

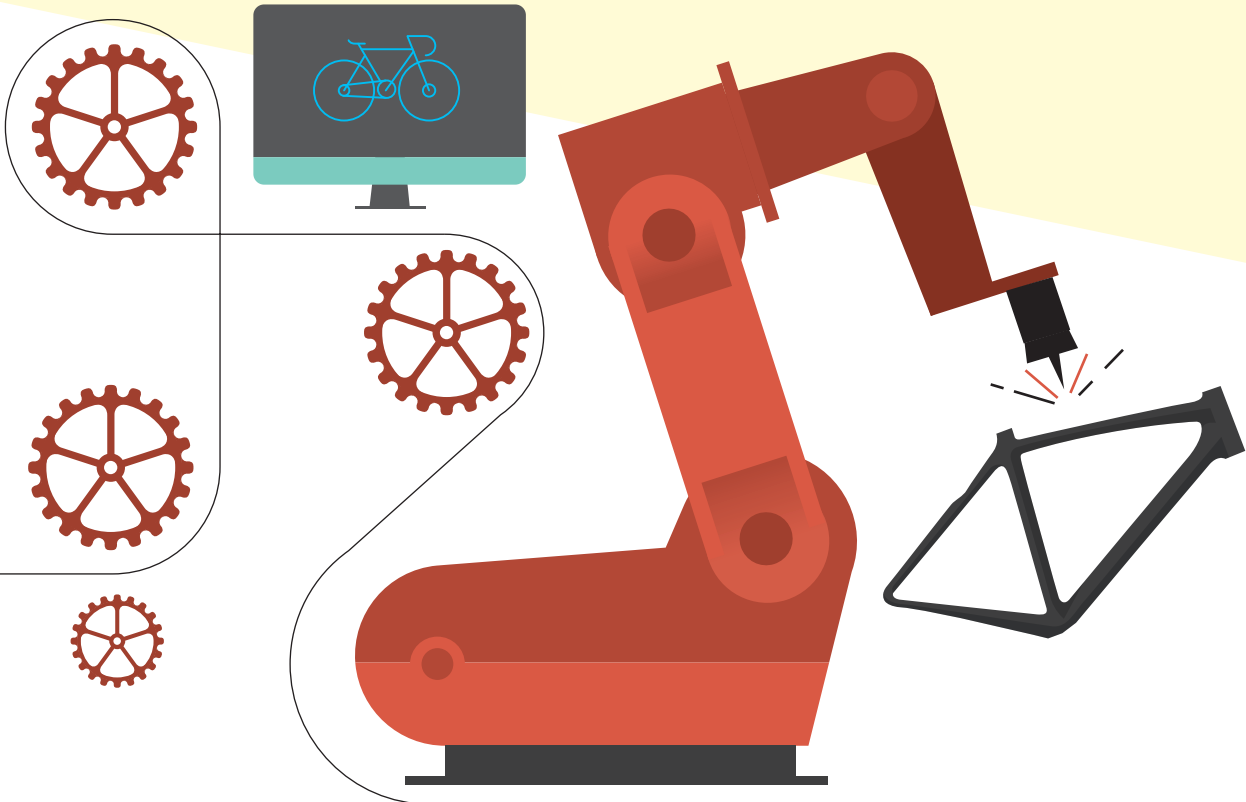


Three steps in one

From traditional tests to [simulation](#)
up to product [optimization](#).



The challenges of business environment, strategic marketing and design



A bigger market, more demanding buyers

Your company is one player among many, facing **more and more competitors** due to **globalization**. In a market that has gone global, both B2B and B2C consumers are better informed and increasingly **demanding**: they no longer tolerate “mediocre” products, and they expect **updated offers** at an ever-faster pace.

This creates **cost** and **performance pressure** and instils a sense of **urgency**: you have to guarantee a competitive, high-quality offer and yet still scale back your time-to-market.



Business challenges

Are you the president of a manufacturing company? Then you are working in an increasingly demanding environment that requires you to:



- **Win market share** while reducing resources (workers, number of prototypes, equipment)



- **Reduce the risk of delay** for market launch



- **Reduce financial risks** related to the development budget (cost overruns)



- **Build and maintain a strong brand image** in terms of quality and sustainable development

Technical challenges

Are you the engineering director or project manager? Then you are confronted with **conflicting demands** (tougher strategic objectives/ same or fewer resources). You have to:



- **Fulfil development objectives** for all products planned by management, with more budget constraints and less time



- **Stabilize fixed costs:** no hiring, because salaries are among the highest costs



- **Reduce the number of prototypes produced**, because they consume primary materials and energy, cutting into the budget

Methods that involve **trial-and-error** and **intuition** are no longer an option: the uncertainty is too high in terms of costs and time.

An impossible equation

You have to meet and even exceed your clients' expectations in terms of the product's **innovation + performance** combination and its **price**. You need to innovate to boost performance – that is, **improve your development methods** and reduce your consumption of energy and materials. At the same time, you have to maintain the same product validation standards and minimize the return-under-warranty rate. In short, **you cannot skimp on reliability**.

If you manufacture bicycles, for example, your clients want a bike that is both light and affordable.

To meet these essentially contradictory requirements, you have to:



- Develop the best products by improving your design techniques



- And do so with less time and money!

Ambitious quantitative and qualitative objectives

That means that for this bicycle, as for any other product, you have to:

- **Develop the product as efficiently as possible** in terms of time and money



- **Get the product to market before anyone else does**, to take advantage of your leadership position as long as possible and draw the maximum potential revenues from the product



- **Reduce warranty costs to a minimum**, to **protect the profitability** of your innovation

