



South African Institute of Foundrymen

**PRESENTATION TO THE PORTFOLIO COMMITTEE
ON TRADE AND INDUSTRY**

The Impact of IPAP on the Foundry Industry

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SCOPE OF PRESENTATION

1. The South African Institute of Foundrymen
2. The South African Foundry Industry
3. Challenges Facing the Industry
4. The Impact of the IPAP Interventions on the Industry
5. Technical Support Programmes to Improve Competitiveness
6. Competitiveness Improvement Programme
7. New Localization and Casting Opportunities
8. Key Issues
9. World Foundry Organization

1. The South African Institute of Foundrymen

- Established in 1939 as a branch of the Institute of British Foundrymen (now the Institute of Cast Metals Engineers)
- The SAIF was formed in 1964 and is a registered non-profit company
- There are 174 members of which 72 are companies

VISION

- To be the voice of the South African Foundry Industry, creating growth and job opportunities through training, skills development and education

MISSION

- To improve the competitiveness of the South African Metal Casting Industry. Generating sustainable growth and employment opportunities in the manufacturing sector

GOALS AND OBJECTIVES

- To advance the service and technology related to the manufacture and use of metal castings through education and training, skills development and the dissemination of information and research
- To facilitate the meeting of stakeholders engaged in the founding and allied industries, to correspond and exchange ideas in the science and practice of the casting of metals
- To represent the South African foundry Industry in common challenges and initiatives with government, municipal and other local authorities, state owned companies, educational institutions and the standards and specifications authorities on any matter within its mandate
- To associate and co-operate with other scientific societies and institutions to promote the goals of the SAIF (Member of the BRICS Foundry Forum)

KEY PARTNERSHIPS

- The National Foundry Technology Network (NFTN)
- The Aluminium Federation of South Africa (AFSA) – A Technical Institute with a focus on the Aluminium Casting Industry and having similar goals as the SAIF
- The Metal Casting Technology Station (MCTS) hosted and the University of Johannesburg, which offers support, services and technology transfer to industry
- The Department of Science and Technology (DST) Through the agencies of the CSIR and Mintek to assist industry and conduct research
- The University of Johannesburg, Vaal University of Technology, Cape Peninsula University of Technology and the Tshwane University of Technology

SA foundry innovation system



Slide 11

2. SOUTH AFRICAN FOUNDRY INDUSTRY

- The industry has contracted since 2007
- Output in 2013 of 375 240 tons is down from 660 400 in 2007, or 43 percent lower
- 170 Production Plants in SA – Down by 36 percent since 2007
- Big plants (more than 1000 people) to very small (less than 20 people)
- Some in – house foundries producing only for their own use
- Iron, Steel, Aluminium, Zinc, Bronze and Special Alloy Castings are made
- Added Value: Machining , Coating, Assembly is evident in some foundries
- Spread all over the country: Gauteng, KZN, W/Cape and E/Cape
- More than 80% of manufactured products contain castings!

Geographical Location of Foundries in South Africa

Province	No. of foundries ,03	No. of foundries ,07	No. of foundries ,2015	% of total foundries '2015
Gauteng	143	141	114	66%
Kwa-Zulu Natal	26	25	20	12%
Western Cape	33	32	14	8%
Eastern Cape	20	20	8	5%
Free-State	13	13	5	3%
North-West	13	13	4	3%
Northern Cape	7	6	3	2%
Mpumalanga	15	15	2	1%
Totals	270	265	170	100%

- In Addition there are 13 “Art Foundries” and 11 “Spin Casters”

Industry Structure By Foundry Type

Foundry Type	No. of foundries in ,03	No. of foundries in ,07	No. of foundries in ,14	2014 v/s 2007 change in %
Ferrous (Iron and Steel)	110	110	89	- 19%
Non-Ferrous (Aluminum, Brass & Zinc) Sand, Gravity, Low Pressure	117	119	50	- 57%
High Pressure Die-casters	36	32	27	- 16%
Investment Casting	7	4	4	0%
Total number of Foundries	270	265	170	- 36%

