

Reshaping the GCC Aluminium Downstream Industry



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Mr Ihab Mouallem is the Commercial Director at Gulf Extrusions LLC. He is a professional civil engineer, with remarkable strategic achievements in the field of aluminum export and technical support.

He has 15 years' experience in aluminum extrusions industry and façade system engineering design in Europe (Belgium, France) and in the Middle East (UAE, Qatar and KSA). He has worked in various expansion projects, market studies and product development.

Aside from being popular for its scorching sun, sprawling sands, oil and tourism, the Gulf Cooperation Council (GCC) states have one of the most exciting developments happening in the field of aluminium. Now, before I dive into talking about the aluminium downstream industry and the various breakthroughs, let me paint a picture of the overall primary aluminium industry in the GCC.

How big really is the primary aluminium business in the GCC?

The primary aluminium production in the Gulf has been increasing over the years to reach 5 million tonnes annually by 2015, which constitutes 10% of the world primary aluminium production of which 70% is exported to the different parts of the world. The growth of the aluminium sector has led to the creation of a number of downstream industries in the GCC supplying local and international market profile for construction, automobile parts, cable and rolling products for packaging. The total investment in the aluminium industry in the Gulf is currently around US\$ 40 billion.

All this investment in the aluminium industry has created a great social impact in the region. In addition to 12,000 direct employments and 30,000 indirect employments, the aluminium industry has helped creation of many small and

medium sized enterprises, providing various technical and logistical services. The GCC states have long realized that their future is an educated and skilled national workforce; consequently all the aluminium industry companies in the region have invested heavily in training, equal to US\$ 20 million annually. Social progress and social responsibility is key factor that aluminium industry have been keen to develop and collectively spend around US\$ 16 million annually towards contribution to social and community projects.

The primary aluminum smelters technically most advanced, and this results in the production of the world's finest quality of aluminium. Apart from this they are lowest cost smelters; thanks to the abundant regular supply of energy in the region. Adding to this they are environmentally clean smelters too. During the last five years, the industry has increased in waste water recycle by 150% and solid waste recycle by 48% and managed to reduce Green House Gas by 15% and fluoride emission by 46%. All the smelters in GCC have achieved the ISO standard 14001 for environmental management system and the only smelter in the world that has received environmental award recognition from the United Nation is from the Gulf.

So, where does all this primary aluminium go? The downstream of course. You will see below the wide downstream applications for the primary aluminium.