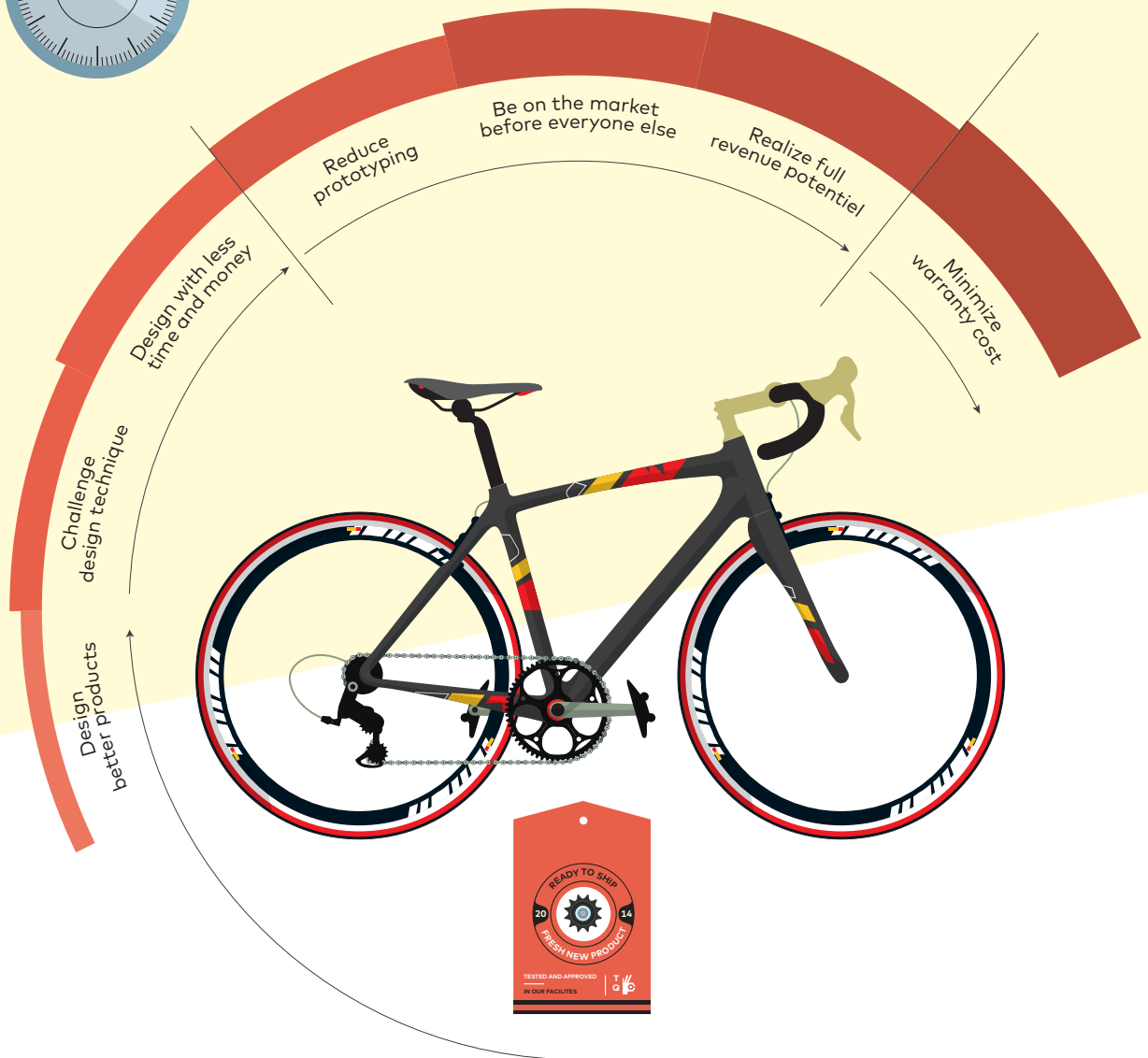
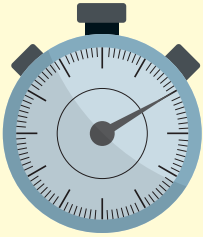


- Create a strong **brand image** for your product and cultivate **loyal customer**

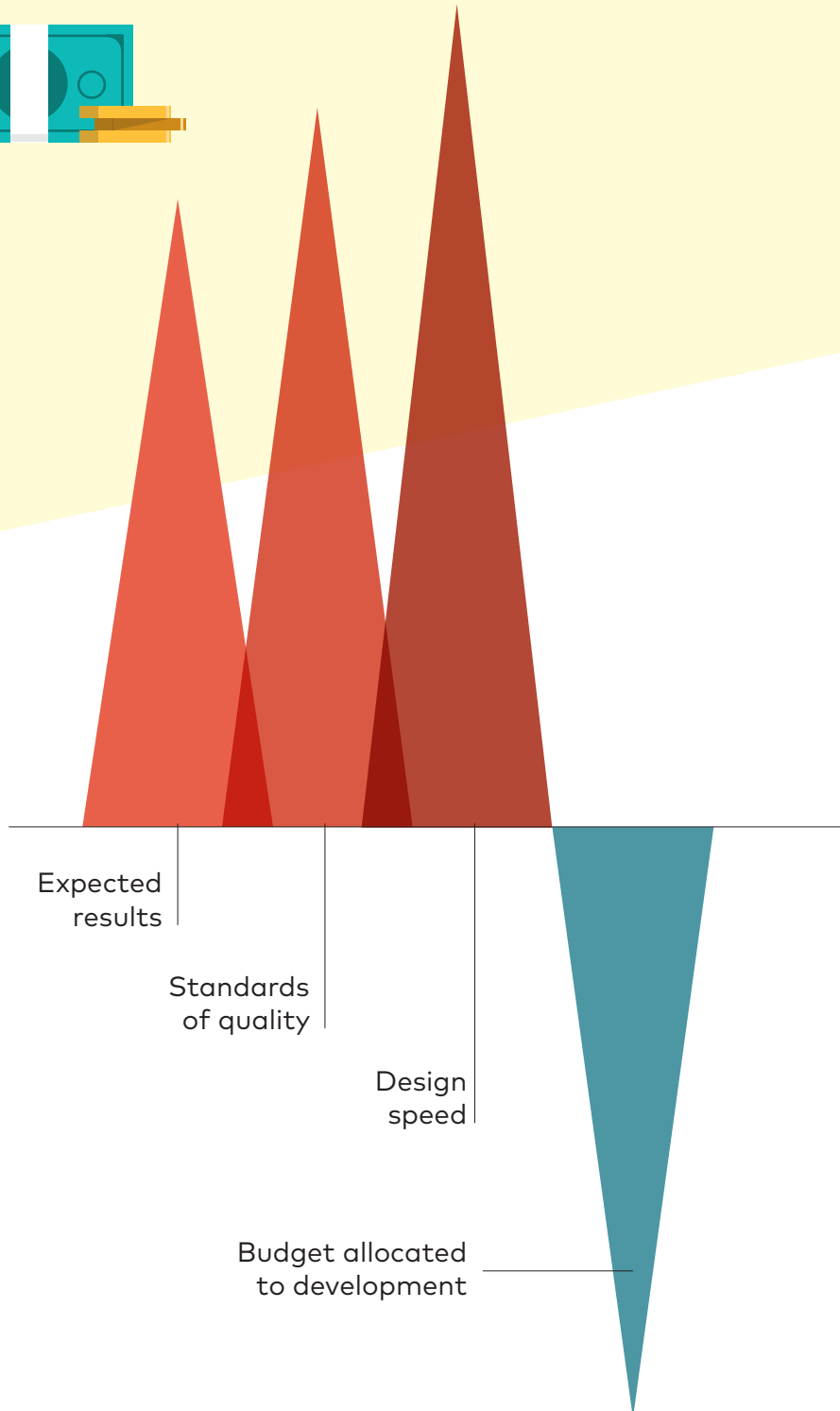
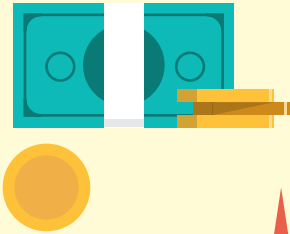


You may also want to **reduce the ecological footprint** across the product life cycle, from initial design to recycling. To come back to our example of the bicycle, you may choose aluminum for its recycling potential. At the same time, you need to use as little as possible to produce the bike and test as few prototypes as possible.

