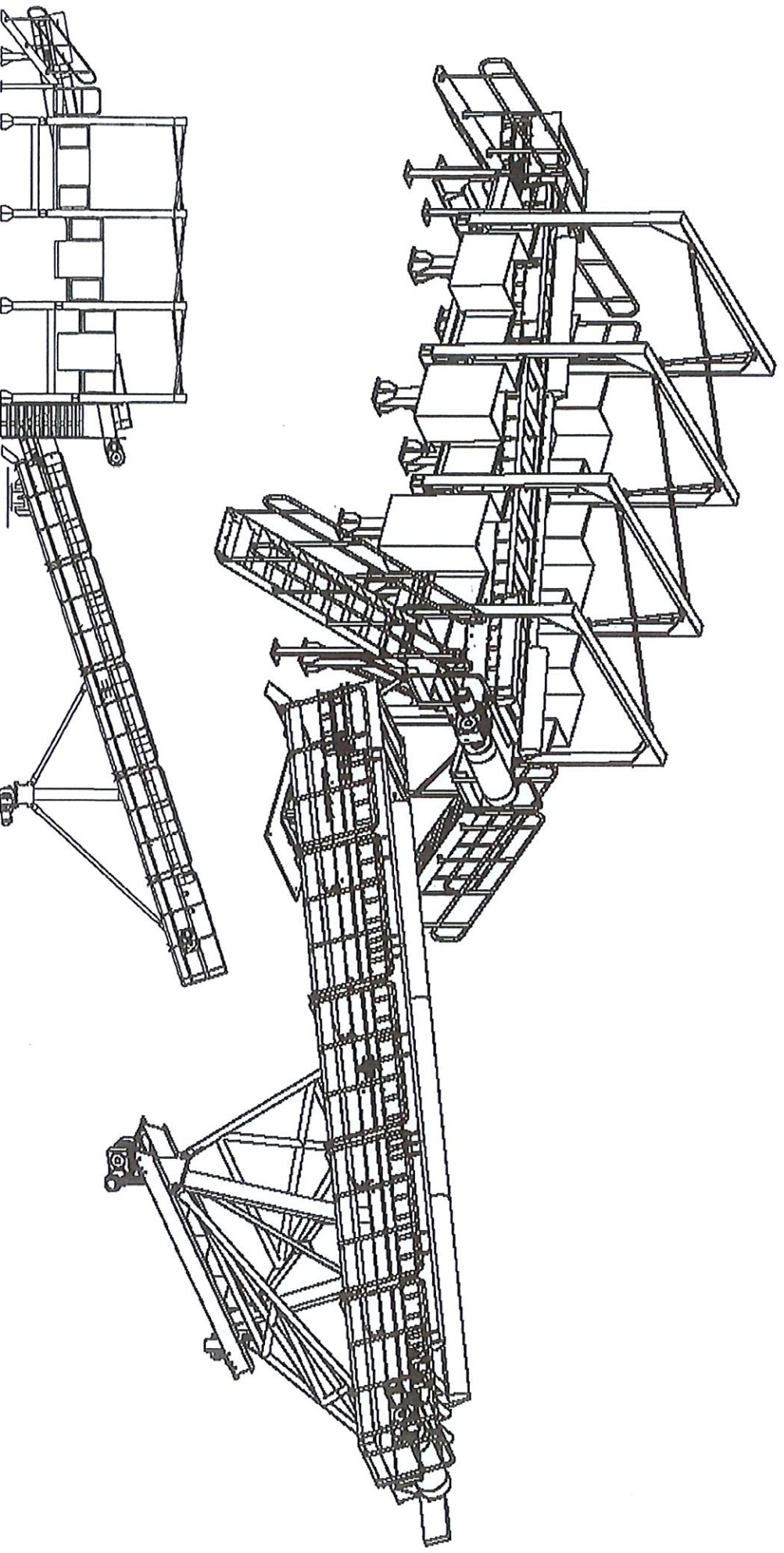
*(Drop out box is not specified as part of the proposal. Cascade connected directly to the cyclone as a closed loop with the Venti Oelde v scrubber preventing dust saturation).*





## Downstream conveyors

- Conveyors are constructed specifically to transfer shredded scrap, and include all guards for safety of personnel, and walkways for access and maintenance.
- All feed boots and chutes are configured to promote the flow of material and prevent blockages.