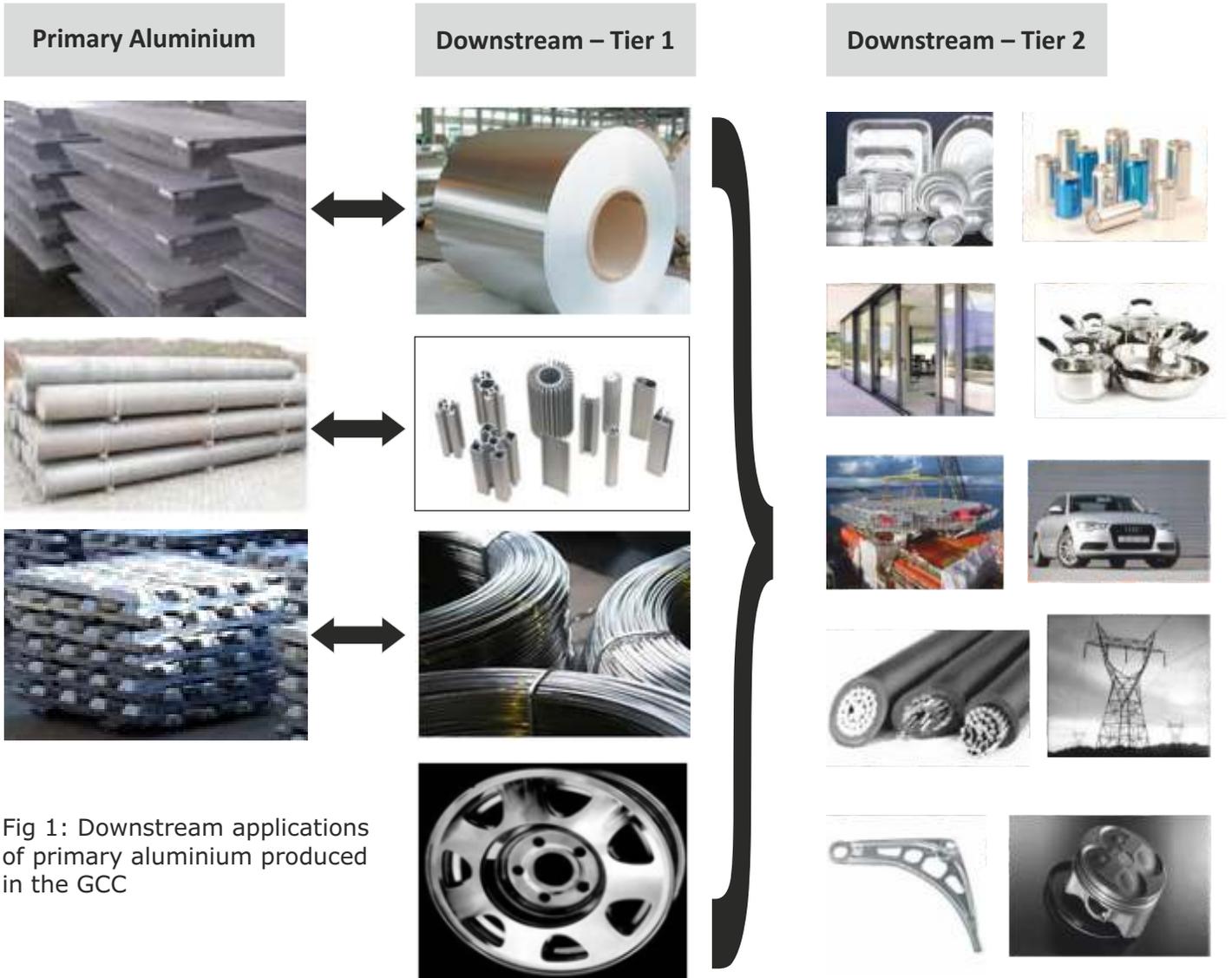
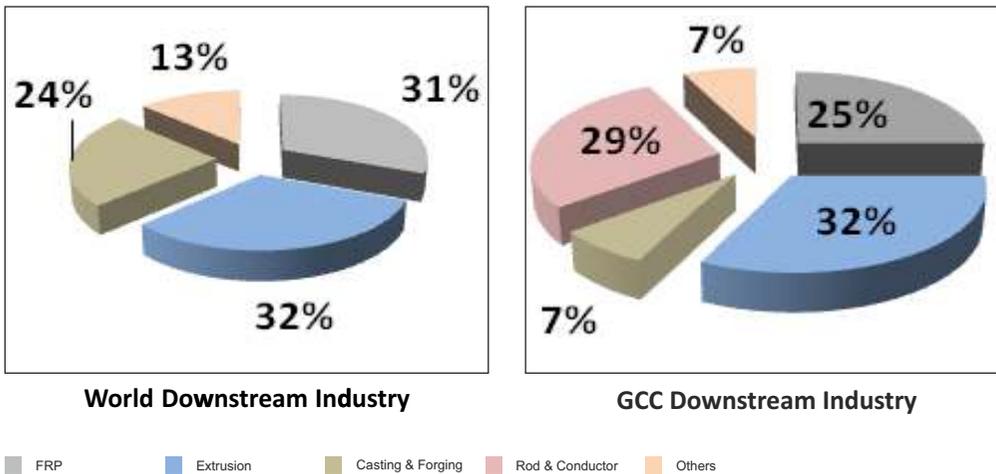


Fig 1: Downstream applications of primary aluminium produced in the GCC

The downstream aluminium industry in the GCC



Primary aluminum is further sold as flat rolled products, aluminium extrusions, cast/forged aluminium, rods and conductors. As you notice in fig 2, globally there is a significant balance in the spread of downstream applications whereas in GCC there is a significant importance for rods and conductors.