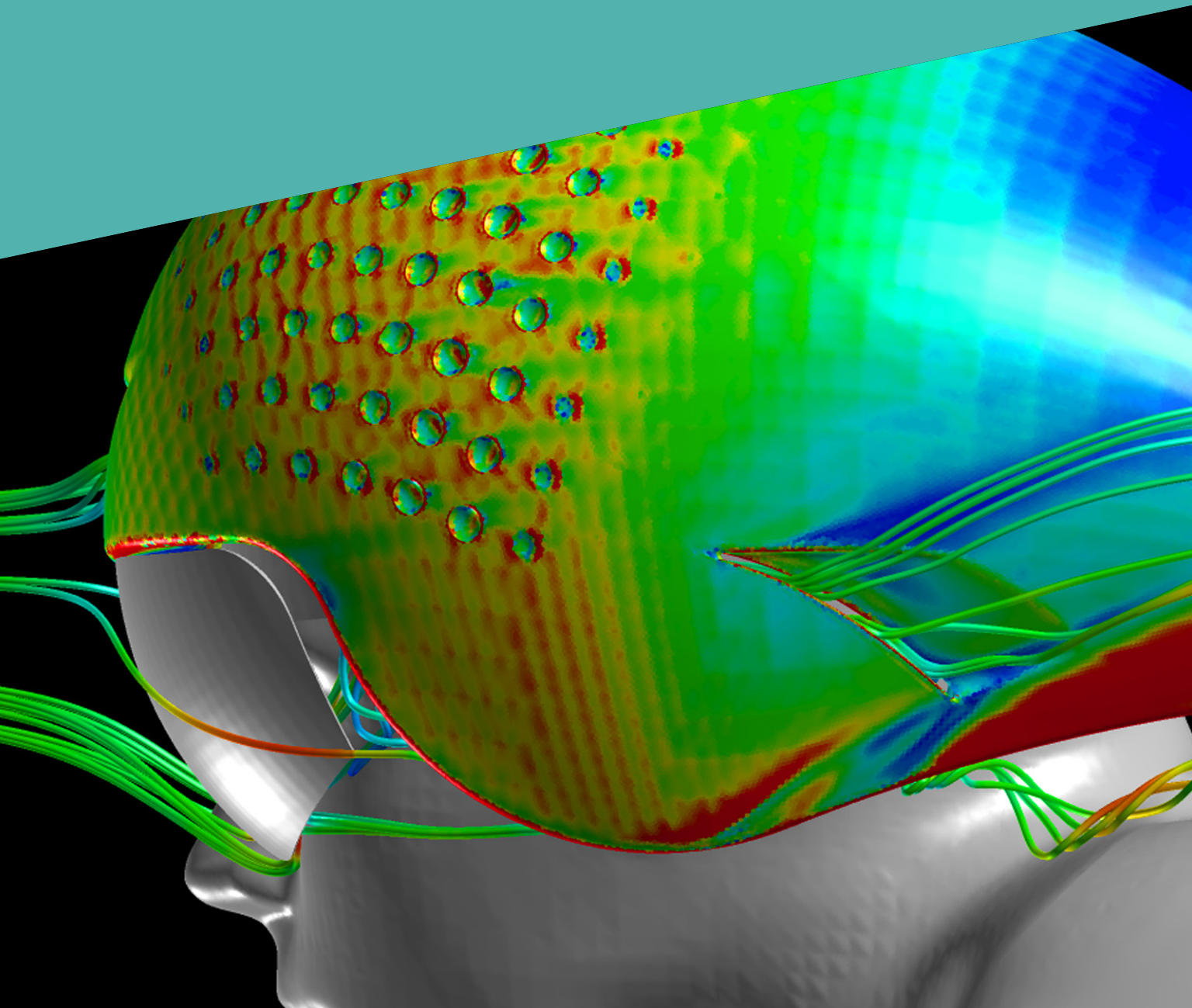
Product Development Challenges



Budget Trends Related To Product Development

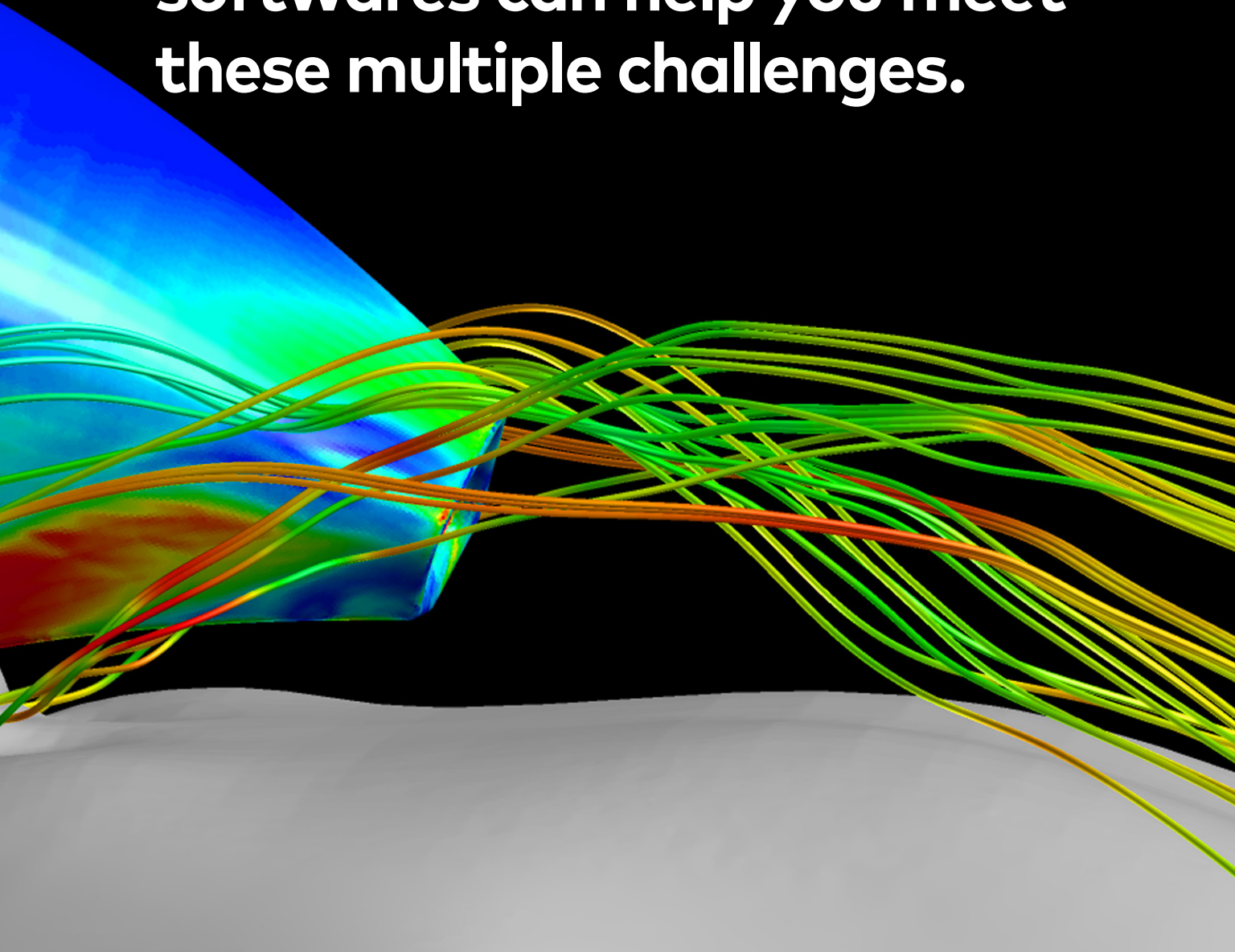


Proposed solutions

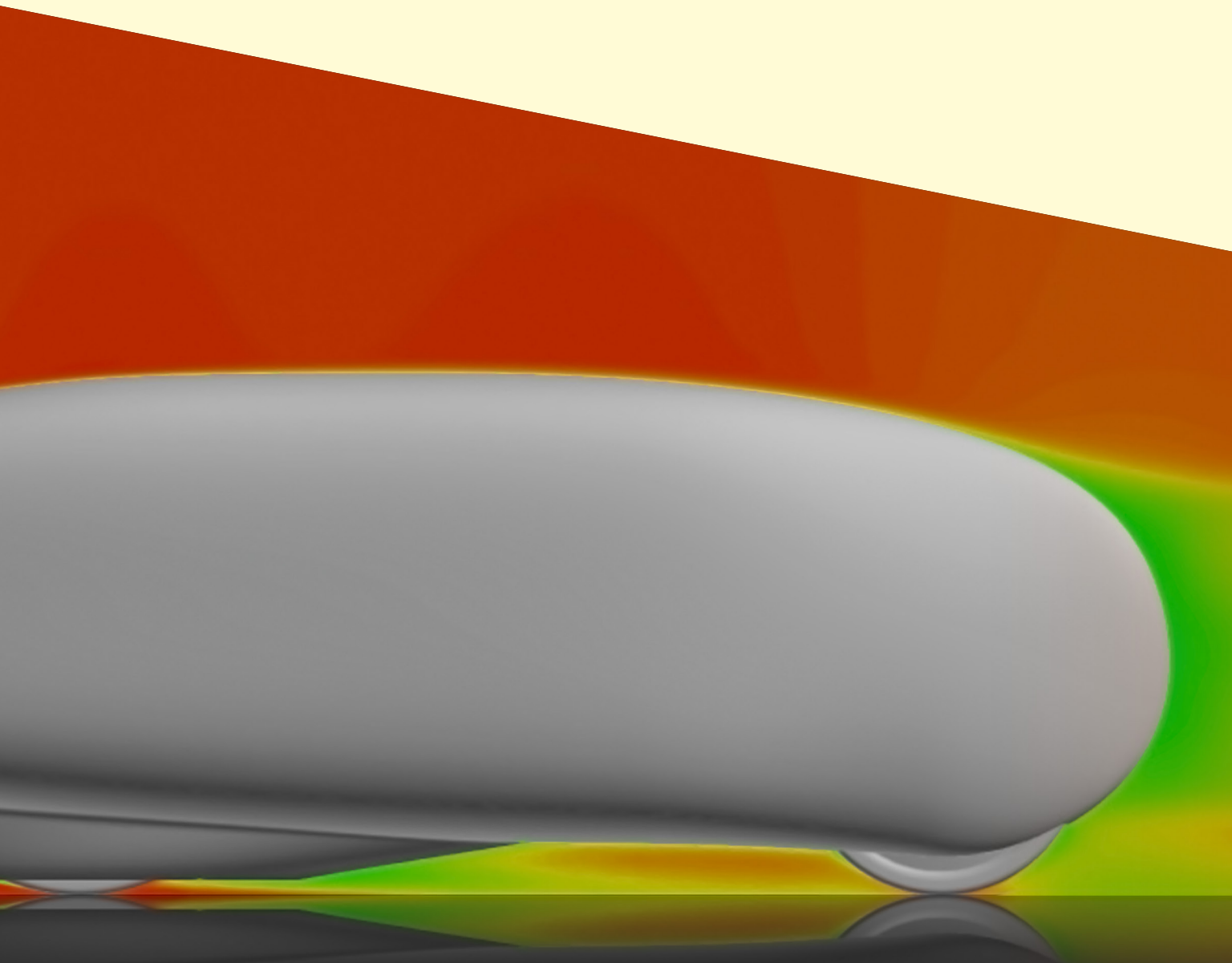


Two software solutions

Engineering simulation and numerical optimization softwares can help you meet these multiple challenges.



Simulation to anticipate and react faster



Simulation is a numerical method engineers use to test products by computer, before building and testing a physical product.

Simulation lets you make informed decisions from the very beginning of the development cycle.



- It generates **more data** (stress, strain, force, etc.) than a physical test.



- It saves resources: **fewer trials, fewer prototypes and less material** to produce the validated product.