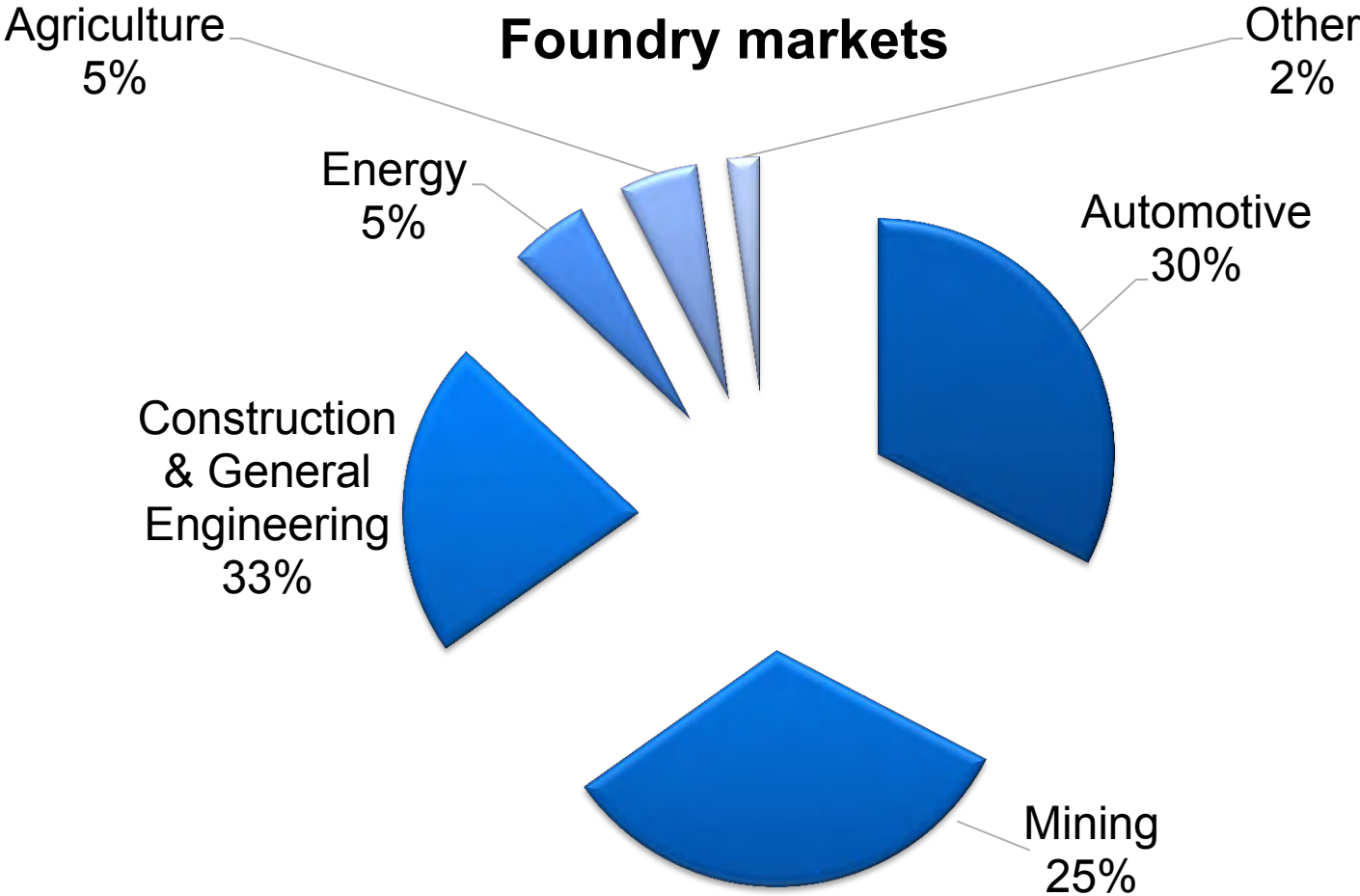
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Estimated Annual Production by Metal Type

