

A17 – A THE LAWS OF DESIGN

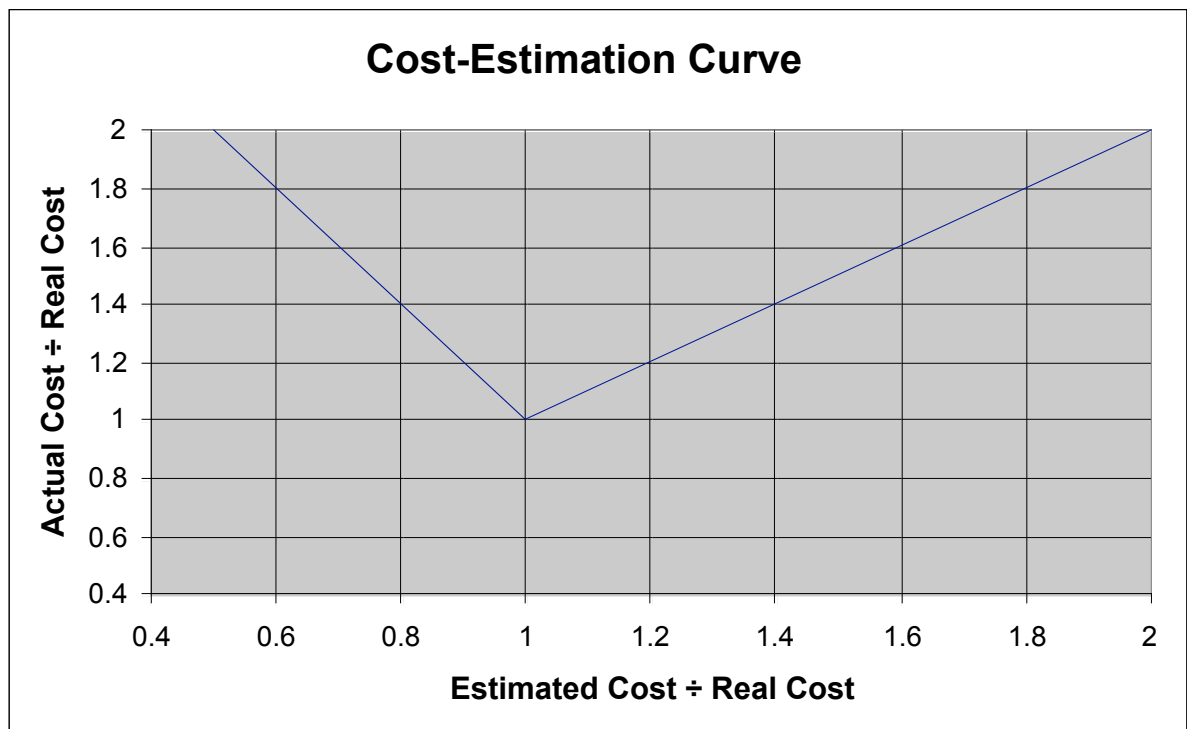
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Engineering design is often treated as rather sterile because it is widely studied and taught in a way divorced from human behaviour – as though design could be taught to an automaton. But because design is a distinctly human endeavour, any Laws of Design must recognise the human element. Here we will discuss the human characteristics of the discipline of design and show that this can often lead to further insights. The laws will be illustrated with examples.

LAW #1

*For every dollar a project is under-estimated, it will be overspent by three dollars.
Further, except in very unusual circumstances, a project is never over-spent.*

From this law we may deduce the cost-estimation curve which plots the actual cost of a project as a function of the estimated cost.



It is immediately apparent that the actual cost of a project is minimised when the cost estimate is accurate and realistic. In the right-hand branch of the curve, project managers are applauded because the project is “on-budget”, even if cost is (say) 50% more than necessary. By contrast, 10% under-estimate results in a 33% over-spent project and severe recriminations. Therefore, it has become customary to over-estimate projects.

LAW #2

The difference between a good and bad designer is the ability to make decisions early with scant information. Bad designers will only make decisions when they have no choice, that is, when circumstances dictate decisions.

Bad designers usually justify their behaviour by suggesting that they are keeping their options open as long as possible. This is a desperate attempt by the inept to keep control over the job. However, the reality is otherwise: if circumstances dictate decisions the designer has actually lost control of the design. Only experience can teach good design skills.

There is an important corollary to the above dictum: *The cost of decisions in a project increases sharply as the project nears completion.* Thus, bad designers not only deliver inferior products, they are also more expensive.

LAW #3

People that work with equipment know more about it than even the designer.

I could quote many examples of this law: relentlessly draining the budgets of plants and projects alike, but I will offer only one or two.

LAW #4

The total cost of a commodity is equal to the unit rate multiplied by the amount.

It seems ridiculous that such a simple law even needs to be stated to such a numerate group as gathered here; but there are so many cases where it is ignored that we obviously need to be reminded.

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