Study on
REVIEW OF THE INDIAN COPPER RECYCLING INDUSTRY

Conducted for
INTERNATIONAL COPPER STUDY GROUP

Presentation by
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CEO
INDIAN COPPER DEVELOPMENT CENTRE
OBJECTIVE
To review the status of Cu & Cu alloy recycling in India (2005-06 to 2007-08) through Primary Research to enable ICSG to improve

• Consistency, coverage & accuracy of scrap statistics

• Current knowledge on demand / supply, and international trade barriers / incentives as also effect of tariffs / subsidies / non-commercial regulations on international trade / scrap usage

• Future research plan based on survey findings
SCOPE OF THE STUDY
FOCUS AREAS

STASTICAL DATA

• Overview of Indian copper industry
• Types & quality of scrap used
• Scrap supply source
• Technology followed for scrap recycling
• Profile of the scrap recycling industry
• Scrap usage data (past 3 years)
• Trade in scrap – local and imported
• Approximate market price

Contd…
FOCUS AREAS

- REGULATIONS
  - Fiscal policy change during past 3 years
  - Scrap specific trade policy – if any
  - Environmental / Pollution regulations

- FUTURE TREND
  - Scrap market for 2008-09 and 2009-10
  - Effects of
    - Regulation
    - Technology
    - Changed pattern of quality demand
    - New/expanded market for copper
    - Substitution
METHODOLOGY
ADOPTED
PRELIMINARY DESK RESEARCH
- Scanning of secondary information available

PRIMARY SURVEY
- Identification of target sectors
- Data base preparation for communication
- Sector specific questionnaire design
- Circulation of questionnaire
- Follow up through e-mail / telephone / visit
- Analysis of collected data / information
- Cross-checking of data (need based) with respondents and experts
- Draft Report preparation & submission
## TYPICAL PAST DATA

(rounded off to nearest ’000 tonnes)

<table>
<thead>
<tr>
<th>Year</th>
<th>Refined Copper Production</th>
<th>Total Copper Usage</th>
<th>Net Copper Scrap Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>265,060</td>
<td>484,000</td>
<td>206,000</td>
</tr>
<tr>
<td>2001-02</td>
<td>305,519</td>
<td>495,000</td>
<td>173,000</td>
</tr>
<tr>
<td>2002-03</td>
<td>351,731</td>
<td>490,000</td>
<td>240,000</td>
</tr>
<tr>
<td>2003-04</td>
<td>395,862</td>
<td>520,000</td>
<td>224,000</td>
</tr>
<tr>
<td>2004-05</td>
<td>415,009</td>
<td>550,000</td>
<td>253,000</td>
</tr>
</tbody>
</table>

Source: Preliminary Desk Research
PRIMARY SURVEY FINDINGS

based on

Contacts : 201
Feedback Received : 116
INDIAN COPPER DEVELOPMENT CENTRE
COPPER & COPPER ALLOY RECYCLING

1. Name of Organisation:

2. Products Manufactured (material & product form, viz., solid round, solid sections, hollow round, hollow sections):

<table>
<thead>
<tr>
<th>Material</th>
<th>Product Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper (e.g., ETP, DHP, etc.)</td>
<td></td>
</tr>
<tr>
<td>Copper Alloys (e.g., Brass, P-Bronze, etc.)</td>
<td></td>
</tr>
</tbody>
</table>

3. Installed capacity and expansion plan if any:

<table>
<thead>
<tr>
<th>Present Production Capacity (tpy)</th>
<th>Expansion of Capacity (tpy) by year (if any plan exists)</th>
</tr>
</thead>
</table>

4. Raw material used:

<table>
<thead>
<tr>
<th>Material</th>
<th>% of Total Raw Material Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingot</td>
<td></td>
</tr>
<tr>
<td>Copper cathode</td>
<td></td>
</tr>
<tr>
<td>Process scrap</td>
<td></td>
</tr>
<tr>
<td>Customer return scrap</td>
<td></td>
</tr>
<tr>
<td>Bought out local scrap</td>
<td></td>
</tr>
<tr>
<td>Bought out imported scrap</td>
<td></td>
</tr>
<tr>
<td>Indicating grade like birch, berry, honey, etc.</td>
<td></td>
</tr>
</tbody>
</table>

5. What is the average % yield (raw material to finished product):

<table>
<thead>
<tr>
<th>Type of Products</th>
<th>Average Yield %</th>
</tr>
</thead>
</table>