Metal Type	Est. annual production '03 (tons)	Est. annual production '07 (tons)	Est. annual production '12 (tons)	Est. annual production '13 (tons)
Aluminum	66,000	77,800	21,000	22,000
Brass	9,000	8,200	Copper Based 14,300	9,100
Bronze	6,000	7,600		
Zinc	3,000	4,200	1,400	900
Grey Iron	110,000	147,000	161,000	155,000
Ductile Iron	100,000	86,000	59,000	47,000
Other cast iron (White Iron)	85,000	145,600	54,000	28,500
Steel	123,000	179,100	118,000	106,000
Stainless steel	4,000	4,900	5,800	6,500
Total annual production	506,000	660,400	416,500	375,240

- **All figures exclude Scaw Metals Ball Plant**

Markets served by the SA foundry industry



Main Casting Processes used in Foundries

Process Type	No. of foundries using the process (%)
Sand	100%
Bonded sand	66%
Green sand	28%
Shell	6%
Permanent Mould	100%
Gravity	61%
Low Pressure	4%
High Pressure Die-casting	32%
Other	3%

Gauteng

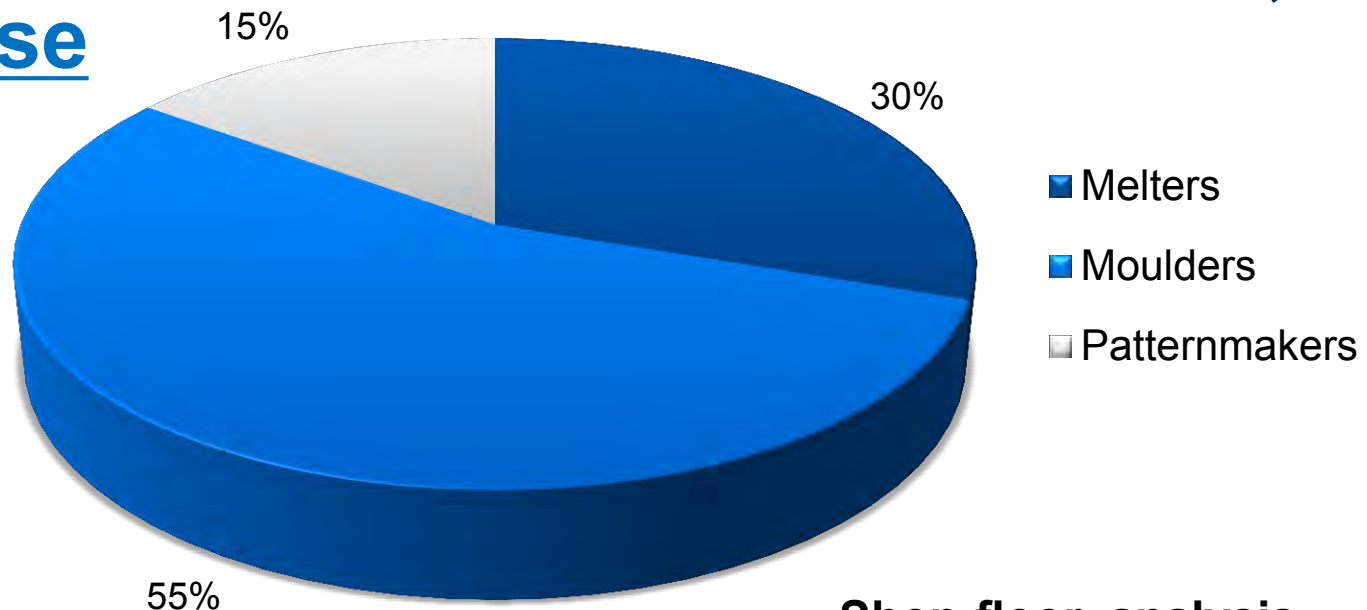
Foundry Type	No. of foundries	No. of foundries (%)
Production	26	24%
Jobbing	64	55%
Prod. & Jobbing	24	21%

Employment in the Foundry Sector

- Estimated no. of direct employees in 2014 – **10,285** (down by 1,080 or nearly 10 percent since 2011)
 - 80% of employees are previously disadvantaged individuals
- Estimated number of indirect employees **4,000** (Adding Value to Products)
 - 80 – 100 supplier companies

