Sein

CULTURE CHANGE

# Changing Culture in Engineering-based Organisations

by Conor Wynn, PhD.

Some say that engineers are ill equipped to change culture, but the opposite is true. If there's one thing engineers are great at, it's building things, so why not culture? This article explains how.

# ‘Culture kills strategy’

**A large engineering-based business with a long history faced a strategic crisis. They needed to deliver six times more project output than before, but culture was getting in the way. Slow moving, bureaucratic, and operating in silos, their culture was no match for the crisis they faced.**

Change wasn’t going to be easy; the old culture wouldn’t go without a fight. To make matters worse, it was being run by engineers, who, if the stereotype is to be believed, didn’t have the skills needed for culture change.

## Behaviour needed to change

This engineering-based business had been in a very stable environment. Arguably it hadn’t changed much in 50 years. Its internal organisation had been well aligned with its external environment – both were conservative and slow moving. Though the culture was hierarchical, and bureaucratic, in managing a very long-term significant asset base there are advantages to being conservative. Mistakes can be long-lasting and costly.

In an engineering organisation competency is crucial, so it’s easier to spot a less than stellar engineer than many other professions. As long as the organisation is minimally functional, the more competent people should rise to the top even if it is through experience. So, there’s a tendency for an engineering organisation in a stable environment to be hierarchical based on competency, or its proxy, seniority.

So, this organisation was conservative, slow moving and bureaucratic. But the strategic crisis created a new environment which effectively stranded the old corporate culture. The organisation needed to become more innovative, responsive, and pragmatic.

Unfortunately, being run by engineers the received wisdom was that this wasn’t going to go well. The stereotype for engineers runs like this: most engineers are men, and men are more interested in things than people.[1] But culture change requires good people skills and so engineers, being less interested in people than things, have little chance of being good at culture change.

**The challenge facing the leadership was how to bring about the culture change they needed.**

1. Su, R., Rounds, J., & Armstrong, P. I. (2009). Men and things, women and people: a meta-analysis of sex differences in interests. *Psychological Bulletin*, 135(6), 859.

