



ABN:39 865 951 145

# Advanced Material Technologies

*Providing Solutions, Delivering Results!*

ACN:154 533 794

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### **EXPERIENCE**

#### **CONTRACTOR/CONSULTANT**

- Employed as an independent refractory inspector and consultant with over 30 years experience.
- Developed refractory recommendations, design for customers to improve life in iron and steel blast furnace stoves, troughs, steel ladles, walking beam furnaces, plate mill furnaces, combustion equipment, chemical plant reformer furnaces, coke ovens, aluminium melting and holding furnaces, carbon baking furnaces, copper converters, nickel sulphide roaster furnaces, power boiler furnaces, chemical plants, foundries, mineral processing calciner kilns, coolers and engineering permanent rapid repairs to industrial concrete pavement.
- Carried out failure analysis of used refractory through certified testing laboratory and recommended appropriate changes to avoid a repeat problem.
- Analyzed reason for excessive refractory wear in many furnace applications, recommended changes in installation procedure and operations.
- Carried out quality audits in customers melting, holding and combustion furnace applications.
- Conducted training seminars on refractory and their applications, including metallurgical principals for molten metal practice.
- Trading and importer of materials, minerals, metals and fabricated equipment to aluminium smelters, steel mills, others.

#### **REFRACTORY COMPANY**

- First in Australia to achieve a new method of permanent refractory repair to existing fired refractory furnace linings with an innovative unique high temperature chemical bond refractory material that does not thermally spall and can be rapidly heated.
- Achieved new developments with molten steel flow control refractories.
- Provided field support for tear outs, failure analysis of refractory and installation engineering and supervision.
- Modified refractory design as needed to better fit operational parameters.
- Carried out functions as application specialist for development, design and support of improved refractory lining materials in furnaces and high temperature equipment.
- Followed refractory brick and castable trials by supervising brick installation, observing the vessel during the campaign and making recommendations for longer performance life.
- Worked effectively with all refractory manufacturing plants to supply better and more reliable, cost effective products.



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## STEEL COMPANY

- Achieved a successful saving of approximately A\$20 million to local steel mill through an innovative, refractory recommendations, technical development, installation supervision and performance for Blast Furnace stove repairs in 2001.
- Modified ladle lining refractory as needed to better fit operational parameters.
- Carried out failure analysis, recommended changes and wrote standard practice for chemical bond castable installation for walking beam furnaces, plate mill furnaces, sealas furnaces, ladle preheating stations and sinter plant combustion refractory.
- Provided the refractory recommendation for permanent hot-gunning repairs to existing fired refractory in pellet plant stack and induration furnace.
- Determined reasons for catastrophic failure of ladle pre-heater lid burner block assembly, interfaced and worked with hourly personnel to obtain a new repaired burner block, demonstrating the refractory quality and installation procedure. Supervised their installation at the customer's plant. Burner block was repaired and back in service 2 hours after the repair and provided over 2 years service.
- Introduced new refractory and applications dossier to steel mill refractory management to decrease operating costs where refractory is the root cause of failure.
- Provided supplier quality specifications and in house testing procedures of new ladle purge plugs, ladle SG plate systems, determined the main variables in cooperation with the steel mill application officer that affect the performance and life to achieve stirring rate target of greater than 98%.
- Worked in a team environment with all steel mill application personnel to find a better and more reliable engineering method to reduce costs and improve refractory life.

## POWER COMPANY

- Achieved unique results with new chemical bond refractory in biomass energy for a new linear hearth downdraft gasification design seeking rapid heat up and combustion.
- Achieved refractory innovation for new coal carbonization plant design.
- Carried out slag analysis, thermal cycling and other test work through CSIRO, ANSTO to present a new method of permanent repair to existing fired refractory in Power boilers and ductwork.
- Recommended a new method of permanent concrete pavement repair for high strength repairs on damaged concrete areas.
- Achieved the first sale of an advanced refractory system to replace alloy steel components in burner tip and quarl assemblies in PCF boilers.

## ALUMINIUM COMPANY

- Managed all technical and operational functions of an aluminium remelt plant from green site to full operation.
- Carried out functions as refractory and metallurgical application specialist for development, design and support of improved refractory lining materials in furnaces and high temperature equipment, with the view to implementing the use of advanced refractory and ceramics.
- Analyzed reasons for excessive refractory wear of aluminium melting and holding furnace burners, roof, sidewalls, hearths, belly band and furnace door assemblies. Also



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recommended best refractory practice for launders, filtration systems, induction melting, carbon bake furnace refractory castable and brick also castable construction procedures via casting, gunning, trowelling and the recommended changes in refractory and installation procedures.

- Achieved the first permanent chemical bond refractory repairs in 2002-2003 through Comalco Aluminium to its holding furnaces in the primary aluminum smelting industry in Australia and New Zealand.
- Introduced new refractory and applications dossier to Carbon bake management to decrease operating costs where refractory is the root cause of failure.
- Senior application specialist and product management in all facets of aluminium melting, holding and casting practices.

## CHEMICAL COMPANY

- Analyzed reasons for excessive refractory wear of primary and secondary reformer furnaces, boilers, acid plants, nickel roaster combustion refractory linings with recommended changes in refractory and installation procedures.
- Achieved a first design change for Reformer furnace gas tunnel lintel blocks.
- Carried out plant inspections and audits on reformer furnaces, boilers, acid plants, transfer lines at international and domestic chemical plants.

## CEMENT COMPANY

- Introduced new liquid phosphate bond refractory castable for rapid repairs and improved alkali resistance and thermal shock resistance in cement kiln coolers, pre-calciners etc.
- Introduced European Kumus dolomite and Mag spinel refractory bricks.
- Introduced permanent refractory repair Thermbond chemical bond refractory castable for burner tips, nose ring repairs and other refractory areas.

## AWARDS

### **American Foundry Society Inc. USA**

Principles of Non-Ferrous Metallurgy - Flux treatment to remove oxide contamination from molten aluminium alloys.

## TECHNICAL PAPERS

1. The techniques and selection of refractories for combustion chambers.
2. How does the choice of steel anchors influence refractory retention in furnace and duct refractory linings.
3. Chemical bond refractory lining of a tunnel kiln car superstructure.
4. Walking Beam furnace bond permanent refractory repairs.
5. Chemical bond gunnite hot gunning repair in a steel mill stack.
6. A world first -Blast Furnace Hot Blast Stove Repair - Ceramic Burner.
7. Cost savings with Permanent repairs to a steel mill walking beam furnace.
8. Rapid repair to refractory in copper caster slag pot.
9. Chemical bond refractory installation in induction furnaces.
10. Chemical Engineering in Fired Heaters



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## MEMBERSHIP OF ASSOCIATIONS AND AFFILIATIONS

1. Member Institute of Refractory Engineers
2. Australian Die casting Association
3. Australian Foundry Industry