INTRODUCTION – THEORY OF ENGINEERING AESTHETIC DESIGN

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BICC – CPD 10/02

AESTETHICS & COST

The Aesthetics of a structure is the outcome of the Social, Cultural, Geographical and Economic Contexts. The structure will be realised if Costs fall within an allocated budget. **Engineers study the variation of Cost with respect to the Shape &Proportion to design structures with Aesthetic qualities within an allocated budget.**
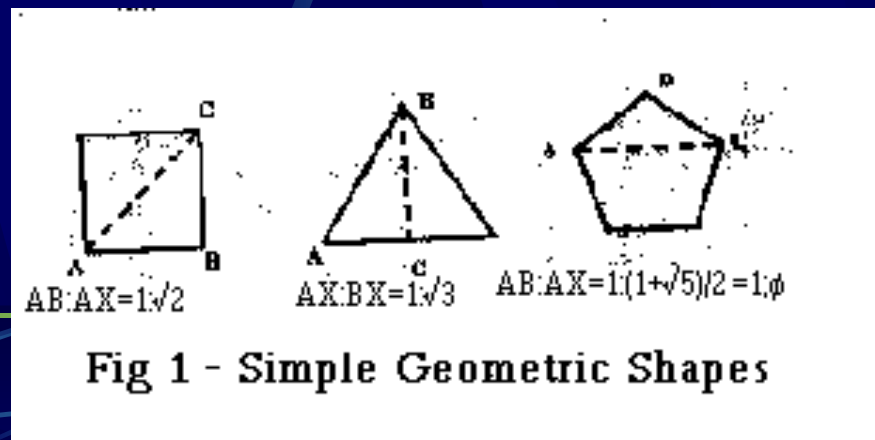
AESTHETIC BEAUTY, PROPORTION & HUMAN SCALE

Commensurable system of proportions

1:2, 2:3 and 3:4 mostly related in the major scales of western music.

Incommensurable system of proportions

1:√2, 1: √3 and 1:Ø (golden ratio = 1:1.618)

AB:AX=1:√2   AX:BX=1:√3   AB:AX=1:(1+√5)/2 =1:φ

Fig 1 - Simple Geometric Shapes

OPTIMISATION OF SIMPLE STRUCTURES
3-span Bridge

A minimum cost value is obtained when the ratio of mid-span to end-span is 1.3 however changing very little between the aesthetically appreciated ratio of unity and golden ratio.

FIG 2 - APPROXIMATE OPTIMISATION CURVE FOR 3- SPAN BRIDGE