

Cold Bent Glass

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Overview | *Curved glass is widely used in modern architecture to form a curved facade. Cold bent glass is a relatively recent development where an initially flat glass plate is bent into a curved shape at ambient temperature. This is considered to be an alternative to traditional sag bending process wherein the glass is heated beyond its softening temperature. Cold bending is therefore cheaper and can be performed on-site. This project involves research into:*

- 1. The strength of chemically toughened glass by experimental investigations. This includes coaxial double ring tests and 4 point bending tests.*
- 2. The possibility of assembling multiple layers of cold bent glass namely: (a) a cold bent double glazed unit is considered where the glass is bent and bonded onto a curved frame and (b) a bent laminated glass is considered where two plates of glass are bent together and then bonded to each other to maintain the curved shape. The stress in adhesive is investigated by both analytical and numerical methods.*

Main Outcomes | *It is found that both configurations are possible with adequate curvature, adhesive properties and frame width. The surface strength of chemically toughened glass is found to have a minimum of 230MPa and follows a two parameter Weibull distribution. The edge strength was not tested but data from elsewhere was obtained and compared with own experiment results.*

Future Work | *Full investigation on edge strength of chemically toughened glass needs to be carried out. This will examine the true strength of glass panel under uniaxial bending and therefore the precise allowable curvature. Other aspects to look at include adhesive selection, frame stiffness and safety measures.*

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