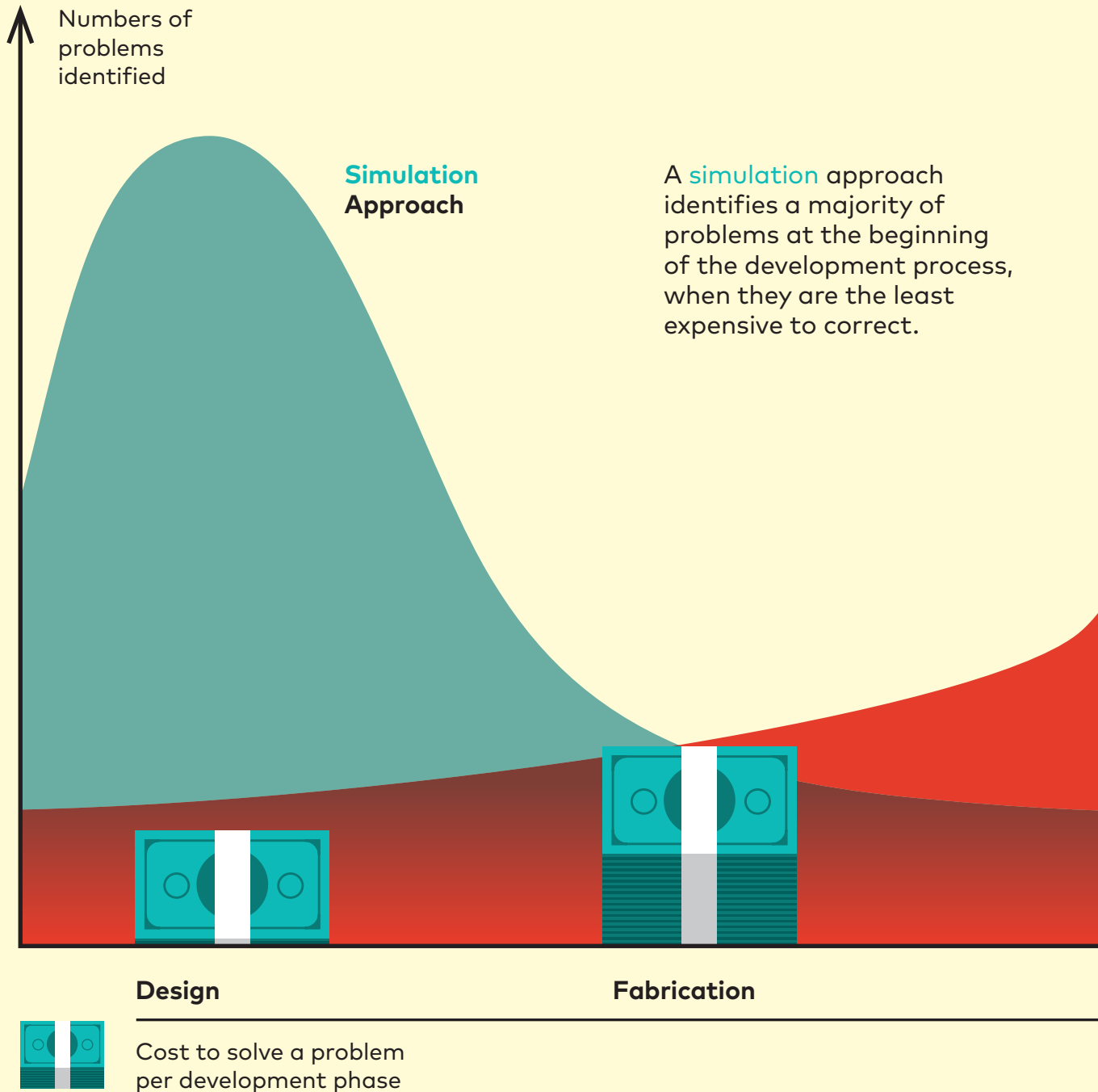


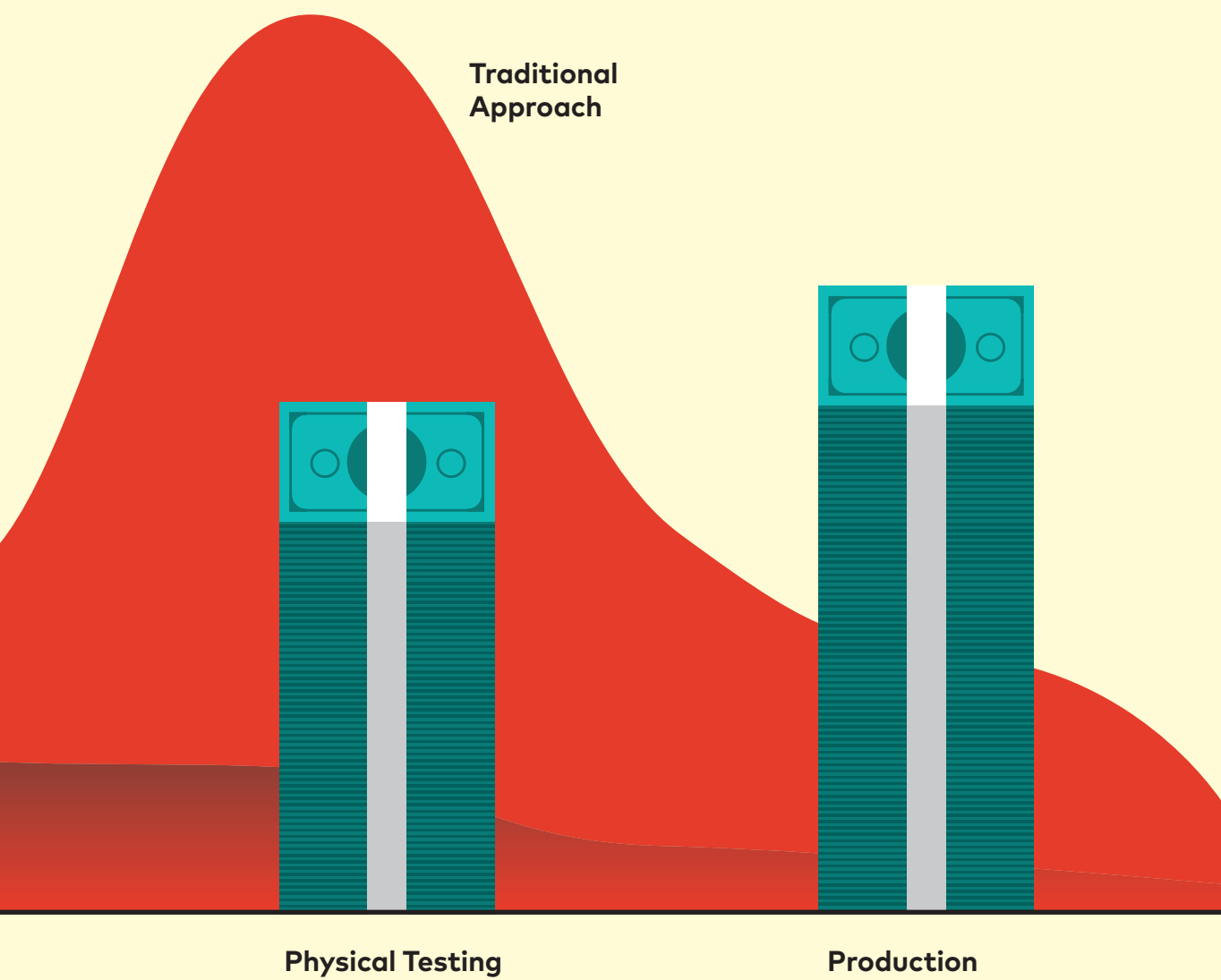
- It increases your understanding of the product's behaviour and lets you **anticipate weaknesses** and **identify possible improvements**.

In short, **simulation** decreases project risk: problems are discovered at the beginning of the development process, when they are the least expensive to correct and have not yet affected the client's perception (as compared to failure during use, which harms the company's reputation).

Comparative Chart

Identification of problems to method used.



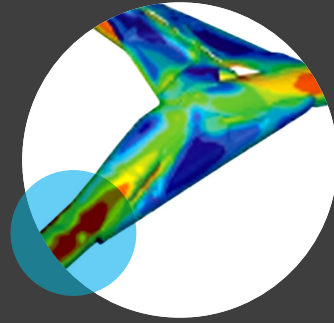
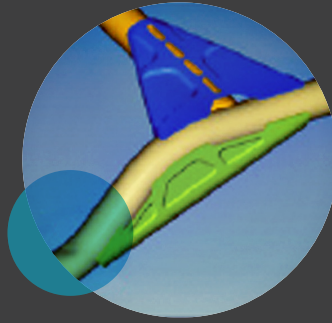






A sound practice
adopted by BRP:

Simulation for
the development
of roll cages for
Can-Am[®]
side-by-side
vehicles



Roll cages have to absorb a lot of energy to be effective.

Before:

BRP had to build roll cages with the vehicle frame and then do a **destructive test in the laboratory**.