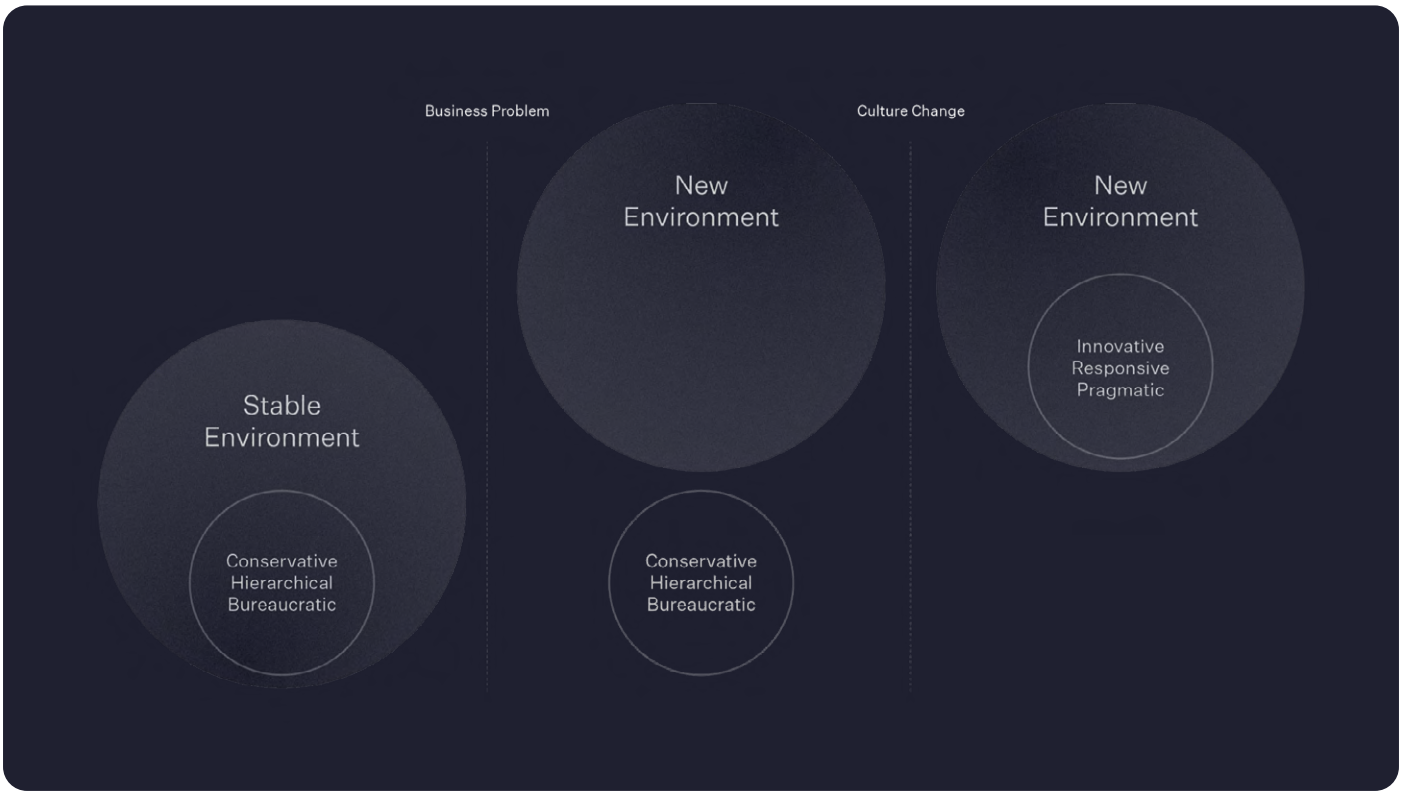


**Figure 1:** Re-aligning culture with the external environment.

# Targeting beliefs directly is not effective

Though it's tempting to target a belief directly, e.g., slow moving, one of the difficulties is that beliefs are complex and hard to change. What's shown here is a simplified version, based on Ajzen's ***Theory of Planned Behaviour***[2].

Ajzen's view is that beliefs are made up of three elements. Norms, which is a combination of how you are expected to behave and how you actually behave, those two things being quite different.

In other words, don't do as I do, do as I say. Attitudes, which is a combination of how you feel about a behaviour versus how good you think that behaviour will be for you.

In other words, we're prepared to put up with some short-term pain around a behaviour if it gives us a long-term benefit, and clearly there's some personal differences and how those trade-offs are managed.

And thirdly control which is the capacity and the challenge involved in undertaking your behaviour so each of those three elements have two components of the two components within them.

This is a very simplified model, yet illustrates that beliefs are complex, requiring more than good comms or some executive coaching to change. A "coaching session" or workshop could either miss or misunderstand much of this.

2. Ajzen, I. (2011). The theory of planned behaviour: reactions and reflections. *Psychology & Health, 26(9)*, 1113-1127.