Total of 14,285

Skill Base



3. Challenges facing the Industry

- **Import Leakages = Reduction of Orders = Low Competitiveness**
- **Rapidly Rising Energy Costs and the need to improve Energy Efficiency**
- **Poor Material conversion efficiency**
- **Lack of Skills Development and Training**
- **Cost of compliance with Environmental Regulations**
- **Cost, Quality and Availability of Metal Scrap**
- **Limited Access to Capital**
- **Recent Technological Developments Require Special Skills**
- **Foundry Environment = 3-D's – **Dark, Dirty and Dangerous****

4. The Impact of IPAP interventions on the Foundry Industry

4.1 Human Capital Development

▪ **Learnership Pilot Program**

- In 2003 SAIF initiated revision of the artisan skills curriculum for moulders, patternmakers and the new trade – melters. (All three were registered with SAQA in 2013)
- The industry skills shortage was confirmed at a RALIS workshop in 2008 and the career path framework project funded by the NFTN and GTZ was started with the participation of industry subject matter experts and trainers.
- The Learnership Pilot Project was launched with 18 learners in 2010 and 14 learners completed the qualification in 2013. All but one have been permanently employed in the industry.
- The SAIF will facilitate the trade testing of the learners in 2015/2016 to enable them to have qualifications consistent with other artisans and acceptable to industry.
- The learnership programme has been replaced with apprentice training for the trades of moulder, patternmaker and melter.

▪ **Apprentice Training**

- In 2011 The Career Path Framework project focussed on the development of curricula for the training of apprentices in the following: Patternmakers, Moulders, Melters
- The NFTN conducted a feasibility study in Gauteng leading to the decision to establish the Gauteng Foundry Training Centre (GFTC) at the Ekurhuleni East College (EEC) in Kwa Thema, Springs with the NFTN, the Gauteng Department of Economic Development (GDED) and the EEC as the joint funders.
- SAIF along with industry and other subject matter experts from academic institutions developed the curricula which were registered with the relevant authorities in





- The fully equipped GFTC was launched in 2013 and opened in 2014. There are 23 apprentices undergoing training

	Patternmakers	Moulders	Melters
Level 1	4	3	4
Level 2	5	2	5
Total	9	5	9

- Industry support for the work experience portion of the training (on the job) and will also arrange for experts to provide specialised training as required



- It is essential that this initiative becomes part of the Department of Higher Education's funding structure
- The merSeta has responded positively this year with funding assistance to the learners at the GFTC
- Assets intended for the Western Cape Training Centre, subsequently sold to Atlantis Foundries (Pty) Ltd were installed in the GFTC to enhance the equipment level



4.2 NFTN / SAIF SHORT COURSE TECHNICAL AND SKILLS TRAINING

- During the 1990's the SAIF branch in the Western Cape developed and implemented an eight module training course for industry workers.
- Since 2010 with assistance from the NFTN, the SAIF has been rolling out these and other short course training programmes to the wider industry
- To date, 663 learners have attended courses and 25 diplomas presented to those who successfully completed at least 6 of the 8 modules
- Since 2013, customised In – House courses were completed at 17 different foundries and 44 advanced technical skills courses held at the university of Johannesburg, or venues in Kwa Zulu Natal, the Vaal and the Western Cape
- Industry support for these courses has been increasing and achievement of the “diploma” established as a common goal

- Comments from industry leaders and learners include:

“The skills acquired have improved the throughout of the company, improved casting quality and reduced the scrap rate. Decision making has also been more informed in problem solving” – ***Peter Dielwart, Owner of Q Pumps***

“Overall, I benefited as an individual and this added to the production improvement. I recommend that everyone should be give an opportunity to attend these courses as they could play a vital role in the employee understanding the operation of the foundry industry completely” – ***Helen Dlamini, Sand Technician at Scaw Metals Group***

“The course was of huge value, because our toolmakers as well as operators had never had any training in die casting before” – ***Alan Shadbort, Foundry Manager at Castaway Foundries***