Building and testing the prototype is long and expensive. When the target energy absorption level was not achieved, it was sometimes difficult to diagnose the cause.

The test had to be repeated for every modification: that meant building another prototype, generating more costs and more delays, with no guarantee of success.

After:

New cage designs are **simulation tested**, while the cages are still **3D files**.

The **simulation** generates a **diagnostic** of the stress values across the entire cage and frame, allowing the **appropriate modifications** to be made.

The modified 3D cage can be **re-tested virtually**.

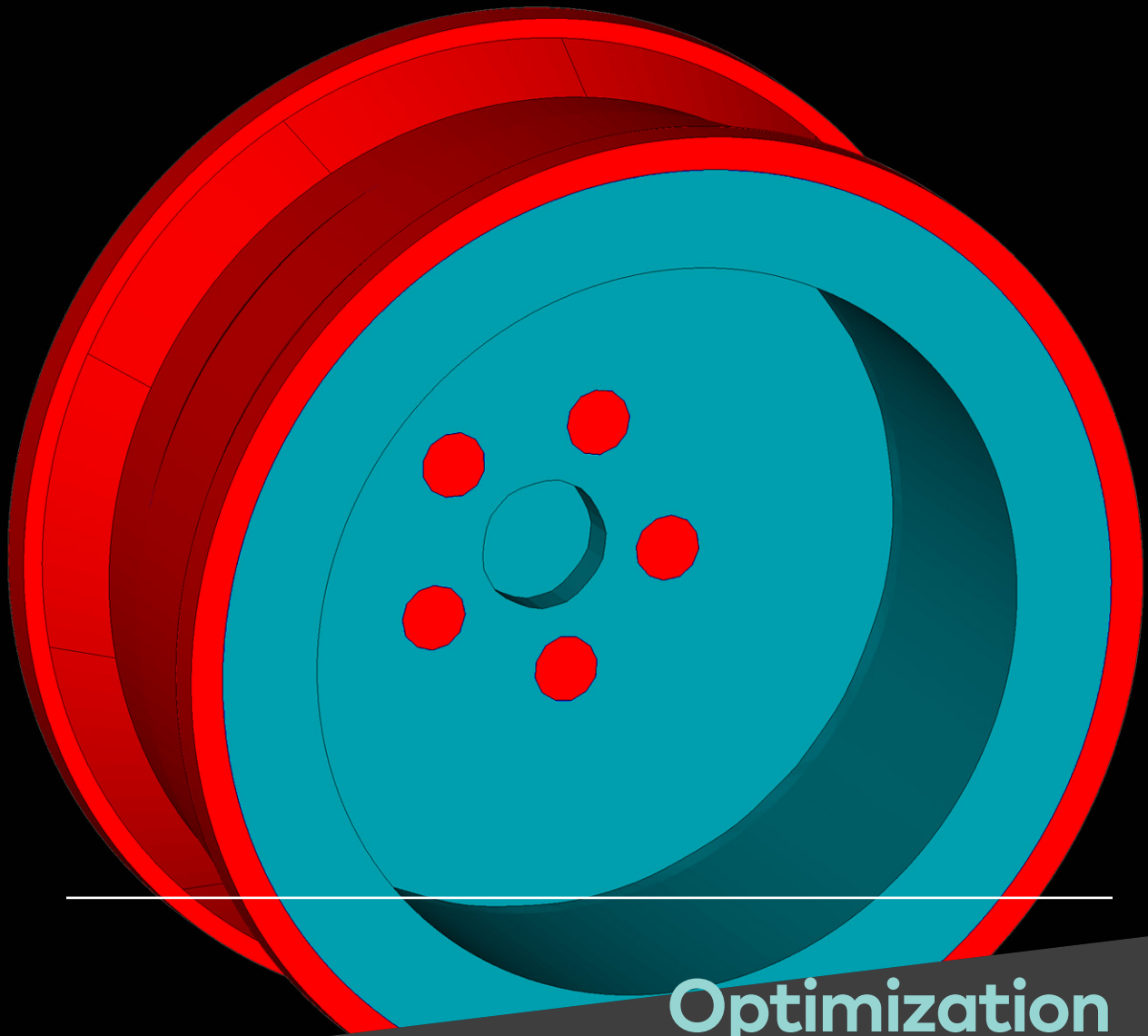
The real trial on the **first prototype** is usually **successful on the first run**.



Thanks to the expertise of the Lx Sim engineers, the accuracy of the results we got from the various non-linear finite element analyses allowed us to eliminate certain physical tests that would have been long and costly. This method is now an integral part of our development process, and the final physical validation tests in the lab succeed on the very first attempt. It didn't take long for us to realize that we were saving considerable time and money"

