MLR System, Lead market:

- Based on our Zinc furnaces we have developed a furnace dedicated to Lead recovery .
- Important criteria's were:
  - Automated process
  - Easier handling of the drums, (un)loading
  - No dust generation
  - Option to cast small ingots

➔ Metaullics Lead Recovery furnace ➔ MLR-1500

Pyrotek - MLR Metaullics Lead Recovery System

The MLR System is a thermo-mechanical device to separate free Lead metal in small particulate from material mixtures generated during the lead casting, and other molten metal processes.

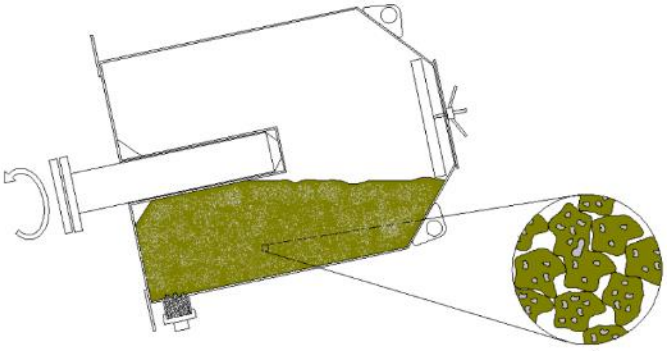
The MLR System increases the value of the lead skimmings by recovering the free lead available and returning "purified" residues that have commercial value to a trader or recycler.

MLR-1500

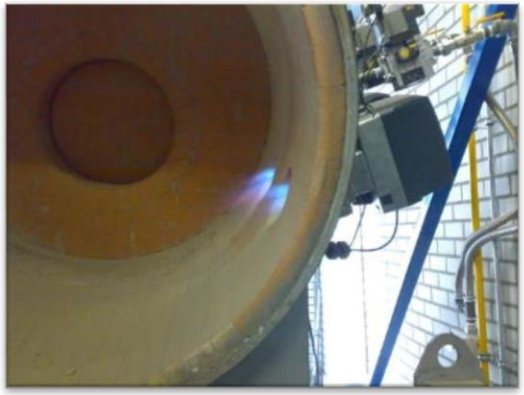
MLR – Processing steps

- Collecting skimmings in the drum and placing it in the MLR furnace

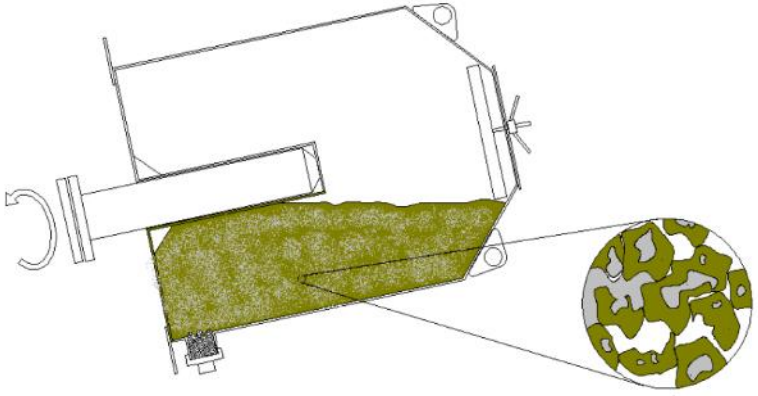
- The drum contains a granular mixture of lead particles and oxides



MLR – Processing steps



- Drum is slowly rotated while indirect heat is applied
- Lead particles begin to melt and flow together



Increasing Metal Plant Efficiency by Utilizing MLR Technology

Current procedures for refining skimmings and dross

- Ball mill / Grinding / Sieving (dust generation)
- Low-efficiency remelting (large surface area)
- Manual working or raking
- Direct sale to a trader at reduced value.

Typical lead plant skimmings (dross)

Increasing Metal Plant Efficiency by Utilizing MLR Technology

- **MLR Systems are operated now at several different Lead melting operations including some of the main Global Battery producers.**

60-75% Lead recovery

40-25% Residue

Pyrotek®

Increasing Metal Plant Efficiency by Utilizing MLR Technology

What are the main advantages of the MLR System over other options ?

MLR Lead Recovery – Main Advantages

1) Increased In-house recovery of lead

Dross at 65% recovery will return 65 tonnes of lead from 100 tonnes of dross generated.
Savings on LME premium for 65 tonnes of lead $$
Savings on alloy premium, as metal is in spec. $$
Savings on transport of Lead into plant $$
Savings on transport of Lead dross from the plant $
Residue powder has commercial value $$

Note: The exact recovery rate for each plant may be different and all variables in your process need to be evaluated thoroughly.