Fig 2: Comparison of downstream industries of the World & GCC (Source:CRU)

Type of Downstream application	Current Capacity	Future Capacity
Flat Rolled Products	350,000 MT	800,000 MT
Extrusions	450,000 MT	600,000 MT
Rod & Conductors	400,000 MT	400,000 MT
Casting	100,000 MT	300,000 MT

Table 1: Current & Future Capacities of Aluminium Downstream in GCC (Source: www.aluminiumtoday.com)

In Table 1, you see that there is significant growth expected in flat rolled products, aluminium extrusions and casting applications in the GCC. This demand is sparked by significant year on year growth in the building and construction sector in the region especially with the iconic events such as Expo 2020 in UAE, Fifa 2022 in Qatar and accelerated construction boom in the Kingdom of Saudi Arabia.

High amounts of Innovation, Research and Development in the downstream aluminium business, especially in the field of aluminium extrusions in GCC; that have encouraged local sourcing of material and also enhanced export opportunities of GCC material into European markets.

I would like to talk about couple of key landmark case studies in the aluminium extrusions which serves as a testimony to the growing business diversifications in the GCC.

Case Study 1: Developing the twisted aluminium profile for the King Abdul Aziz International Airport, Jeddah, Kingdom of Saudi Arabia

About the Project:

- Designer: NACO (Netherlands Airport Consultants B.V)
- Consultant : Dar Al Handasah Group
- Main contractor: SBG (Saudi Bin Laden Group)
- Aluminum & Glass Contractor: United Arab Aluminium Company
- Extrusions supplied by: Gulf Extrusions Co LLC

Key Statistics:

- Total area of Project – 100 sq km.
- 100,000 sq m of glass & aluminium

Unique Design Feature:

- 40,000 sq m of Rain Screen Louver System
- Aluminium extrusions system has blades transiting from closed to open over a distance of 6m.
- Supports the façade by providing wind load connection.
- Location of the system: In the boarding bridge area & in front of the glass facade

Technical Challenge:

- Design, Extrusion and Fabrication of Twisted profile
- Required twisting of 430mm wide and 6m long Aluminum profile from 0 degrees to 60 degrees.
- After several failed trials, the project team reached out to the pioneers in Aluminum extrusion with the challenge
- Gulf extrusion designed the profile and extruded it. Gulf Extrusions also developed and built the machines to twist the profile.
- The Twisted profile from Gulf extrusion has been selected as the most innovative Aluminum Product by the most prestigious Aluminum event, Aluminum 2014, Dusseldorf.

Solution & Planning - Making of the twisted profile:

Planning:

Internally, Gulf Extrusions studied the project specifications and came with a

special extrusion design for the project. Then the right alloy required for twisting was chosen.

The twisting process:

The three stages:

Stage 1: We studied the stress distribution in the profile and designed a special machine with pneumatic cylinders. The machine had three clamps which held the profile. Design challenge was to create supports on the panel to distribute the stress created by the twisting load; Had to secure the panel and the connecting grooves from any strain– Solved by incorporating ribs designed to crack when strained and thus protect the profile.

Stage 2: We found that the twist was not consistent and because of the spring effect of the profile, the aluminium fought its way back to its initial position. The solution was to redesign the machine with hydraulic cylinders, reduce the number of clamps to two and we had to trick the metal by twisting it in stages. We had to twist in stages of 30°, then 25° twice, and we took it back to a full 0°. By this we were able to achieve the 60° twist.

Stage 3: After successfully twisting the profile, we had the last challenge which was to release the profile from the clamps. So we redesigned the clamps to be 'Y' shaped and we were able to release the twisted profile smoothly.

The clients and the stakeholders were extremely delighted to see the final outcome and this project is yet another testimonial which reaffirms the leadership and know-how of Gulf Extrusions in the field of Aluminium Extrusions.

