Local Government and Communities Committee

The Draft Climate Change Plan (RPP3)

Submission from the Modern Masonry Alliance

MMA submits this response for consideration by the following Parliamentary committees:

- Economy, Jobs and Fair Work Committee
- Environment, Climate Change and Land Reform Committee
- Local Government and Communities
- Rural Economy and Connectivity

Question 2

The scale of reductions proposed within their sector/s and appropriateness and effectiveness of the proposals and policies within the draft RPP3 for meeting the annual emissions targets and contributing towards the 2020 and 2050 targets.

In RPP3, the Scottish Government suggests that it strongly favours timber over other construction materials viewed as having higher embodied carbon, such as masonry and concrete blocks. Cement is one of the ingredients in concrete and although the embodied carbon of cement is relatively high, actually concrete/masonry is a low carbon product that is locally produced. NHBC Foundation research that resulted in the publication entitled ‘Operational and Embodied Carbon in New Build Housing’ states that the “No significant differences emerged between masonry and timber construction in terms of overall CO$_2$ impact over 60 and 120-year study periods.” Furthermore, only considering embodied carbon, the carbon emissions associated with the manufacture and transport of a product to the construction site, is entirely misleading and can lead to the wrong behaviours and decisions. Carbon must be considered on a whole life basis not just on an embodied basis. All materials have their place and their properties must be considered in the context of the building and infrastructure in which they are used. For example, use of thermal mass benefits of concrete can hugely reduce the carbon emissions from a building during its use by reducing the need for cooling and heating. Also, during the life cycle of concrete it will reabsorb around a third of the carbon emitted during manufacture.

Concrete and masonry also have many advantages over timber from durability to fire resistance, from acoustic performance to climate change resilience (flood, overheating and extreme weather. MMA believes that Scottish timber is not always

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1 Whole Life Carbon and Buildings, MPA The Concrete Centre, 2016
suitable for the majority of construction purposes, which results in the use of imported wood. Timber must undergo considerable chemical treatment before use, it is a fire risk whilst in use and at the end of life it is unrecyclable due to its classification as hazardous waste, a result of the required chemical treatment. Timber is not as carbon neutral as it may appear on the surface as the significant end of life emissions (burning and decomposition) are not considered when only the embodied carbon is accounted for and MMA challenges the Scottish Government to rethink its favouring of timber and instead provide stronger support for low carbon and locally produced masonry and concrete blocks for the reasons set out below.

Concrete is a low carbon product that has high thermal mass properties, which, when used correctly in buildings, enables the storage and then slow release of heat. This has the effect of stabilising the temperature within a building so that less heating is required in winter and less cooling is required in summer, but the benefits are year-round as the diurnal temperature cycle peaks are reduced. This in turn reduces the energy demand of buildings such that the embodied carbon dioxide of a typical building can be “paid off” within 11 years\(^2\). This ‘demand side flexibility’ offered by heavy weight buildings could be a key solution to the growing imbalance between energy demand and renewable energy generation\(^3\). As space heating alone accounts for around 20 to 50 per cent of a building’s energy consumption depending on type\(^4\), and around a third of the carbon emissions from all UK buildings\(^5\), concrete can make a valuable contribution to reducing emissions in residential and service sectors.

A recent study\(^6\) by the Mackintosh Environmental Architecture Research Unit has shown that overheating of a building in summer is by no means a problem limited to the southern half of the UK. The research involved two years of temperature monitoring in 26 new-build low energy homes in six developments located across Scotland. The results showed overheating to be a problem in nearly all of the dwellings, particularly in bedrooms. The key conclusion of the study was that whilst the risk of overheating is greater in southern England, the combination of heat retention and recovery, occupant behaviour and poor design largely overrides the benefit of a northern location. This suggests that the cooling potential offered by thermal mass is as relevant to housing design in Scotland as it is elsewhere.

Further benefits of concrete include that it is fire resistant and it is a very durable material so it needs to be replaced less often and when it reaches end of life, it is 100% recyclable.

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\(^2\) The Concrete Centre “Thermal Mass for Housing”, 2006
\(^3\) 3E Report for CEMBUREAU (The European Cement Association), “Structural thermal energy storage in heavy weight buildings- analysis and recommendations to provide flexibility to the electricity grid”, October 2016
\(^5\) INGENIA, Issue 31, Building Research Establishment, June 2007
Government statistics show that fires in timber framed buildings are more extensive than those of no special construction\textsuperscript{7}.

Masonry and Concrete also act as a carbon sink, partly while in use, but once crushed it has been shown to reduce the embodied carbon dioxide of cement leaving the factory gate by 20\% after a 160-year period in use\textsuperscript{8} RPP3 specifically singles out timber as the Scottish Government’s construction material of choice, but to dismiss masonry and concrete, when it can contribute so much to decarbonisation, is a mistake and would prevent Scotland from benefiting from the clear advantages that thermal mass and concrete can bring over the whole life of a building.

\textsuperscript{7} Analysis of fires in buildings of timber framed construction, England, 2009-10 to 2011-12; Department for Communities and Local Government; December 2012

\textsuperscript{8} Clear C and De Saullès T (2007) “Recarbonation Scoping Study”, British Cement Association