MLR Lead Recovery – Main Advantages

2) MLR residue goes out for sale, while plant retains metal for reuse.

- With metallic lead removed, 65%+ reduction in material being shipped out for reprocessing.

- Energy savings by recovering In house, Vs. energy required to produce new metal

- Reduced generation of new dross formation due to re-melting Ingot Vs. low efficiency re-melt of small metal pieces.
-MLR unit offers a oxygen starved environment with a covering layer of powder.

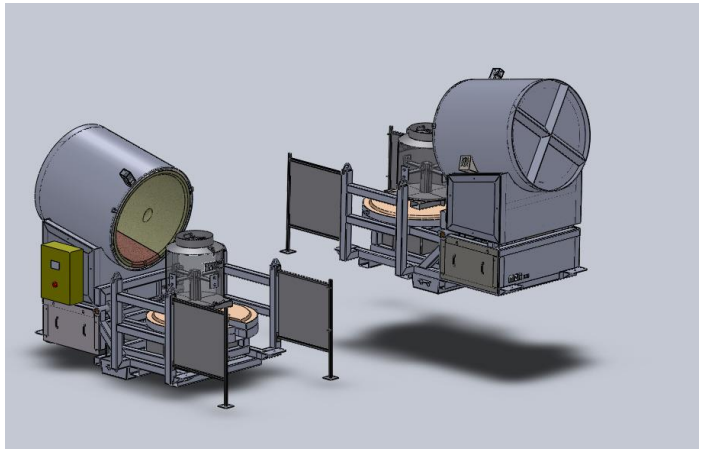
MLR Lead Recovery – Main Advantages

3) Less high grade Lead is needed to be purchased to meet normal production.

4) The MLR output can be valued at full LME value per Kg recovered

5) Alloying in the MLR is possible, reducing cost.

MLR Lead Recovery – Main Advantages



6) Different types of dross can be processed

- With the batch processing of the MLR, dross from alloying furnace and elsewhere can be segregated.

- Can process negative and positive grids separately

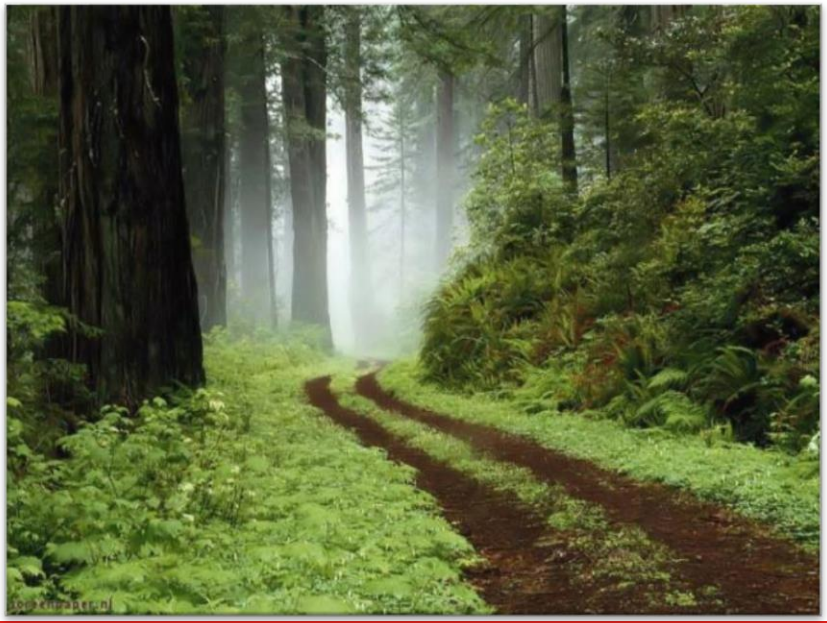
- MLR is also effective for processing Lead-Antimony, Bismuth and other alloy drosses.

-MLR is simple to install and operate, fully portable

MLR Lead Recovery – Main Advantages

7) MLR is more environmentally friendly process and reduces the plant waste footprint !!

- MLR System facilitates less reprocessing of the same material allowing less energy-consumption per tonne production and reduced carbon output per tonne



MLR Lead Recovery – Main Advantages

8) MLR has low investment and operating costs with minimal labor input.

- MLR System has a low capital cost and is maintenance friendly for reliable, repeatable, economic operation.
-Allows for Lead recovery from dross 'Offline' from main production process, enhancing plant capacity and efficiency.

Increasing Metal Plant Efficiency by Utilizing MLR Technology

MLR – gives much weight to your dross…..