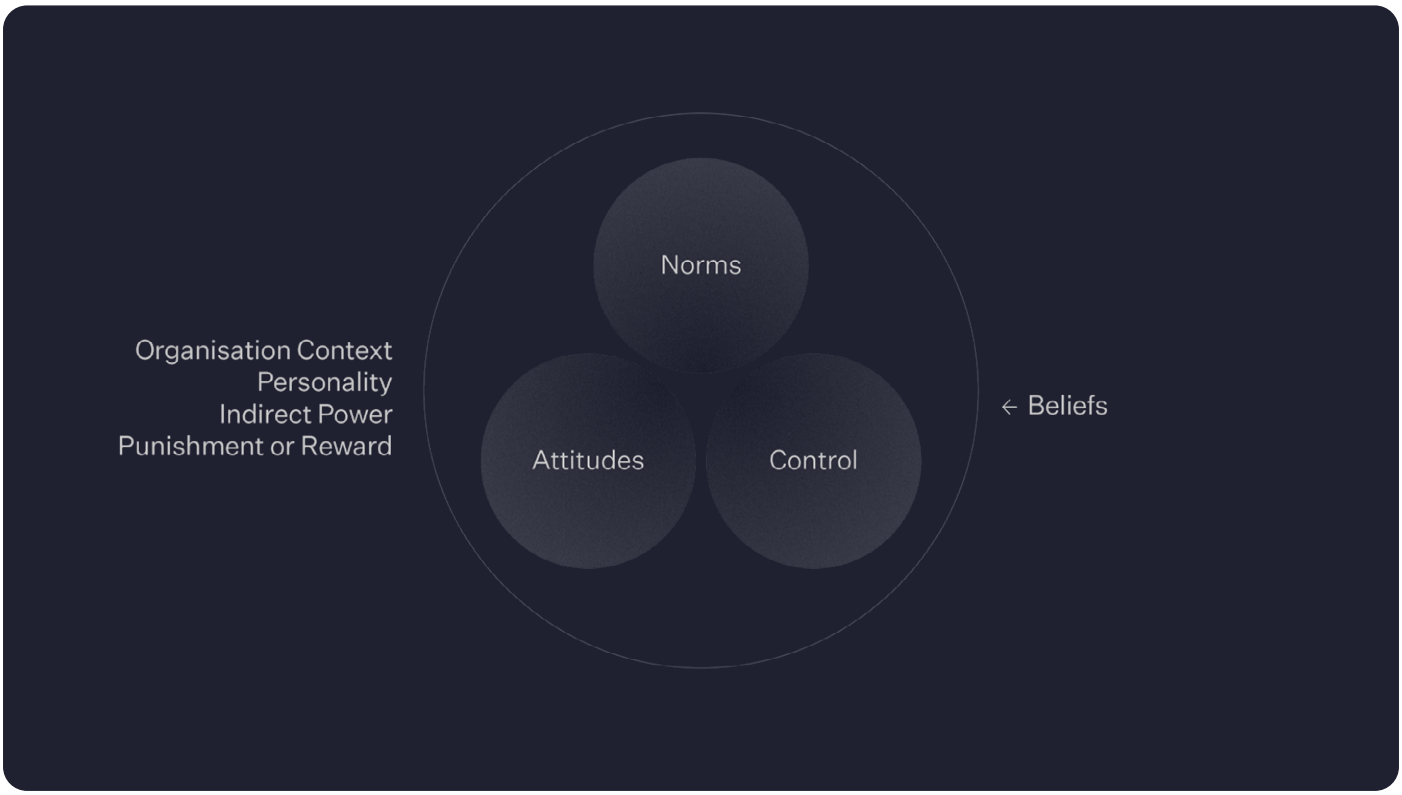


**Figure 2:** Ajzen's Theory of Planned Behaviour.

# Change context to change behaviour

While it's taken as axiomatic that changing context changes behaviour, these two examples to illustrate the point. First, judges make different decisions depending on the time of day. You would think that lawyers and judges who've been trained extensively in the law and have come up through the ranks would be largely impartial and objective. Unfortunately, not it seems.

A study found that you are between two and six times more likely to be released if you are one of the first three appearance before the judge rather than the last.[3] So, it pays to appear early because a favourable ruling is much more likely early in the day or after a meal or a break than later in the day and when it's been a long time since they've been break. Even the time-of-day influences something as consequential as a judicial decision.

Secondly, a commonly referred to example is that questions framed positively results in different decisions than when those same questions are framed negatively. This is called prospect theory and is credited to Kahneman and Tversky who popularised it in their book ***Thinking Fast and Slow***.[4] The research asked a question about a treatment in response to a pandemic which is oddly ironic. And depending on how the question was framed, decisions changed.

3. Danziger, S., Levav, J., & Avnaim-Pesso, L. (2011). Extraneous factors in judicial decisions. *Proceedings of the National Academy of Sciences*, 108(17), 6889-6892.
4. Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.

# Here's how engineers changed culture

**The organisation changed after the leadership of the organisation made four key changes to context. They set up power structures that broadcast new behavioural cues and in response those affected changed their beliefs. That's how indirect power works – "... to structure the possible field of action of others..."** [5]

## Leadership made four changes

The leadership of this organisation made four key changes to context.

1. They started to **measure culture** with a well validated culture instrument.
2. They entered **alliance contracts** for most of their project work.
3. Their internal engineers and project managers worked alongside alliance project managers and engineers in **project-based teams**, and were co-located away from their normal office environment, rather than working in silos.
4. **Unacceptable behaviour was policed.** In other words, people who pushed back against a more innovative approach to engineering standards were noticed and their behaviour was picked up.

Those four changes to context provided four strong cues that influenced beliefs.

- First, it became clear to people that they were being watched through the culture instrument.
- Second, the alliance contract environment with an injection of external capability meant that when traditional engineering approaches didn't seem to be effective, they were encouraged to challenge and innovate.
- Third, because engineers and project managers were co-located, the cue or message was that there was to be no more silos. Co-location was the physical manifestation of that cue.
- Fourth, those who we're not listening or continuing to push back were punished.


**Figure 3:** Change context to change behaviour

5. Foucault, M. (1982). The Subject and Power. *Critical Inquiry*, 8(4), 777-795. https://doi.org/10.1086/448181

In this case we had very senior management in engineering who were wedded to the idea that traditional engineering standards were set in stone and project delays were a legitimate consequence of sticking to that interpretation of engineering standards. This power struggle was brought to a head and a number of senior engineering managers were asked to leave. While asking people to leave is a direct use of power, it also has a very strong indirect effect on those that remain. The message being that those who resist too long or too hard will be punished, harshly. Sociologists call these sanctions, or norms about norms.[6]

This power struggle happened not just at senior management levels but spread to their direct reports for example with the construction of large structures which had traditionally been built of a special kind of steel. Since the lead time for the steel specified by the engineering standards team was several months, and the materials hadn't been ordered in time the schedule was in real danger. The old culture – worn as a shield by some senior engineering staff was – "... too bad, the project will have to wait for the right steel."

