Australasian (iron and steel) Slag Association Inc.

Membership Annual Survey Results

January to December 2016

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The Australasian (iron & steel) Slag Association (ASA) conducts an annual survey for information regarding iron & steel slag (ISS) production and value added sold quantities by members and non-members for each calendar year. This report compiled during 2017, reports on industry members[1] and non-members ISS production, importation and sales for the calendar period 2016.

Information provided by members and non-members is reviewed, compared, collated and aggregated into a national set of results and include ISS production levels, and nominated uses for all slag products.

For the calendar period January to December 2016, some 2.587 million tonnes (Mt) ISS was generated by steel makers nationally or imported from overseas sources and used within various industry sectors. Compared with 2015, there was an increase of approximately 90,000 metric tonnes of total slag available within the market.

This increase in volume of ISS and slag utilisation correlates well with current demand for steel and the increased road and infrastructure spending by the Australian Government, in particular within the streams of steel production for BOS and EAF processes. However, the reduced demand for granulated blast furnace slag (GBFS) within the cement and concrete sectors has meant that GBFS use has decreased some 63,000 tonnes over the period. For the reported period, GBFS was from either domestic sources or imported mainly from Japan.

From the 2.587 Mt available, 2.447 Mt or 95% of ISS produced was effectively utilised within various value added civil and construction material applications throughout Australasia.

The survey results include all generators, (iron & steel plants) marketers, (processing and marketing companies) and users for the total production and resulting sales by each end use. Where required, data is supplemented with importation data[2] and other secondary data sources for accuracy purposes.

The key results for the calendar period 2016 survey were:

- Approximately 2.587 Mt (million tonnes) of iron and steel slag products were produced within Australasia (Australia and New Zealand).
- From the ISS produced, some 2.447 Mt or 95% has been effectively utilised [sold or reused for some beneficial use].
- On per capita basis, this equates to 107 kgs per person recycled or reused for 2016

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[1] http://www.asa-inc.org.au/membership/members-and-affiliates
[2] ABS [Austats] based on import tariff code for Granulated Blast Furnace Slag (GBFS).

- 77% or 1.88 Mt was used in cementitious applications - "high value add" [HVA][3] Note: approx 1.1 Mt of GBFS was imported.
- 13% or 0.322 Mt was used in non-cementitious or road construction applications - medium value add [MVA][4].
- 9% or 0.236 Mt was in general civil or fill applications – low value add [LVA][5].

In summary the longer-term trend of ISS materials end use applications continues its movement towards HVA away from LVA applications. To this end, the active recovery and use of ISS continues to provide significant positive environmental impacts, including resource conservation and in this case, the reduction of greenhouse gas emissions from the processing of virgin resources.

Table 1 provides more detail for individual category sales of ISS for the period 2016 with comparisons against 2015, 2014, 2013, 2012, 2011, 2010, 2009 and 2008.

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[3] HVA – High Value Add – means where ISS materials are sold for > (more than) $100/tonne
[4] MVA – Medium Value Add – means where ISS materials are sold for between $10-$100/tonne
[5] LVA – Low Value Add – means where ISS materials are sold for < (less than) $10/tonne

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2016 Slag Production & Sales Survey

SECTION A Slag Beneficial Use Calculations (mt)	BFS	GBFS	SFS	EAFS	KOBM	Other	2016 Combined	2015 Combined	2014 Combined	2013 Combined	2012 Combined	2011 Combined	2010 Combined	2009 Combined	2008 Combined
A1. Total Produced in 2015 (Jan-Dec)	318,551	479,050	241,627	127,674	50,000	268,579	1,485,481	1,489,246	1,927,688	2,429,150	2,529,541	2,861,918	2,399,883	2,941,079	3,157,222
A2. Total imported in 2015 (Jan-Dec)		1,101,099					1,101,099	1,006,980	968,585	820,049	684,033	612,662	449,129	384,250	249,100
A3. Total Stored [not used]	0	0	0	0	0	25,800	25,800	0	382,746	421,041	617,707	235,547	470,472	843,438	695,766
A4. Total Removed from Storage during 2014	0	0	0	0	0	25,800	25,800	0	100,020	51,933	426,349	167,879	295,814	0	0
SECTION B Auto Calculations							Combined	Combined	Combined	Combined	Combined	Combined	Combined	Combined	Combined
B2. Total Used in 2015 (Auto calc)	318,551	1,580,149	241,627	127,674	50,000	268,579	2,586,580	2,496,226	2,613,547	2,880,090	3,022,216	3,406,912	2,674,354	3,414,107	3,406,322
SECTION C Slag Use (mt)	BFS	GBFS	SFS	EAFS	KOBM	Other	Combined	Combined	Combined	Combined	Combined	Combined	Combined	Combined	Combined
C1. Cement or Binder products	0	1,587,686	0	0	0	0	1,587,686	1,479,762	1,521,496	1,491,736	1,135,569	1,055,662	871,394	561,529	671,153
C2. Feed stock for Clinker/Glass products	0	37,429	51,490	0	0	0	88,919	126,645	56,154	114,105	46,820	28,538	16,778	57,270	65,547
C2. Grit Blasting products	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C2. Structural Fills/Embankments	0	0	13,317	1,000	0	0	14,317	13,260	13,260	0	689,215	524,242	22,119	388,443	14,443
C2. Road Base/Sub-base	119,258	21,790	3,379	68,051	0	6,954	219,432	122,728	122,728	203,245	241,475	409,822	405,636	522,967	604,421
C2. Rockwool products	0	0	0	0	0	0	0	0	0	0	1,430	3,505	2,766	2,000	11,719
C2. Mineral Fillers (e.g Asphalt)	0	0	0	0	0	0	0	0	0	0	4,291	22,012	28,199	38,730	31,182
C2. Agricultural applications	0	0	0	0	0	0	0	275	275	421	0	115	0	611	611
C2. Water treatment/filtration products	0	0	0	0	0	0	0	0	0	0	56	29,317	29,205	25,643	25,793
C2. Asphalt & Concrete Aggregates	190,999	0	79,330	31,100	0	0	301,429	335,347	335,347	407,776	428,385	630,277	710,014	677,585	887,092
C3. Mining Applications	0	0	0	0	0	0	0	0	0	0	0	0	22,484	53,384	35,493
C3. Waste Stabilisation/Solidification	0	0	0	0	0	0	0	0	0	0	0	3,758	3,758	7,137	7,137
C3. Miscellaneous/Other	33,580	38,575	145,153	0	0	18,890	236,198	294,965	294,965	259,700	241,838	476,947	234,097	235,370	355,965
SECTION D Summary Results	BFS	GBFS	SFS	EAFS	KOBM	Other	Combined	Combined	Combined	Combined	Combined	Combined	Combined	Combined	Combined
D1. Total of all sold in 2015 (Auto calc)	343,837	1,685,480	292,669	100,151	0	25,844	2,447,981	2,372,982	2,344,225	2,476,983	2,789,080	3,184,195	2,346,451	2,570,669	2,710,556
	107.94%	106.67%	121.12%	78.44%	0.00%	9.62%	94.64%	95.06%	89.70%	86.00%	92.29%	93.46%	87.74%	75.30%	79.57%

Table 1 - 2016 Slag Sales and Production Survey