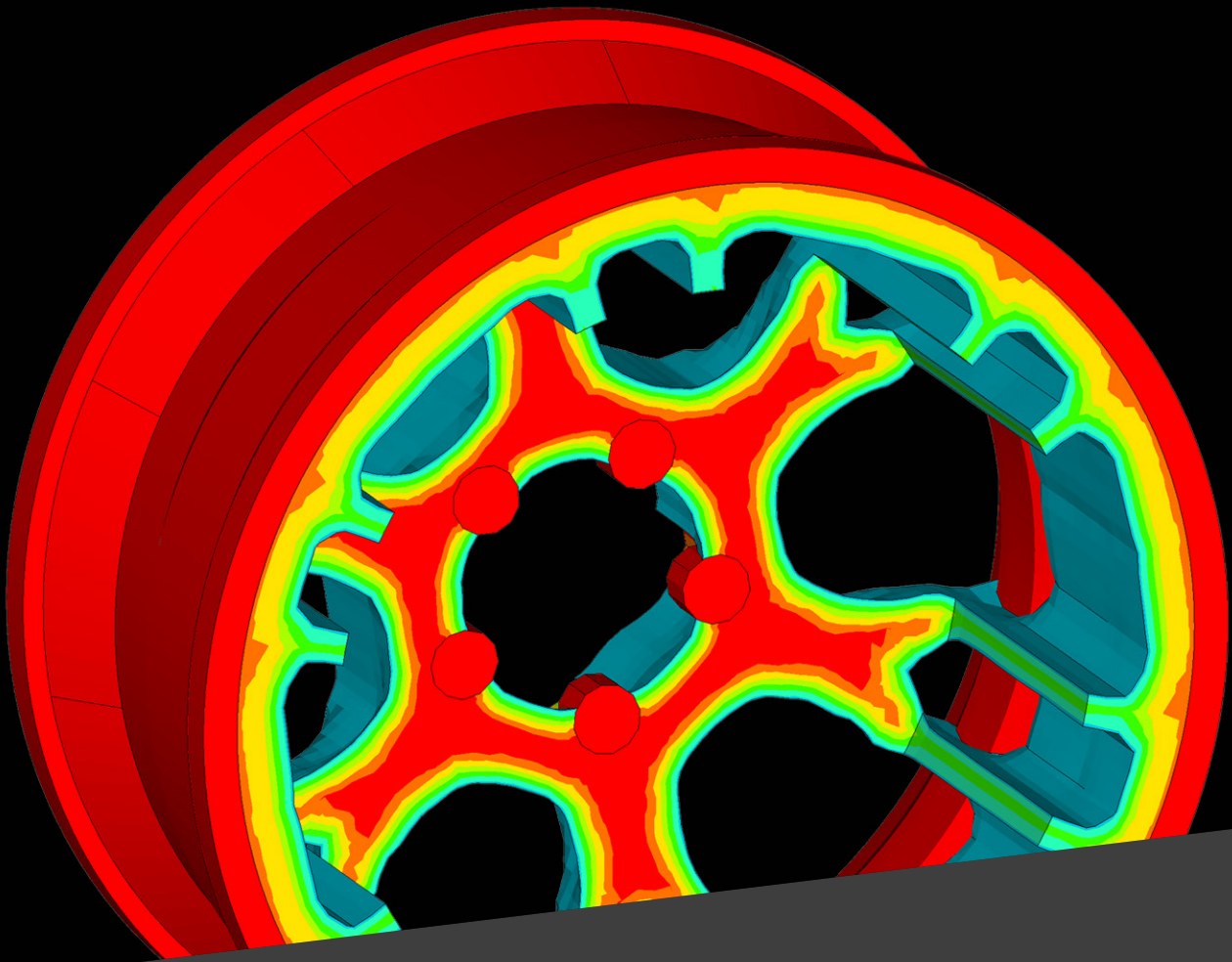
Philip Maltais

PROJECT ENGINEER – ATV–SIDE-BY-SIDES,
BOMBARDIER RECREATIONAL PRODUCTS



Optimization for the best design

You can go even farther toward your performance,
cost and delivery objectives: numerical optimization
takes your product design and validation
to a whole new level.



Optimization takes place between the definition of the specifications and the first 3D modelling (CAD).

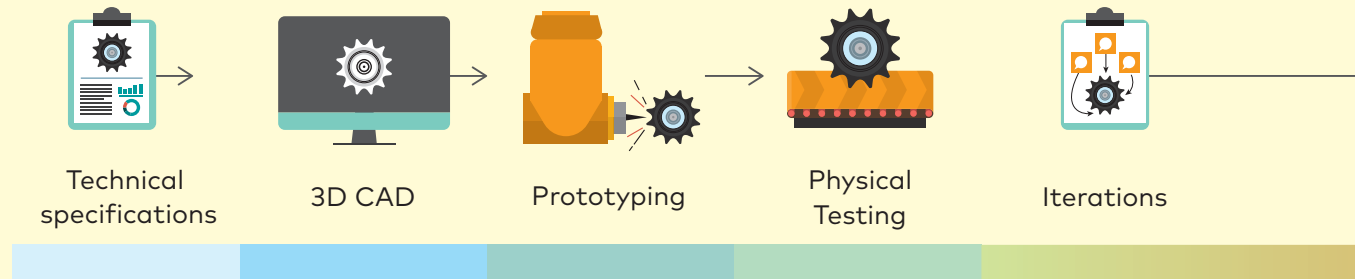
Based on simulation technologies, the optimization software takes all the parameters from the specifications into account to recommend an optimized 3D form.

Optimization guides the engineer toward the best possible design when the greatest freedom of action still is possible.

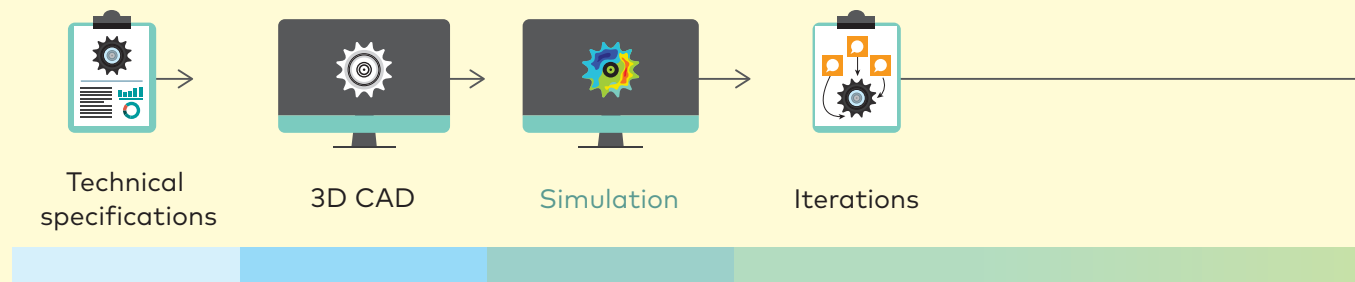
It shaves weeks or even months off the development delivery cycle and produces higher-performance products.

