

OPTIMUM SHAPIAL BUILDING STRUCTURES – AN ECONOMICAL ESTIMATION

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1. INTRODUCTION:-

Civil Engg discipline has been the assimilated term since genesis of engg, which includes construction, design, supervision, quality, management and safety in public, private cum commercial structures like bridges, dams, roads, buildings-complexes-industries-malls-banquets, water supply and sanitary, which has meaning with durability, life longing, comfort, appearance and economy. With these objectives, various disciplines have come in notice like architecture, environment, surveying, valuation, town planning, construction management and public health which are included in civil engg on which special optional courses are being run in existing scenario.

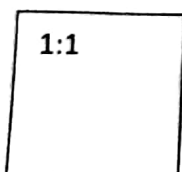
While going on massive construction it has always been criteria and human tendency that construction should be appealing, durable and economically sound. For this most commonly we often compromise with the quality of materials and engage sub class lab ours. But we don't think about the shape of the structures. I have observed that shapial changes in the structure may develop cheaper construction cost. The matter came to my mind while I was teaching the subject Estimating Costing & Valuation, where I found during estimation of buildings that for the same plot coverage if changes in the shapes of the rooms i.e. drawing dining, store, stair-case, kitchen and toilets etc is done, the parametric length of overall walls are reduced which gives an economy while doing masonry work, plaster work and white/colour washing/ snowcem. Due to this parametric change in length involving the suitability of the rooms by **changing** shape with acceptability and accommodability, it has revealed through this paper that up-to 15% cost **reduction** can be done without affecting the strength of structure. Most of builders are using same theme for their cost benefit and for the safety of structures.

Here concept is that, lesser the wall length, lesser the cost during the construction and vice-versa. Most of architects, drawing drawer[draughtsman], engineer and designer may be aware/unaware with these facts, however an attempt has been made through this article to conform the economy in structures. The shapes of the rooms are very important for good looking and utility cum serviceability of structure as well as for Vastu shastra.

Here square, various ratios oblongs, circular, triangular, hexagonal, octagonal, semi hexa and semi circular shapes have been shown vis-à-vis there circumference to demonstrate their differential aspects for assessing economical estimation and valuation as well.

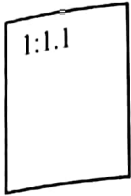
2. SHAPES AND THEIR ASPECT FOR-UNIT-AREA:-

{a} Ratio 1:1 , perimeter =4 , Height=1.0, Width=1.0

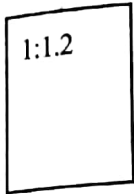


(desirable for drawing room, bathroom, store, lobby and toilet etc)

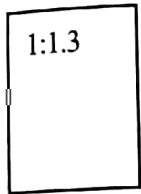
{b} Ratio 1:1.1, perimeter=4 , Height=1.05, Width=0.95



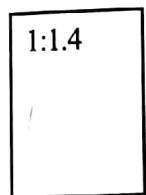
{c} Ratio 1:1.2, perimeter=4.02 , Height=1.10, Width=0.91



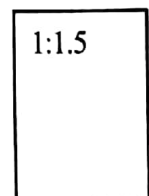
{d} Ratio 1:1.3, perimeter=4.04 Height=1.14, Width=0.88



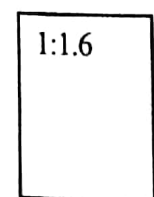
{e} Ratio 1:1.4, perimeter=4.06 , Height=1.18, Width=0.85



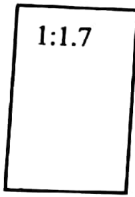
{f} Ratio 1:1.5, perimeter=4.1 , Height=1.23, Width=0.82
(desirable shape most commonly in rooms for effective space use)



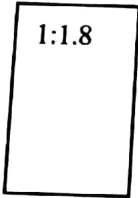
{g} Ratio 1:1.6, perimeter=4.1 , Height=1.26, Width=0.79



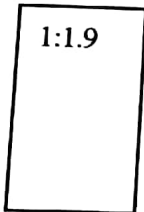
{h} Ratio 1:1.7, perimeter=4.16, Height=1.31, Width=0.77



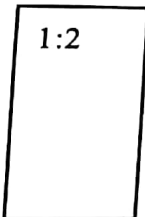
{i} Ratio 1:1.8, perimeter=4.18 Height=1.34, Width=0.71



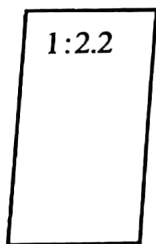
{j} Ratio 1:1.9, perimeter=4.2, Height=1.38, Width=0.72