A young engineer working alongside an alliance contractor came up with an alternative approach to delivering the same outcomes, made of re-enforced concrete rather than steel, which was cheaper and crucially much faster than steel construction. The new culture had defeated the old symbolically and pragmatically.

# Resistance was slowly crushed

**Structure change resulted in new cues, namely that you're being watched, that you should challenge and innovate, that there should be no more silos, and that you will be punished if you resist too hard and too long.**

So, a number of norms were changed, not only how people ought to behave, and how they did behave. Engineers and project managers listened not only to the messages from above about how to behave but also paid attention to how other people around them actually behaved.

As norms were changed, attitudes too were impacted. Engineers and project managers asked, "how do I feel about the behaviour that's being required of me here?" In other words, how do they feel about challenging traditional interpretations of the standards and innovating?

And secondly did they think it was going to be worth their while? Was there a personal payoff with that behaviour? The combination of those two lead our engineers to have either a positive or a negative attitude towards behaving the way the new culture was asking them to behave.

Resisters initially pushed back against the new culture, determined to defend the traditional approaches to engineering solutions. But that resistance didn't survive the feedback loop from those who complied. As more people complied, pressure on the remaining resisters increased. Though they initially felt resisting was going to be tough, they thought it would be worth the struggle.

But as the feedback loop from the social proof of compliance spun up, the weight of expectation layered up with each cycle and bore down on them. The strain of continually pushing back became harder to bear. And when they saw how other resisters were treated, they questioned the value of the payoff from that suffering. They suffered stress, lost sleep, and work mates began to socially isolate them. In time they stopped resisting and compromised.

6. Goffman, E. (1971). Relations in public: Microstudies of the social order. London: *Allen Lane*.

One instance of this was an engineer who was convinced that his calculations were right and that the efficiency of a plant he had designed should be 98%. But in order to do so it would make the construction of the plant more expensive than the alliance team could build it for.

Once again just as with the tanks a culture battle broke out around the efficiency of this new piece of plant. That engineer battled not only with senior management, but with the alliance and the rest of his team members, insisting that the efficiency of the plant should be at 98% versus the alliance at 95%. After too many sleepless nights, social isolation and being stranded by management, he settled on 96% efficiency, a kind of moral victory for him and a compromise that came at some personal cost.

There were others though who no matter how often they went around that loop of resisting did not change attitude to the point where senior management intervened and punished them by asking them to leave the organisation.

**If punishment is in place to enforce the new norms,** you either comply, compromise – at a personal psychological cost – or go out on your shield.

Crudely, the mechanisms are a combination of norms and attitudes, re-enforced with punishments or rewards. Nonetheless the result was that capex delivery increased six-fold, the programs were delivered on time and to budget, within tolerance.