## Explanation of the plan

- The proposed plant is a DCR1827 shredder with a main drive of 1380HP. The machine is for the reduction and liberation of mixed metal scrap into high quality separated metals appropriate for recycling in to new steel products.
- The production capabilities of this plant will be 35-45 Tonnes per Hour, with an average utilisation around 95% per day. (Utilisation can be aided by good general house keeping, by making sure interface build ups are cleaned at the end of each working shift).
- The plant features several material out fall points, including a shredded ferrous scrap stock pile, a bunker for ASR (Auto shredder residue, or similar material), a bunker for Ferrous material scavenged from the ASR, and a bunker for copper windings which may be recovered at the second drum magnet.
- The plant is foreseen for the future installation of an optional air system. When it is included, then an extra waste material is produced, in the form of slurry from the wet scrubber. This material is primarily made up of mud, (water and dust particles), but may also include ferrite particles and other materials broken down by the shredder. Once contained inside the slurry the material can be dried out and disposed of. The material exhausted back to atmosphere from the wet scrubber is primarily steam but may still contain small quantities dust at around 20mg/m<sup>3</sup>.
- Water can be introduced into the shredder chamber as a means for controlling dust emissions at the throat of the shredder, water can also prevent a build up of dust inside the shredder, (Aluminium dust in particular can lead to explosions). Unlike other manufacturers, Danieli have full control of all water used, high pressure nozzles burst water into the shredder chamber at an interval from 5 seconds to second depending upon the level of dust the operator can see. This allows the system to be very efficient in terms of water usage. A probable figure for average water usage at the shredder would be 150 Ltrs/Hour.
- Water can also be piped around the plant to be tapped as required for cleaning the plant and preventing blockages, this water can come from a lagoon or the mains system, and is only used when required.
- Dust suppression is also advisable at the ASR bunker, as the material stored within can be subject to smouldering and flash fires. Dampening for a period of 5 minutes every hour can prevent fires from happening, and also significantly reduce airborne dust around the site.
- Staff required to operate the plant would number as follows, 1 plant driver for loading the tilt table, 1 shredder operator, 4-6 picking personnel, and a front end loader driver for bunker organisation, loading product etc. Naturally if more than 1 daily shift is to be utilised then these quantities of staff are multiplied.
- Maintenance personnel would include a foreman, a crane operator and 3 workmen inside the shredder, who are experienced fitters. In general, the picking staff are responsible for the upkeep of the plant in operation mode, and any blockages to conveyors which occur can be cleared by these staff. Emergency stop buttons and pull cords are fitted around the plant for the immediate stoppage of the plant, so build ups can be avoided and action taken.





## Plant Data and media requirements

- Production per hour and per Year:- 35-45 TPH; 172,350 TPY max production capacity.
- Charging material:- Mixed grades of scrap 0.3-0.75 T/m<sup>3</sup> density.
- Output materials:-
  - Shredded steel scrap density 1.1 T/m<sup>3</sup> average.
  - ASR (Auto shredder residue, waste and non ferrous mix)
  - Scavenged ferrous (Light weight, low quality steel material, high waste content)
  - Armatures (Copper windings, or copper with an attachment to a steel component)
  - Waste water from the shredder (May present as run off from the under mill shaker, but unlikely due to the low quantity of water used). Will most likely evaporate due to the temperature inside the shredder.
  - Waste from the Wet Scrubber (FUTURE UPGRADE ONLY). This once dried can be disposed of with the shredded waste.
  - Exhaust from Wet scrubber contains <20mg/m<sup>3</sup> of remaining particles (FUTURE UPGRADE ONLY).
- Water usage :-
  - Average 90 Ltrs/Hr.....Maximum 150 Ltrs/Hr. (Dependant up on material and waste content)
  - This water is for dust suppression within the shredder and is under manual control.
  - Cooling water for main drive motor, on a circulating system, top up water only.
  - LRS cooling on a closed loop system, top up only.
  - Top up of Wet scrubber settlement tank. (FUTURE UPGRADE ONLY).
- Water usage :- (Cleaning)
  - Plant cleaning, piped to several take off points. This water can be collected from ground water run off, in a lagoon or clean water from the mains.
- Water usage :- (Fire Suppression)
  - C1 conveyor. (In event of fire only)
  - ASR Bunker. (5 minutes per hour for prevention, shredder waste can smoulder, damping down prevents this)
- Noise:-

The noise output from the shredder will be around 113db at 1m from the shredder similar to the scrap handling equipment. Sound insulation if required shall be supplied by the buyer. It is extremely important that there is NO pedestrian access around the shredder area during operation within 15m. Picking staff should stay inside the enclosure unless the plant has been stopped.