

Crinkle Crackle Walls: Solving Thickness Vs Strength Design Contradiction

Walls are an essential component of any civil structure, now to make a straight wall that is sturdy, you need at least two layers of bricks.

Now if you want to reduce the construction cost and therefore decide to use only single layer of bricks then the wall is not sturdy as you may want it to be. We have a technical contradiction here.

This contradiction in simple English will read as “we want to use single layer of bricks to reduce cost of construction, but we also want wall to be sturdy which we think we may not achieve with single layer of brick construction”.

When we have technical contradiction, we can use TRIZ contradiction matrix to guide us to the solutions. The above contradiction can be mapped in the contradiction matrix to find what inventive strategies we can use to arrive at the solution.

The parameter that we are trying to improve is thickness of wall. Improvement here means reduction of wall thickness by using single layer of bricks (Contradiction Matrix Parameter **#4** Length / Angle of stationary object, since wall is stationary object) but the parameter that goes worst as a result of this is strength of the wall (Contradiction Matrix Parameter **#20** “Strength”)

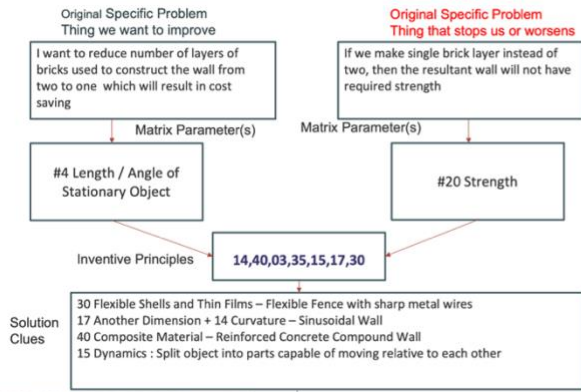
The inventive principles that are applicable for this pair of contradiction are 14,40,03,35,15,17,30. Interestingly we see applicability of two principles here 14-Curvature and 17-Another Dimension

Now only curvature would have led us to an idea of ‘curved walls’ but that would not have solved the problem because one can’t have curved walls along a long length of fencing. Now here combining principle **#14** curvature with inventive principle **#17** another dimension helps. The principle **#17** states “if an object moves in a straight line, consider use of dimensions or movement outside the current plane”. Combining these two principles **#14**-Curvature & **#17**-Another Dimension the idea of sinusoidal curve walls strikes us... Voila!!!! Here are the sinusoidal shape walls which are more prevalent in England and used for fencing estates.(Refer Image on the next page)

We see lots of other applications of this idea; asbestos sheet is one such example. If you are having such a contradiction in your technical system, this idea is worth a try. Other solutions from principles are flexible fencing, steel reinforced concrete walls, collapsible fencing etc.

There are possible 2450 number of possible contradictions that a Design, QA, Process Engineer may face while improving a technical system. TRIZ contradiction matrix can suggest them focussed inventive strategies that either in standalone manner or in combination will help arrive at the ingenious solution. Building innovation capability will aid your organisation’s endeavour to have best products, processes & business models.

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Crinkle Crackle Walls Principle 14 + 17

Inventive Principles Nomenclature

- 14 – Curvature
- 40 - Composite Material
- 03- Local Quality
- 35 – Parameter Changes
- 15 – Dynamics
- 17 – Another Dimension
- 30 – Flexible Shells & Thin Films



Asbestos Sheets is Another application of same idea



Flexible Fencing Principle 30



Crinkle Crackle Walls (Principle 15)



Pre-Cast Steel Reinforced Concrete Wall (Principle 40)