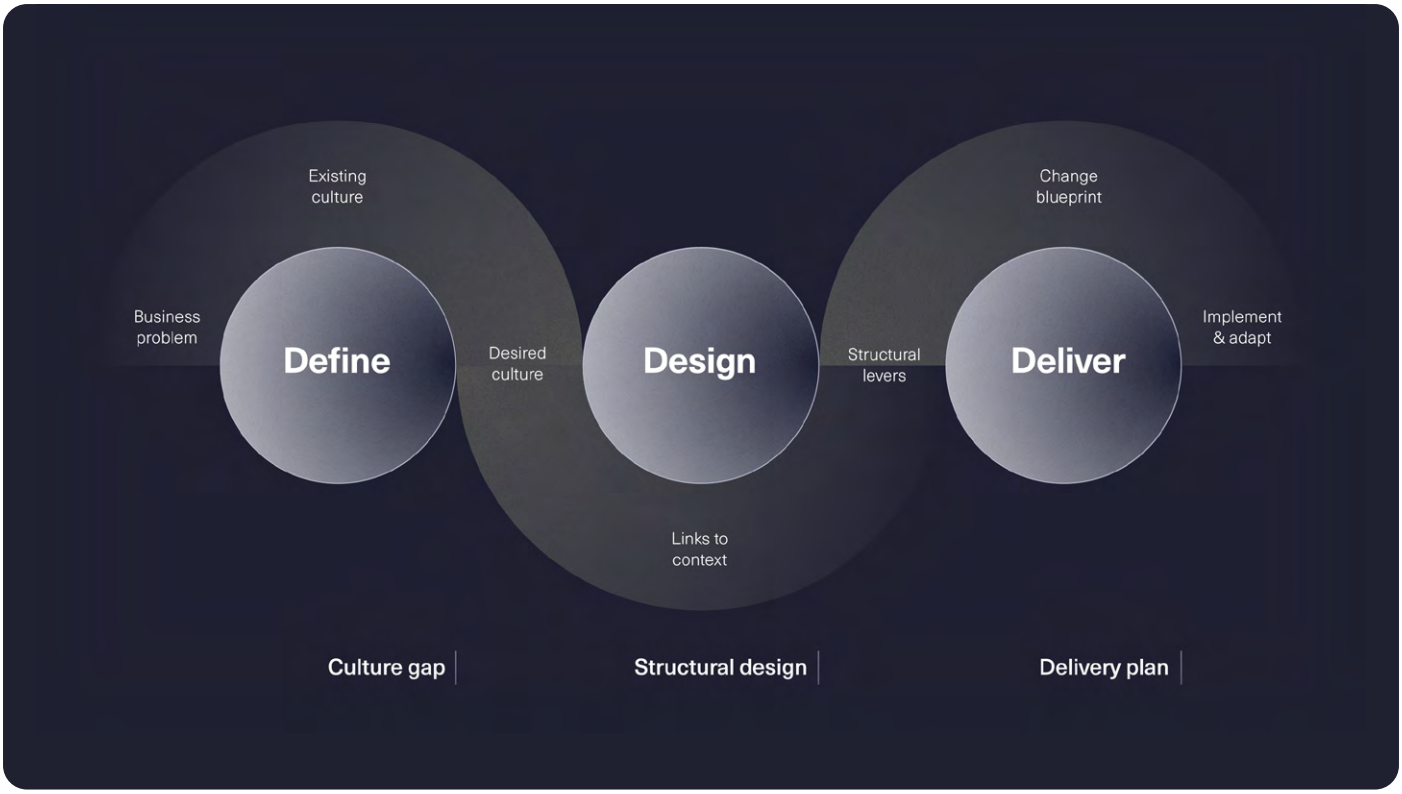


**Figure 4:** Three Steps to Culture Change

# Three steps to culture change

**In summary, to change culture there are three key steps: define, design, and deliver.**

## Step One: Define

In the first step what you're trying to do is identify the culture gap. So, start by looking at the business problem. And it's hard to over-emphasise this.

Culture change for change's sake, or that's ideologically driven, is a bad place to start. There needs to be value on the table, either in the form of preventing value loss or growing the business. Either way culture change has to be business problem driven if it's not to degenerate into propaganda.

In this case it was plain, they needed to grow capex delivery six-fold in a very short time period, and culture was getting in the way.

And the third part of Define is to look at what would the culture look like if it was to support or enhance or enable strategy or help solve the business problem. The new culture our organisation was looking for was innovative and collaborative.

## Step Two: Design

Once the gap between existing and desired culture is understood, it's time to bridge it. That happens in the second stage. What you need to do is link it back to the sources of cues that are causing the wrong behaviour. Ones which if changed would lead to the desired culture. This is what we call links to context. In our case one of those links was physical location. The other was a monopoly supply internal engineering standards team.

On the basis of that analysis, you can identify the structural levers to pull to change your culture. So, in this case when engineers were taken from their old desks and collocated with others in the organisation and mixed in with alliance contractors, much of the silo or bureaucratic behaviour evaporated.

## Step Three: Deliver

The third step, Deliver, involves intervention refine, detailed design and implementation. However, as these are mature change management practice areas, little further insight is proposed here.

**In summary, a powerful way to change culture is rather than just focussing on people and their behaviour directly, to do so indirectly by building new structures that change context and influence behaviour through new behavioural cues.** So, by focusing on things rather than people, and building structures, you can build a new culture.

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**This article is based on a case study of a large engineering-based organisation that faced a strategic crisis and needed to change its culture, as that culture was getting in the way of its business objectives.**

The case study was published in a special edition of the Project Management Journal,[1] presented at a webinar for Engineers Australia[2] and the subject of a LinkedIn Webinar.[3]

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1. Wynn, C., Smith, L., & Killen, C. (2021, 2021/12/01). How Power Influences Behavior in Projects: A Theory of Planned Behavior Perspective. Project Management Journal, 52(6), 607-621. https://doi.org/10.1177/87569728211052592
2. Wynn, C., (2021) Changing Culture in Engineering-based Organisations. Engineers Australia. https://portal.engineersaustralia.org.au/event/2021/06/changing-culture-engineering-based-organisations-37891
3. Wynn, C. (2022, Jan 26). Changing culture in engineering-based organisations [Webinar]. LinkedIn. https://youtu.be/_jKHIwM-d9k