Product Development Cycles Timeline

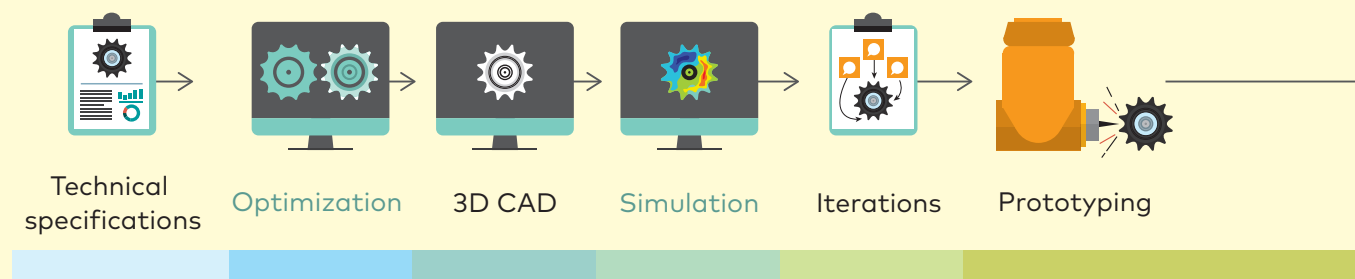
Traditional Method

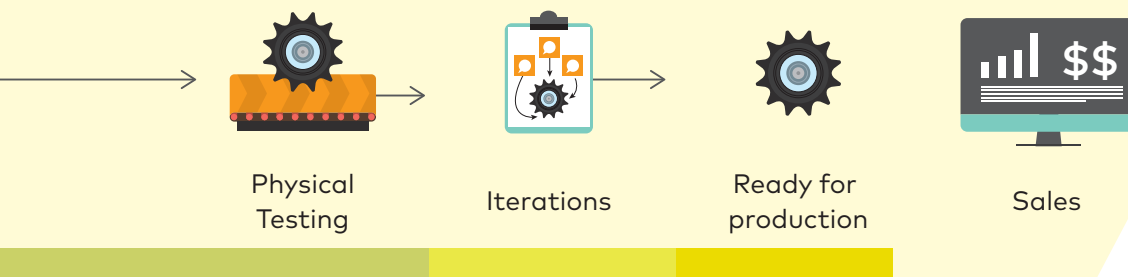
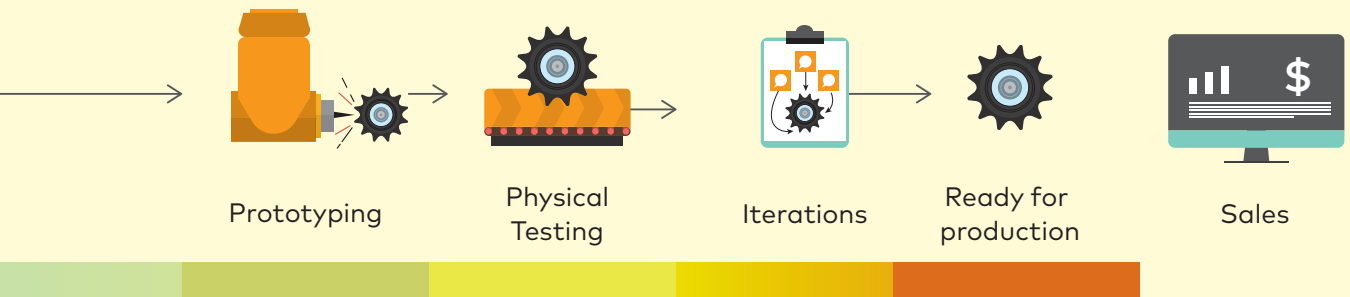
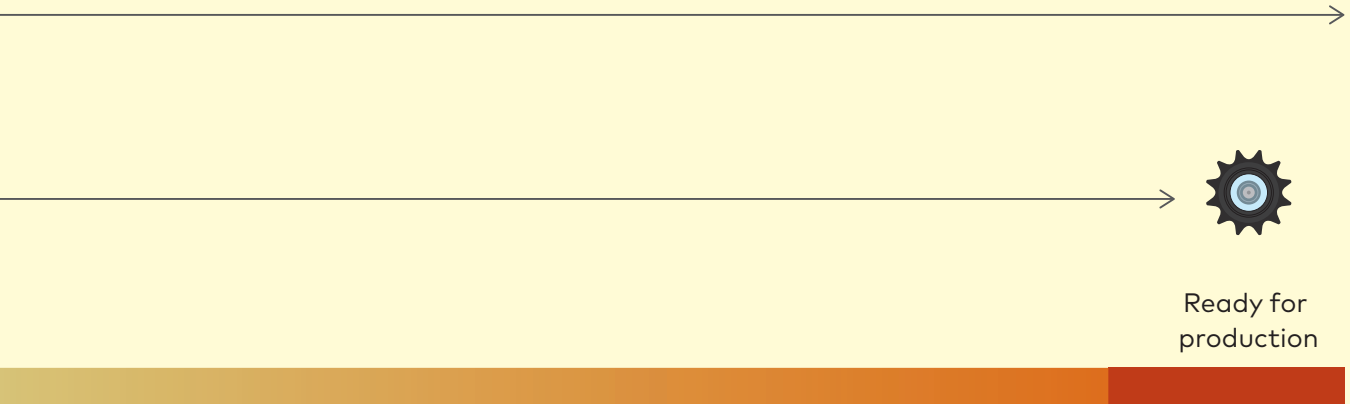


Method Using Simulation



Method Using Simulation & Optimization

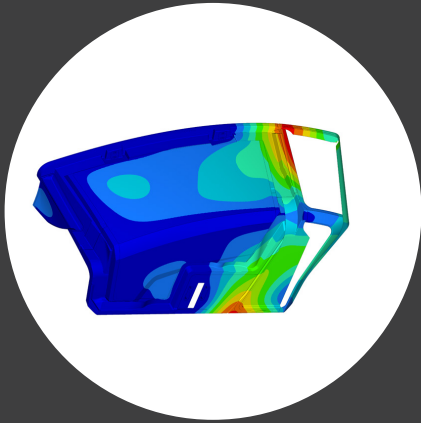








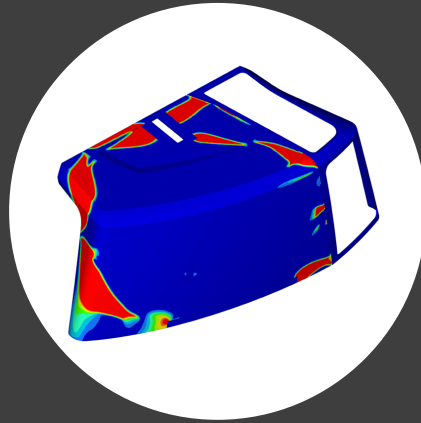
The RMC (René Matériaux Composites) story: Numerical **optimization** for the best stiffness/ weight ratio in truck body parts



RMC produces truck body parts made of a composite that is lighter than steel but less stiff.

Reinforcements have to be added as judiciously as possible to achieve the required stiffness and the lowest possible weight.

Numerical optimization is the ideal method for this kind of problem.



The optimization software takes into account the available design space, the characteristics of the material and all the possible loads.

It then calculates the minimum thickness of the panel and the required location and inertia of the reinforcements.

RMC can now design optimal parts, right the first time, in record time!



Lx Sim has been a reliable, affordable and flexible partner and resource for our engineering **simulations**.

Their numerical **simulation** and **optimization** services are a crucial resource for the development of our products. Whether we are trying to reduce the weight of a truck cabin frame or validate the integrity of a complex structural assembly made of composites, Lx Sim helps RMC deliver exceptional performance and stay on budget and on time.”

Marc-André Grenier,
TECHNICAL DIRECTOR, R&D,
RENÉ MATÉRIAUX COMPOSITES LTÉE.

**Lx Sim
solutions
support
efficiency
and quality**

Adding **simulation** and **optimization** to your product development cycle gives your business a head start.

The combined benefits of numerical **simulation** and **optimization**:



Help you **stay competitive** in the globalized market



Increase **client satisfaction and loyalty**



Create a greener tomorrow through improved engineering

accel

your product development.



Lx Sim is an engineering consulting firm helping R&D departments integrate simulation and optimization in their product development process



150 R&D

DEPT



We helped over 150 R&D departments like yours in Canada and USA



500

We delivered more than 500 successful simulation and optimization projects

15

15 qualified employees



THE LX SIM DIFFERENCE



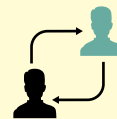
THE RIGHT PEOPLE

Deep simulation expertise combined with product development knowledge



UNDERSTANDING YOUR NEEDS

Ability to translate your expressed needs into simulation language



KNOWLEDGE TRANSFER

Communication throughout the project making sure you learn about your product and its simulation

erate

7+

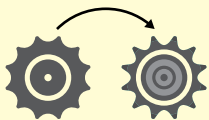
7+ years
dedicated
to simulation
& optimization

100K\$

Annual investment
in SR&ED to offer
cutting-edge
solutions

10

We master
10 high-end
softwares



MAKING IT WORK

Proposed design
modifications
to improve your product
are always included



LEADING-EDGE SOFTWARES

Precise results so you
get it right the first time



PREMIUM RESULTS DELIVERY

On-time, detailed reporting
and 3D simulation results you
can explore yourself



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