6. Average quantity of copper bearing solid scrap and waste generated as % of total input material used:

<table>
<thead>
<tr>
<th>Type of Scrap / Waste Generated</th>
<th>Quantity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billet cropping</td>
<td></td>
</tr>
<tr>
<td>End cuts</td>
<td></td>
</tr>
<tr>
<td>Process rejects</td>
<td></td>
</tr>
<tr>
<td>Inspection reject</td>
<td></td>
</tr>
<tr>
<td>Slag, dross (Cu %)</td>
<td></td>
</tr>
<tr>
<td>Flux &amp; floor dust (Cu %)</td>
<td></td>
</tr>
<tr>
<td>Oxide scale</td>
<td></td>
</tr>
<tr>
<td>Spent pickling liquor</td>
<td></td>
</tr>
</tbody>
</table>

7. How do you handle / process the scrap / waste generated?

- Recycle (i.e., melt directly)
- Sell to traders
  - Local (%)
  - Export (%)

8. Do you segregate, sort, clean scrap before recycling or selling - if yes, how?

9. When you purchase scrap from market:

<table>
<thead>
<tr>
<th>Type of Scrap Purchased</th>
<th>Specification / Grade, viz., birch, berry, honey, etc.</th>
<th>% of Local Scrap</th>
<th>% of Imported Scrap (either direct import or imported through traders)</th>
<th>Approx. Purchased Price/tonne or Pricing Mechanism followed</th>
</tr>
</thead>
</table>

10. Do you purchase sorted scrap or sort at your end

11. When you sale copper bearing scrap or waste:

<table>
<thead>
<tr>
<th>Type of Scrap Sold</th>
<th>Approx. Quantity Sold (tonne)</th>
<th>Sale to Domestic Buyer (%)</th>
<th>Export %</th>
<th>Approx. Selling Price or Pricing Mechanism</th>
</tr>
</thead>
</table>

12. Do you face any problem in scrap purchase, processing and selling (technical, legal or anything else)? Please give your suggestions on how to overcome the problems

13. Any other relevant information you like to furnish
NUMBER OF RESPONSES RECEIVED FOR SURVEY (SECTORWISE BREAK-UP)

- Traders: 7
- Refined Copper Producers: 4
- Wire & Conductor Manufacturers: 6
- Semis Manufacturers: 10
- Forging, Secondary Wire, Castings, Billets & Ingot Manufacturers: 33
- Other Manufacturers viz. PM Products, Handicrafts, Chemicals, etc.: 15
- Associations / Experts: 12
- “End of Life” Scrap Generators: 4
- Equipment / Component Manufacturers: 12
- Ship-breakers: 4
- Regulators/ Govt. Depts.: 4

DATA / INFORMATION POOL

ICDC
TYPE OF SCRAP USED, SOURCE, QUALITY

TYPE OF SCRAP:
- Process scrap (not traded)
- New scrap (from both semis manufactures & OEM)
- Old scrap

SOURCES:
- Indigenous
- Import
- Ship breaking

QUALITY:
- Traded mostly as per ISRI specification & local market terminology. BIS specification exists.

Source: SURVEY Findings
BREAK-UP OF TECHNOLOGY WISE SCRAP USAGE

• Direct Melt > 92%
• Secondary Refining < 5%
• Others < 3%

Source: SURVEY Findings
# INTERNATIONAL TRADE IN SCRAP

(rounded off to nearest ’00 tonnes)

<table>
<thead>
<tr>
<th></th>
<th>IMPORT</th>
<th>EXPORT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Copper Alloy</td>
<td>91400</td>
<td>72700</td>
</tr>
<tr>
<td>Copper Content in Copper Alloy *</td>
<td>59400</td>
<td>47300</td>
</tr>
<tr>
<td>Copper</td>
<td>58900</td>
<td>31200</td>
</tr>
<tr>
<td>Net Copper Content</td>
<td>118300</td>
<td>78500</td>
</tr>
</tbody>
</table>

* @ 65% copper in copper alloy

Source: DGCIS, Ministry of Commerce and Industry, GOI
INTERNATIONAL TRADE IN SCRAP IMPORT (TONNES)

