

ALUMINIUM – THE GREEN METAL

Introduction

Much has been said in recent months about the need for the construction industry to put its house in order regarding environmental issues. These include responsible and ethical sourcing of raw materials and manufactured products, designing for deconstruction, minimising in-process waste and maximising reuse of building products at the end-of-life stage. Add to these improving the energy efficiency of building and component designs and minimising the toxic effects of the manufacturing process and you have a significant task for all of us to tackle.

So what has the aluminium in building supply chain done to address these concerns and how is it going to further improve its performance to meet the ever tightening rules and regulations that our legislators believe are necessary if we are to save the planet?

Production

Starting in 1991 the International Aluminium Institute has monitored the performance of the large majority of global aluminium mining and smelting operations. The total area being mined at any one time is surprisingly small (260ha or 1 sq mile) and the vast majority of the sites are subject to formal rehabilitation plans and agreements with around 80% being restored to the native hardwood forest. Alongside these well established activities the smelters, in the period 1900 to 2000, have reduced the energy needed to produce alumina from bauxite by almost 70%. They have a current target of a 10% reduction in smelting energy from 1990 to 2010 and the use of the ever increasing (now over 60%) hydro-electric energy sources enhances their efforts. Add to this the fact that since 1990, despite a 54% increase in primary aluminium production, the global greenhouse emissions have been reduced by 32% and you see an industry that is highly proactive in improving its environmental profile.

Manufacturing and Use

Aluminium systems designers and fabricators make every effort to optimise bar and sheet stock sizes and use sophisticated software programmes to further reduce the in-process wastage to around 5%, of which virtually 100% is collected and remelted as clean scrap. The demand for aluminium fenestration, roofing, cladding and allied products, especially in the commercial and high rise residential sectors, remains high due to their well known and proven characteristics such as slim sightlines, low weight, corrosion resistance and durability. Its inherent ability to form a protective oxide coating on exposure to air plus the highly durable anodised and powder coating finishes now available make aluminium a very attractive and cost effective option for architects and specifiers.

Recyclability

Aluminium is already recognised as a valuable commodity by the construction industry and across Europe an average of 95% of the aluminium in buildings is collected for recycling (Delft Report). In fact the current price for clean scrap is very similar to that for prime aluminium while the cost penalties for processing powder coated and thermally broken scrap are relatively low due to the efficiency of modern refining processes. The recyclability of aluminium alloys can be summarised as the rule of 95;

95% is recovered from buildings, the process saves 95% of the energy needed to produce prime metal and typically 95% or more of the original material is recovered.

With a proven service life exceeding sixty years, a growing worldwide demand that enhances scrap values and an industry that continues to improve its environmental profile aluminium is truly a 'green' metal.