The benefits of Lead recovery using an MLR System vastly outweigh the constraints of capital costs and changes in existing processes.

And provide immediate impact to your bottom-line profits!

Pyrotek®

Increasing Metal Plant Efficiency by Utilizing MLR Technology

Conclusions:

- Over the past decade, the MZR System has a proven track record at over 375 metal processing plants around the world to reduce metal loss and enhance plant profitability. Based on this Zinc furnace we have developed the MLR dedicated to Lead recovery

- Processing Lead dross through an MLR System can potentially provide an immediate increase in overall plant competitiveness, production and make the processes more efficient at the same time.

- The MLR System has the potential to improve business performance while being environmentally positive.

Pyrotek - MLR Metaullics Lead Recovery System

Can the MLR System be utilized in a Lead Battery, Secondary remelt or Recycler to increase total plant capacity and plant profitability?

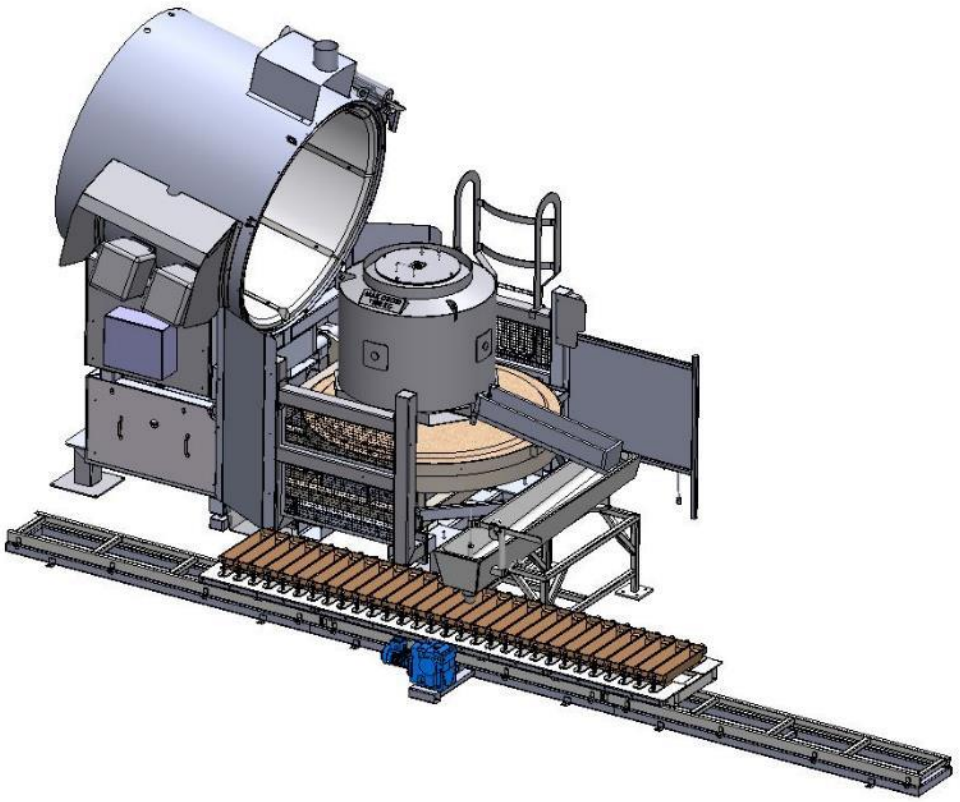
YES, it can!