{k} Ratio 1:2, perimeter=4.26 Height=1.42, Width=0.71



{l} Ratio 1:2.2, perimeter=4.31, Height=1.48, Width=0.62

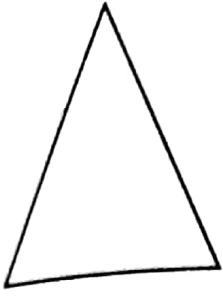


{m} Circular perimeter=3.54 Dia=1.13 Dia=1.13

[This is desirable shape for chaukidar's cabin, typical staircase, booking window etc]

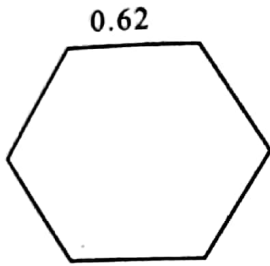


{n} Triangular shape perimeter= 5.12 Height of triangle=2.0 Two sides of the triangle=2.06

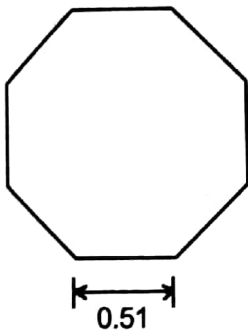


{o} Hexagonal shape, perimeter=3.72

This shape may be used in malls, theatres, library and canteen etc

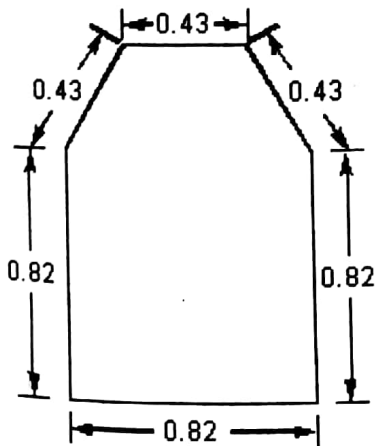


{p} Octagonal shape perimeter = 4.08



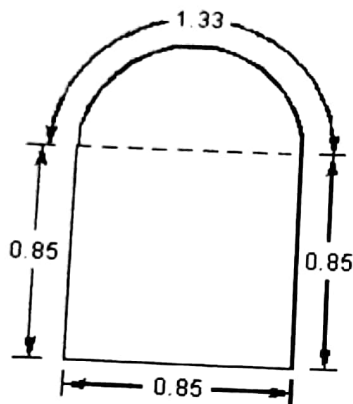
{q} Quasi hexagonal shape perimeter = 3.78

This shape is usually used in bungalow, officers quarters etc



{r} Quasi circular shape, perimeter = 3.88

Generally used for drawing room, Gust room & stair case



3. OBSERVATION FOR ECONOMY:

For economical construction, an observation table is being made to aware technocrats, included in construction activities.

Sl No	Room size ratio	Perimeter	Extra cost % age wrt circular shape	Extra cost % age 1:1.6 ratio room	Extra cost %age wrt square shape	Extra cost %age wrt semi hexa	Extra cost %wrt semi circular
1	1:1	4	13%	-	-	5.8	3.09
2	1:1.1	4	13%	-	-	5.8	3.09
3	1:1.2	4.02	13.56%	-	0.5	6.35	3.6
4	1:1.3	4.04	14.12%	-	1.0	6.88	4.12
5	1:1.4	4.06	14.69%	-	1.5	7.4	4.64
6	1:1.5	4.10	15.82%	-	2.5	8.46	5.67
7	1:1.6	4.10	15.82%	-	2.5	8.46	5.67
8	1:1.7	4.16	17.5%	1.46	4.0	10.05	7.21
9	1:1.8	4.18	18.08%	1.9	4.5	10.58	7.73
10	1:1.9	4.20	18.64%	1.95	5.0	11.11	8.2
11	1:2.0	4.26	20.34%	3.90	6.5	12.69	9.79
12	1:2.2	4.31	21.75%	5.12	7.75	14.00	11.08
13	CIRCULAR	3.54	-	-	-	-	-
14	TRIANGLE	5.12	44.6%	24.88	-	-	-
15	HEXA	3.72	5.08%	-	28%	35.45	31.96
16	OCTA	4.08	15.25%	-	-	-	-
17	SEMI-HEXA	3.78	6.78%	-	2	7.9	5.15
18	SEMI-CIRCULAR	3.88	9.6%	-	-	-	-
						2.6	-

4. CONCLUSION:

The matter is highlighted through this technical title, which consists of using various inside shapes of the structure that may be accommodated according as suitability, acceptability and affordability for the structure makers, involved directly as owner or builder. To develop economy, while erecting building structure, an effort has been made to brought into notice to the colonizers, valuers, estimators, quantity surveyors, architects and drawing makers to consider these special outlines while inviting tenders, contracts and valuation work. As things are becoming dear, hence to reduce construction cost an alternative method of shaping structure, becomes mandatory to all of us, which is the need of the hour.