“There has been a direct effect on our operations” – ***Jaime Goncalves, Technical Director of Kimberley Engineering Works***

4.3 NEW FOUNDRY GENERATION FORUM (NFGF)

- The first group of young foundrymen and women completed their initial programme in 2014, with a presentation of their project work. Industry members were fully supportive. (An immediate permanent position was offered by one the major foundries to a young female engineer in training)
- The positive feedback from the “new generation” about the interaction, teamwork and collaboration was a significant benefit
- The first feedback from the 2015 group to industry members was inspirational by demonstrating the positive impact already made at their respective companies
- The continued support of the industry is guaranteed and advance management skills development would be welcomed.



5. TECHNICAL SUPPORT PROGRAMMES TO IMPROVE COMPETITIVENESS

5.1 Technology Assistance Packages (TAPS)

- Introduced in 2010/2011 by the DST, there was a positive response from 23 of the 26 foundries and 18 considered the programme valuable
- Continued interventions by placing interns in the foundries has been positively received
- It was unfortunate that some momentum was lost by the short duration of the intervention

5.2 Bench Marking Programmes

- For both sand and permanent mould foundries the exercise was useful and helpful
- Some new opportunities have emerged for a small number of foundries
- The base-line analysis should be used in assessing the nature and extent of any proposed interventions

6. COMPETITIVENESS IMPROVEMENT PROGRAMME

- Examples of Benefit to Industry:

6.1 Vaal Foundry Initiative

- Training Courses
- SA Roll Company – Surface defects resolved with teamwork

6.2 Kwa Zulu Natal

- Several Foundries assisted and prevented at least one from closure

6.3 Bell Equipment

- Casting scrap reduction

6.4 High Chrome White Iron

- Simulation parameters providing a competitive advantage to local foundries

6.5 Microcast

- Significant cost reduction in an automotive component foundry (good teamwork)

6.6 Pfisterer

- Improved productivity using simulation software

6.7 Overseas Experts – Morris Murray

- Assisted Die Casters to –
 - Improve energy efficiency
 - Increase yield
 - Better die design for improved life
 - Robust practices and procedures
 - Reduction of scrap

6.8 Publications by NFTN have assisted industry

- Energy usage and efficiency increase in foundries
- Sand management
- Environmental legislation guidelines for foundries
- Addressing key challenges in foundries
- Other surveys on energy usage provide needed data

6.9. EFFSAFOUND

- Energy and waste related projects with German assistance

7. NEW LOCALISATION AND CASTING OPPORTUNITIES

- 7.1 Valves – Designated products - workshops held created at least two new sources
- 7.2 HW Schmidt – Die casting automotive part
- 7.3 Knorr Bremse – Assisted with sourcing of castings
- 7.4 Malaysian – Denez off-set – Hosted visits to several local foundries and industry visit to Malaysia



MENTORSHIP OF DEVELOPING FOUNDRIES

- *At least one black owned foundry commenced business in 2012*
- *Several rural foundries assisted in 2010 – 2011*



8. KEY ISSUES

8.1 Metal Scrap – *Cost, Quality, and Availability*

The industry is working closely with the Treasury, Economic Development and DTI to seek sustainable benefits for the use of input materials

8.2 Energy

Industry interacts with NERSA, Eskom and Municipalities to find mutually beneficial solutions

8.3 Localisation – *How to accelerate this vital initiative?*

8.4 Capital Investment

The industry is under invested, but need to optimise use of the manufacturing competitiveness enhancement programme (MCEP)

8.5 Technology Transfer

Industry will work with the Casting Simulation network recently launched

8.6 Human Capital Development – *We must keep the momentum going forward*

8.7 What happens after 2017? – *Will the foundry industry continue to receive support?*

WORLD FOUNDRY ORGANISATION – TECHNICAL FORUM 2017

- Industry and SAIF view this as an opportunity for knowledge transfer, to showcase expertise and network with international experts
- **WE WILL BE THERE!!**



THANK YOU



South African Institute of Foundrymen