Appendix

Additional equipment info

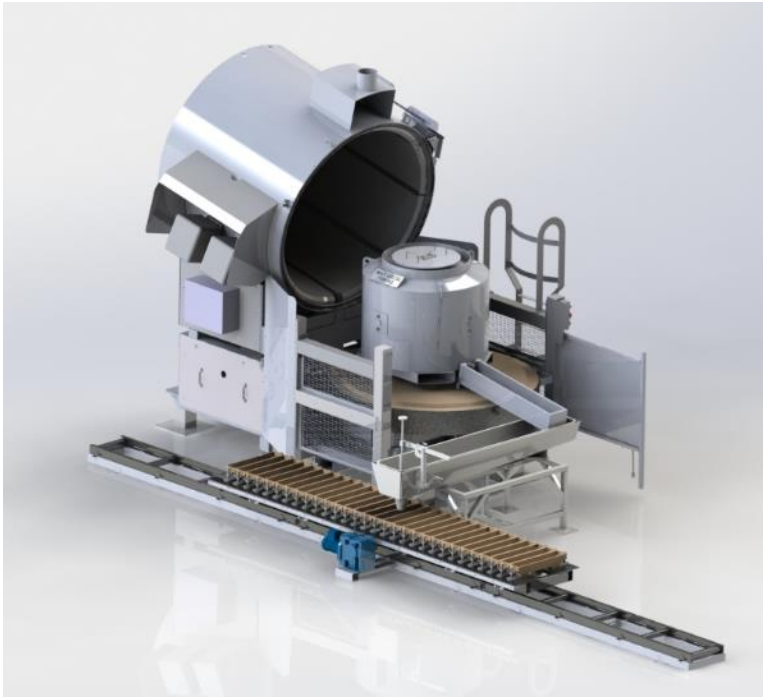
Ingot Casting Machine

- A Ingot Casting Machine can be supplied with the MLR furnaces
- 40 kg ingots weights
- 15 to 30 mold machines
- No manual lifting of ingots required by using collapsible site molds or lifting eye inserts