Image Glossary:



Fig 3 – Above: The King Abdul Aziz International Airport, Jeddah, KSA

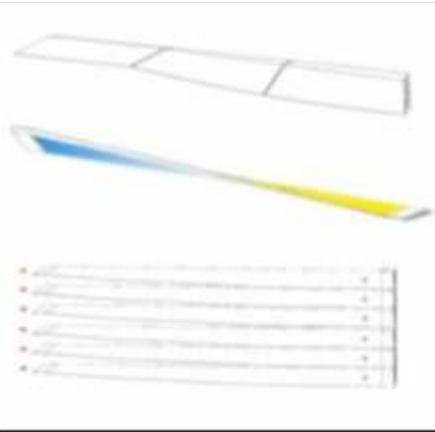


Fig 4 (Left): Design stage at Gulf Extrusions – Twisted Profile



Fig 5 (below): R & D for the twisting machine



Fig 6-a

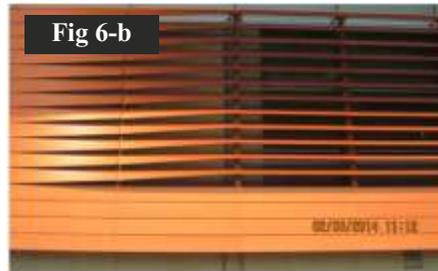


Fig 6-b



Fig 6-c

Fig 6-a,b,c: Site pictures after installation

Case Study2:

Setting up the Middle East's first vertically integrated aluminium supply chain for the automotive industry and beyond

When aluminium extrusions in the GCC was known for its domestic consumption and architectural applications, a burning desire to cater the global automotive industry and beyond led to the birth of REFCO – the royal engineering fabrication company.

Supplying to the automotive industry is not only challenging but also boundary busting in various aspects from production to fabrication to supply chain. Automotive industry is one of the strictest when it comes to quality auditing and in order to cater to the automotive industry, companies need to have more than just good quality but also

- a solid downstream business that is world class in its execution of Quality, Cost and Delivery (QCD)
- Support fully the Just In Time targets of manufacturers in different locations

To build a company of this nature from the UAE was not only a challenge but also socio-cultural breakthrough.

REFCO was born from the recent acquisition of Sport Carrier Limited, a U.K. extruded alloy fabrication and surface treatment specialist that supplied world class finished alloy product to Aston Martin, BOS, UYT and Webasto.

REFCO started with a rapidly expanding manufacturing location in the UAE in close proximity to Gulf Extrusions (L.L.C) and EMAL/DUBAL, the primary raw material supplier. The basic strategy of the acquisition was to obtain the capability and expertise to quickly establish a manufacturing site in the U.A.E. that converts extruded alloy section to components for end product assembly.

Finished alloy components were then shipped to company operated regional distribution points in the European Union for 'just in time' delivery to existing clientele and into the emerging consumer markets.

REFCO today manufactures approximately 2 million automotive parts per year which go into critical applications which involves kinematic movements –sun roof guiderails, roof consoles, cross rails, pull bars to name a few.

