

# Table of Contents



# Challenge Assumptions

Fig. 1: A military aircraft (the Su-47) with forward-swept wings.



The angle of the “V” between the two sets of cylinders in a V-8 auto engine is 90 degrees. Why? What's so magical about 90 degrees? Why was a 90 degree V chosen to begin with? What was the original problem that the V solved? Are there any other solutions? Are there any new technologies, materials, or methods that make those other solutions better than the actual one?

Would it surprise you to know that there are alternative piston arrangements that are just as good?

Say you have to design a high-speed airplane. It would be perfectly natural to design the wing of that plane to be swept backwards from the root to the tip. After all, pretty much all planes are designed that way. There must be a good reason for it, right? The alternative, a so-called forward-swept wing, looks very weird, but actually makes the aircraft much more manoeuvrable. This is because a plane with a forward swept wing is inherently unstable - no human can fly it. But *computers* can fly such a configuration, because computers can make the thousands of necessary adjustments per second to keep the plane flying. The assumption that a conventionally swept wing is the only reasonable solution is not valid (any more).

This is a great example of how the **balance** of a situation can change over time. Forward swept wings are aerodynamically unstable. Before computer technology had advanced to the point of being able to control such configurations, it was simply impossible to control an aircraft with forward swept wings. Backward swept wings were the best balance point. However, computer technology changed the forces acting on that design situation, and unbalanced it. Forward swept wings re-balance the situation in light of the new computer technology.

So challenge the assumptions of your design. Ask “why?” whenever someone makes a statement about how the product must be. Many times there are excellent reasons that you really cannot dispute. But when you come across an assumption that isn't really valid, then you've got a better chance of coming up with a substantially different (and hopefully better) design.

In asking *why*, you are really asking *What function does that serve?* Once you understand the functions involved, look for other ways to achieve those same functions.

- See Also: [why why why](#)

[creativity](#), [method](#), [balance](#)

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