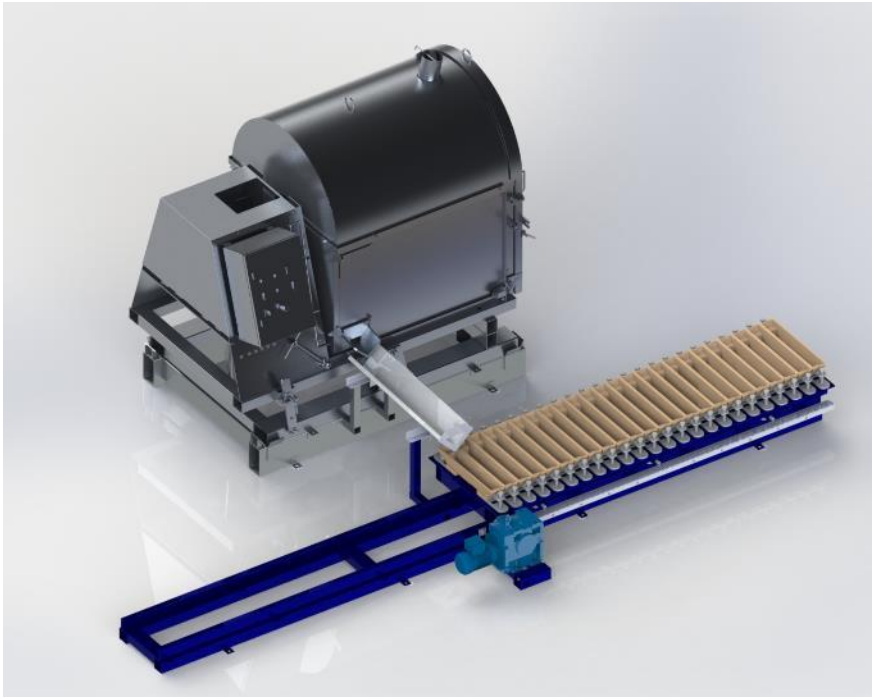


Increasing Metal Plant Efficiency by Utilizing MLR Technology

Ingot Casting Machine



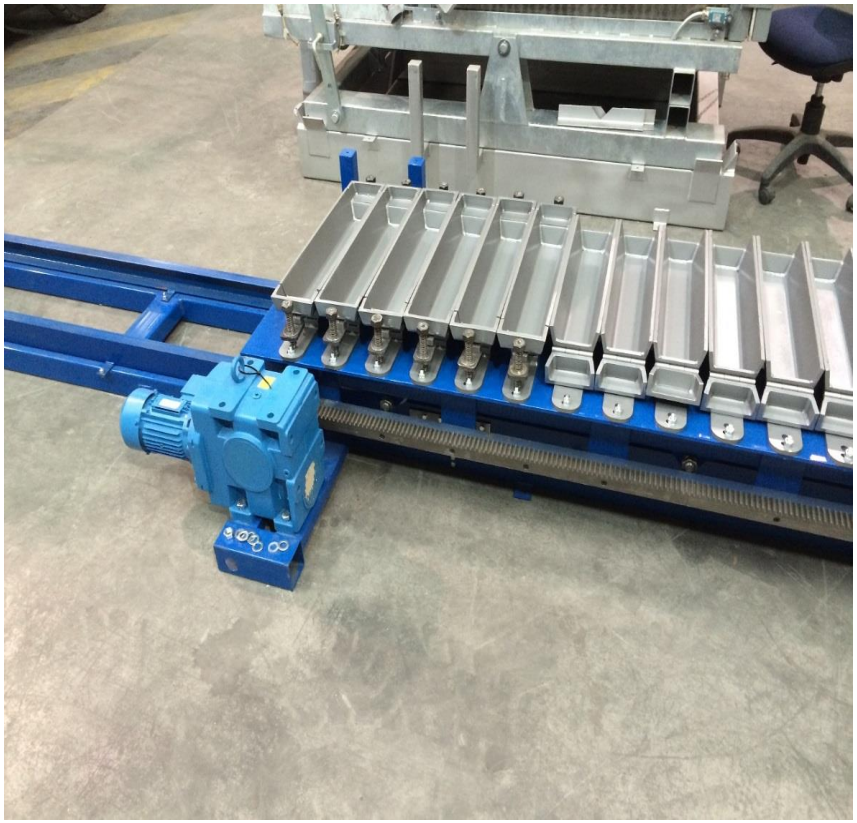
MLR1500



MLR750

Innovative Ergonomic Design (OHS&E)

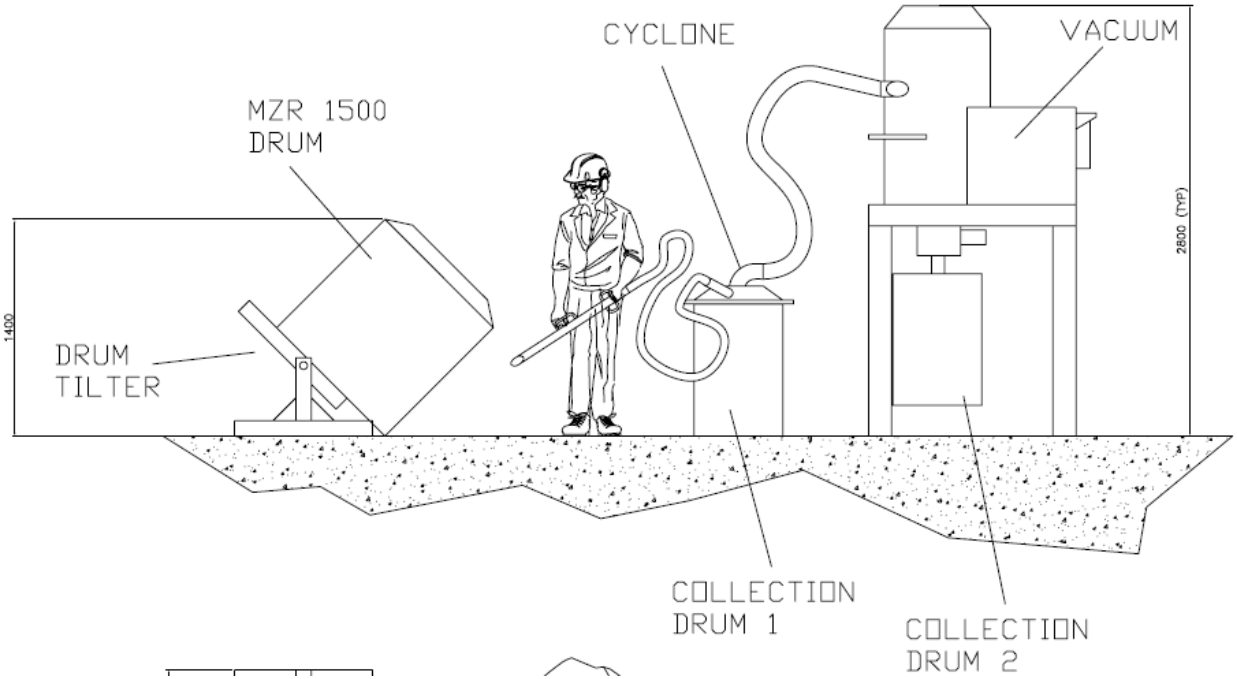
Positive close design



Drop down ends for jib crane handling

Residue Vacuum System

- A Vacuum System can be supplied to remove the residue out off the drums after Lead has been tapped out
- Residue is a fine Lead-Oxide powder



Increasing Metal Plant Efficiency by Utilizing MLR Technology

Residue removal system with extraction

Dust Minimisation

- Operator ease
- Barrel position variable for comfort
- Ergonomic platform to handle barrel and reduce worker fatigue.

Typical Lead Battery Alloys

- -Antimonial Lead Alloys with up to 4% antimony (Sb) is commonly used by battery manufacturers to produce finished batteries.
- Calcium (Ca) Lead Alloys are commonly used by battery manufacturers to produce finished batteries.
- Calcium is lost during the re-melting of Ca Lead alloy (via normal open re-melt or through the MLR. Typically around 90% of the calcium is lost during metal recovery. New Calcium needs to be added back into the metal to get the alloy back to specification.
- All other elements like Sb, Sn and Al remain in the recovered Lead.
- The MLR Process can be utilized to alloy the metal.