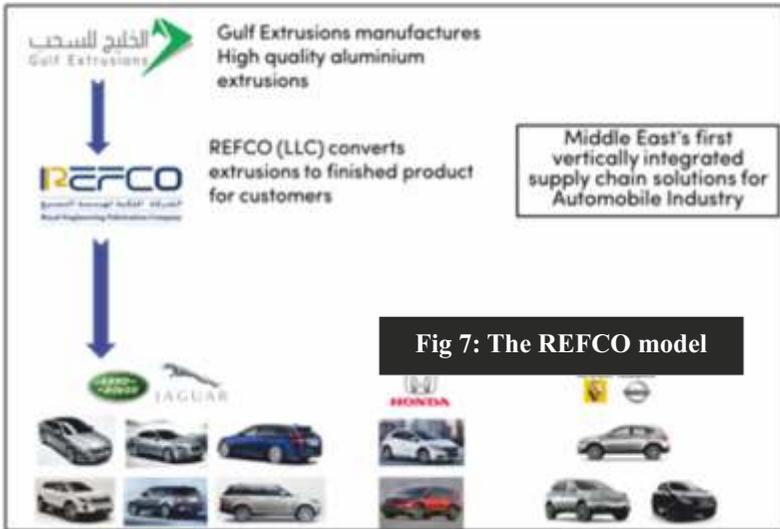
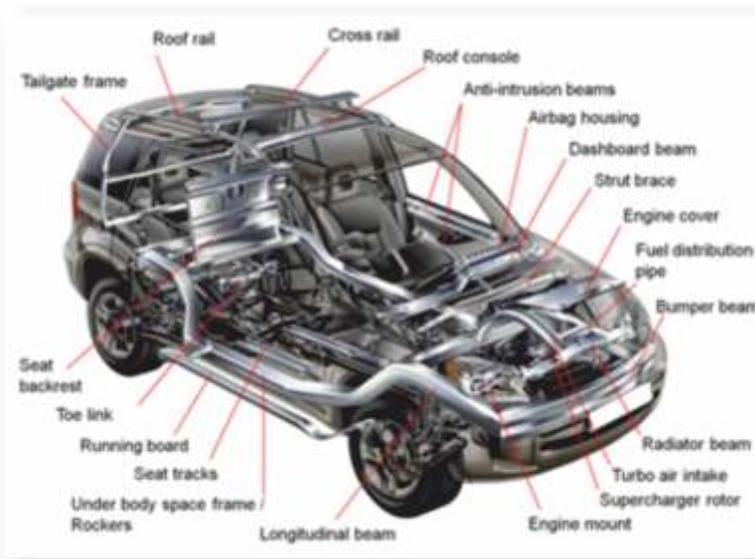


Fig 7: The REFCO model



Fig 8: Aluminium extruded products for the automotive industry from the UAE to the World



Conclusion:

Gulf Extrusions has been an innovator and market leader when it comes to enhancing the aluminium downstream business in the Middle East, Europe and globally. Gulf Extrusions' vision and goals are towards achieving on time delivery for its customers. Every enhancement in the processes is focused towards this same goal.

There is an open budget for Research and Development in Gulf Extrusions. We are always working towards enhancing our capabilities to further enhance our value proposition to our clients and to the aluminum

industry in large. It is evident that Gulf Extrusions has played an important role in reshaping the aluminium downstream industry in the GCC. It is committed to play a more aggressive role in the coming years and serve as a benchmark for enhancing future investments in the aluminium downstream industry in the GCC.

Gulf Extrusions' tagline is “ towards a future of possibilities”. This statement summarizes our commitment towards the industry in all aspects quality, cost effectiveness, value proposition and most importantly on time delivery.

About Gulf Extrusions:

Gulf Extrusions is a leading aluminum extrusion company, member of the entrenched Al Ghurair Group and Metals Industries. The company is strategically located in Dubai alongside its main supplier Dubai Aluminum as well as its foremost gateway to the world The Jebel Ali Ports.

Gulf Extrusions extrudes aluminum for architectural, industrial and automotive sectors. The company well utilizes its resources including contemporary six presses and over 500 highly skilled teams of international specialists to annually produce approximately 50,000 Tons of extruded aluminum that includes 24,000 Tons of Powder Coating Finishing, 5,000 Tons of Anodizing Finishing and 18,000 Design Profiles.

The company prides itself by its distinctive capability to produce high quality profiles that are internationally acknowledged through its distinguished Design Team as well as its own state of the art laboratories for chemical, microstructure, composition and optical analysis.

Since its establishment in 1976, Gulf Extrusions has been a reputed and socially responsible Emirati company for over 37 years with an extremely strong regional presence. Gulf Extrusions was the first extrusion company in the GCC region to receive the Emirates Quality Mark Certification from the Emirates Authority for Standardization and Metrology. The company is ISO Certified: ISO 9001:2008 in Quality Management, ISO 14001:2004 in Environmental Management, and ISO/TS 16949 in Automotive Quality Management. The company also won several awards in the last years for its Green Sustainability support being able to reduce 50% of CO2 emission in comparison to exploiting primary aluminum. The company has initiated a range of environment-friendly programs in line with its broader Corporate Social Responsibility agenda and commitment to sustainable development practices.