![Graph showing international trade in scrap import (tonnes) over years 2005-06, 2006-07, and 2007-08. The graph compares different types of copper content: Gross copper alloy, copper content in copper alloy, copper, and net copper content. The y-axis represents the tonnage, ranging from 0 to 120,000.]
<table>
<thead>
<tr>
<th>Year</th>
<th>Net Import (Import – Export)</th>
<th>Indigenous</th>
<th>Ship Breaking</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005-06</td>
<td>114,600</td>
<td>86,100</td>
<td>4,000</td>
<td>204,700</td>
</tr>
<tr>
<td>2006-07</td>
<td>68,700</td>
<td>183,800</td>
<td>3,500</td>
<td>256,000</td>
</tr>
<tr>
<td>2007-08</td>
<td>71,200</td>
<td>131,000</td>
<td>3,800</td>
<td>206,000</td>
</tr>
</tbody>
</table>

**Source**: SURVEY Findings

*(rounded off to nearest ’00 tonnes)*
TREND IN SECTORWISE NET COPPER SCRAP USAGE

Source: SURVEY Analysis
<table>
<thead>
<tr>
<th>Material</th>
<th>Year 2005-06</th>
<th>Year 2006-07</th>
<th>Year 2007-08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathode</td>
<td>283.70</td>
<td>387.21</td>
<td>420.03</td>
</tr>
<tr>
<td>Copper ** Heavy Scrap</td>
<td>212.43</td>
<td>347.57</td>
<td>348.60</td>
</tr>
<tr>
<td>Brass ** Utensil Scrap</td>
<td>145.99</td>
<td>228.86</td>
<td>247.54</td>
</tr>
</tbody>
</table>

* Includes Excise Duty only

** Source: Bombay Metal Exchange Declared Price
“SCRAP SPECIFIC” REGULATIONS - EFFECT

- Environment (Protection) Act, 1986
  - Hazardous Wastes (Management & Handling) Rules include copper & brass scrap under ‘Hazardous Waste’

- Environment Regulations
  - Have imposed many restrictions on ship breaking

- Effect
  - Restriction in scrap trading, buying & disposing
  - Reduced ship breaking activity

Source: Ministry of Environment & Forests, GoI
IMPORTANT COMPARATIVE ANALYSIS
FOR 2005-06 & 2007-08

Decline in Import
  — Copper scrap : 57%
  — Copper alloy scrap : 20%
  — Net copper content : 38%

Decline in Export
  — Copper scrap : 77%
  — Copper alloy scrap : 70%
  — Net copper content : 74%

Net Copper Scrap Usage
  — No significant growth

Growth in Refined Copper
  — Production : 34 %
  — Usage : 22 %

Source : SURVEY Findings
FUTURE TRENDS : 2008-09 & 2009-10

- Total copper demand growth : 9-12% p.a.
- Net copper scrap demand : 200,000-225,000 tpa

<table>
<thead>
<tr>
<th>Variables</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPCB regulations, if remains</td>
<td>↓</td>
</tr>
<tr>
<td>Higher product quality (e.g. conductor, ACR tube)</td>
<td>↓</td>
</tr>
<tr>
<td>Substitution (e.g. sugar mill tube, art metalware)</td>
<td>↓</td>
</tr>
<tr>
<td>Expanded / new market (e.g. building &amp; sanitary hardware; alloy semis;</td>
<td>↑</td>
</tr>
<tr>
<td>fire sprinkler system; plumbing &amp; gas pipeline tubes &amp; fittings)</td>
<td></td>
</tr>
<tr>
<td>Price difference &amp; ease of availability</td>
<td>↓↑</td>
</tr>
<tr>
<td>Demand in non-electrical sector</td>
<td>↓↑</td>
</tr>
</tbody>
</table>

● COPPER SCRAP IMPORT ↓  ● COPPER ALLOY SCRAP IMPORT ↑
CONCLUSION

- Copper scrap demand growth % will be lower compared to refined copper — reasons include:
  - increased quality awareness / need by certain end-use sectors
  - substitution in traditional scrap usage areas by alternate metals
  - increased domestic availability of refined copper

- Trading will be restricted unless changes take place in regulations like Hazardous Waste (M & H) rules

- Domestic scrap generation / usage will increase due to higher volume of fabrication / usage of copper

- Increase in scrap usage possible, — if more secondary refined copper is produced
RECOMMENDATIONS for FUTURE RESEARCH
• Possibility of establishing “indigenous scrap trading data bank” may be explored

• Research needs to be done on regular basis

• Each year the ‘focus’ can be given on one or two particular areas; and periodically extensive research may be launched

• Objective vis-a-vis benefits to the respondents need to be made clear
Thank You