

# Spent Pot Lining

**Alternative Fuel & Raw Material for Cement Industry**  
**Roundtable Conference on use of SPL in cement Co-processing**

22<sup>nd</sup> September 2015



# Vision

*"World largest, Environmentally Best, Safest & Globally Benchmarked Integrated Aluminium Business, to be the Pride of Stakeholders & Community at large"*



*Towards Zero Harm to People and Environment*

## Cement Industry

- Availability of Raw Material viz. Limestone, Clay, Bauxite,
- Cheap and alternative fuel
- Reduction in Green House Gas Emissions- Contributing nearly 6-8% of world CO2 emissions
- Falling commodity prices
- Stringent Environmental norms

## Aluminium Industry

- Availability of Raw Material viz. Bauxite & Coal
- Disposal of Red Mud, SPL and Fly Ash
- Reduction in Energy Consumption
- Falling commodity prices
- Stringent Environmental norms

- **Basic Ingredients of Cement Industry**

<input type="checkbox"/> Calcium ( Limestone)		<b>60-65%</b>	
<input type="checkbox"/> Silicon	}	<b>20%</b>	
<input type="checkbox"/> Aluminium		<b>Clay+ Sand</b>	<b>10%</b>
<input type="checkbox"/> Iron			<b>5%</b>

- **Fuel for Cement Industry** - Predominantly Coal.

- **Waste from Aluminium Industry**

<input type="checkbox"/> <b>Red Mud</b>	Source of Iron, Alumina, Silica & sodium or
<input type="checkbox"/> <b>Spent Pot Lining</b>	Source of Carbon (fuel) and mineralizer/fluorides
<input type="checkbox"/> <b>Fly Ash</b>	Source of Alumina, silica

**FACT:** Cement produced using Red Mud + Fly Ash + Lime + Gypsum+ SPL have the following advantages:

- ❖ Reduced Energy Consumption by reducing clinkering temperature
- ❖ Improve Early Strength of Cement
- ❖ Improve Resistance to Sulphate
- ❖ Excellent absorbent for SO<sub>2</sub>

By Collaborating, AI & Cement Industries can reduce ecological footprint and enlarge social role

Typical Spent Pot Lining Composition		
Component	Amount	Major Phases
Fluorides (wt.%)	6-10	$\text{Na}_3\text{AlF}_6$ , NaF, $\text{CaF}_2$
Cyanides (ppm)	500-600	NaCN, $\text{NaFe}(\text{CN})_6$
Aluminium total (wt%)	15-20	$\text{Al}_2\text{O}_3$ , $\text{NaAl}_{11}\text{O}_{17}$
Carbon (wt%.)	40-50	Graphite
Sodium (wt.%)	15-20	$\text{Na}_3\text{AlF}_6$ , NaF
Aluminium Metal (wt.%)	<1.0	Metal
Calcium (wt.%)	<1.0	$\text{CaF}_2$
Iron (wt.%)	2-3	$\text{Fe}_2\text{O}_3$
Moisture (wt. %)	1-2	
Titanium (wt.%)	<0.2	$\text{TiB}_2$
GCV, Kcal/Kg	3800-4500	

**SPL has been classified as Hazardous Waste mainly due to :**

- Toxic fluoride and cyanide compounds that are leachable in water
- Corrosive - exhibiting high pH due to alkali metals and oxides and
- Reactive with water - producing inflammable, toxic and explosive gases

		<b>Jharsugurha</b>	<b>BALCO, Korba</b>
<b>Aluminium –</b>	<b>Present</b>	500,000TPA	240,000 TPA
	<b>Future</b>	17,50,000TPA	600,000 TPA
<b>SPL –</b>	<b>Present</b>	15,000 TPA	6000 TPA
	<b>Future</b>	40,000 TPA	12,000 TPA
<b>SPL Treatment –</b>	<b>Present</b>	Secured Landfill	Secured Landfill
	<b>Future</b>	Recycling/ Disposal	Recycling/ Disposal



- A. Disposal techniques i.e Complete destruction of SPL like:
- Power Generation using Plasma, Microwave or conventional
  - Slag additives in iron and steel industry
  - Fuel and mineral supplement in cement manufacture
  - Red brick industry
  - Conversion to inert landfill materials
  - Flux in Copper and Nickle Smelting
- B. Recovery or recycling techniques :
- Fluoride recovery from leaching processes
  - Pyrohydrolysis
  - Pyrosulfolysis
  - Silicopyrohydrolysis
  - Graphite recovery
  - Cathode carbon additives
  - Anode carbon additives

Recycling is an attractive and proven option; Best may be Cement Industry

*“Aluminium is a green metal and Cement is the necessity for overall development . By utilizing wastes of Aluminium Industry as an alternative Fuel/ Raw material in Cement industry, both the Industries can ensure Sustainable Development”*

*.....Let us join hand*

**THANK YOU**

