Overengineering

Overengineering (or **over-engineering**, or **over-kill**) is the act of designing a product to be more robust or have more features than often necessary for its intended use, or for a process to be unnecessarily complex or inefficient.

Overengineering is often done to increase a factor of safety, add functionality, or overcome perceived design flaws that most users would accept.

Overengineering can be desirable when safety or performance is critical (e.g. in aerospace vehicles and luxury road vehicles), or when extremely broad functionality is required (e.g. diagnostic and medical tools, power users of products), but it is generally criticized in terms of value engineering as wasteful of resources such as materials, time and money.

As a design philosophy, it is the opposite of the minimalist ethos of *"less is more"* (or: "*worse is better*") and a disobedience of the KISS principle.

Overengineering generally occurs in high-end products or specialized markets. In one form, products are *overbuilt* and have performance far in excess of expected normal operation (a city car that can travel at 300 km/h, or a home video recorder with a projected lifespan of 100 years), and hence are more expensive, bulkier, and heavier than necessary. Alternatively, they may become *overcomplicated* – the extra functions may be unnecessary, and potentially reduce the usability of the product by overwhelming lesser experienced and technically literate end users, as in feature creep.

Overengineering can decrease the productivity of design teams, because of the need to build and maintain more features than most users need.

Excessive pursuit of simplicity and minimalism in a product in order to avoid these effects, however, can result in premature optimisation, potentially to the detriment of the project due to diminishing returns on time and effort invested in the design process, thus also constituting overengineering.

A related issue is market segmentation – making different products for different market segments. In this context, a particular product may be more or less suited (and thus considered over- or under-engineered) for a particular market segment.

Contents

Cultural references

A story about very precise engineering is given in the 1858 story *The Deacon's Masterpiece or, the Wonderful "One-hoss Shay": A Logical Story* by Oliver Wendell Holmes, Sr., which tells of a carriage (one-horse shay)

> That was built in such a logical way
> It ran a hundred years to a day,
> And then,
> ...
> went to pieces all at once, --
> All at once, and nothing first, --
> Just as bubbles do when they burst.

Because it had been engineered so that no single piece failed first – no piece was over-engineered relative to the others, and they thus all collapsed at the same time.

A similar quote by Ferdinand Porsche claimed "the perfect race car crosses the finish line in first place and immediately falls into pieces."

A modern example is Juicero, a wi-fi "smart" juicing press. But after its release, Bloomberg News published a story that showed that the juice packs could be squeezed by hand faster than the press, and that hand-squeezing produced juice that was indistinguishable in quality and near-indistinguishable in quantity from the output of the machine, which cost $400 even after a price reduction.[1]

See also

- Technical debt
- Feature creep
- Overqualification
- You aren't gonna need it (*YAGNI*)
- Premature Optimisation

References

1. "Silicon Valley's $400 Juicer May Be Feeling the Squeeze" (https://www.bloomberg.com/news/features/2017-04-19/silicon-valley-s-400-juicer-may-be-feeling-the-squeeze). *Bloomberg.com*. 2017-04-19. Retrieved 2017-04-21.

External links

- "Stop Over-Engineering! (http://www.industriallogic.com/wp-content/uploads/2005/09/StopOverEngineering.pdf)", *Software Development* magazine, Joshua Kerievsky, April 2002
- "Overengineering: How much is too much? (http://www.edn.com/electronics-blogs/edn-blog-postings--january-2008/4327368/Overengineering-How-much-is-too-much-)", *EDN* magazine, Paul Rako, January 2008