

DESIGN • DEVELOP • DEPLOY

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LTB Engineering

Overview

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Needs:

Successful companies must provide stakeholders with ever-increasing value. Manufacturers need to realize increased revenue and reduced cost. An optimal method by which to achieve this is new business through new technology and products based on:

- A focus on customer needs, wants & expectations
- Increased market acceptance
- Robust, cost effective manufacturing

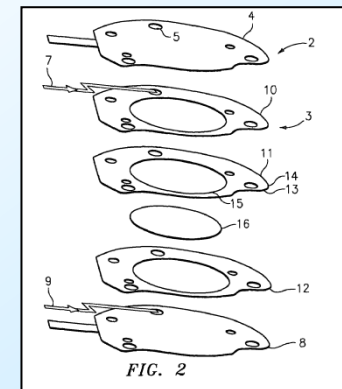
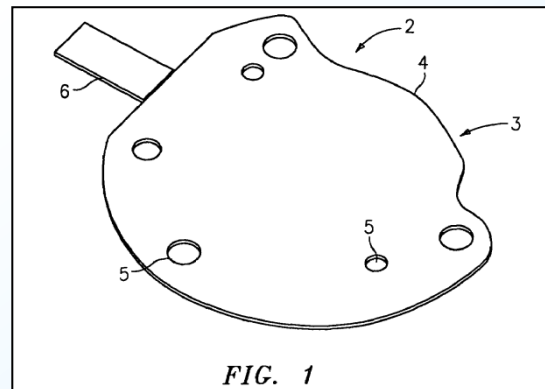
Case: Piezoelectric bimorph actuator

Challenge: A manufacturer of high performance gas transducers, faced with an expensive outsourced potting process to protect sensitive bimorphs from water, needed better technology.

Objective: Develop inexpensive encapsulation to isolate bimorph from water.

Solution: Encapsulation system based on die-cut laminating packaging materials.

Impact: Reduced encapsulation cost from \$30 to \$0.41. US 7,259,499 B2 (see figures).



LTB Approach:

LTB's approach is unique. With a constant focus on disruptive & transformational technology development we exploit customer input by applying:

- Simultaneous market and technology R&D
- First principals – breakdown the challenge into physics
- Outside the 'organizational box' thinking
- **Multiple** iterations of ideation, design, prototype, customer & lab test in development phase
- First in class analysis and design
- Concurrent manufacturing, quality, sales development

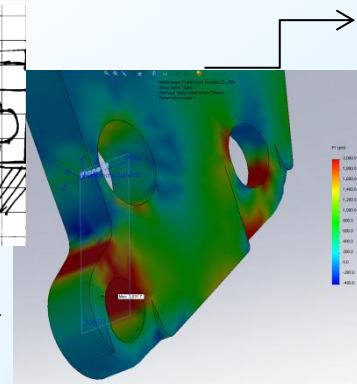
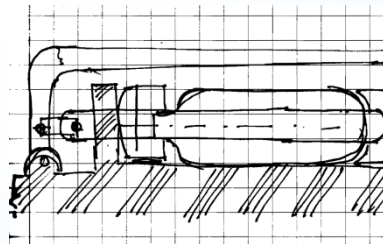
Case: Personal Flotation Device (PFD)

Challenge: Over 3400 US drowning deaths reported in 2007 that could be reduced.

Objective: Develop inexpensive PFD that serves shore and beach activities.

Solution: Single use device, CO₂ cylinder **IN** elastic polyurethane bladder that acts as own over-pressure control. Multiple iterations.

Impact: Affordable PFD. US 8,016,627



Alternatives:

Alternative development approaches exist, but tend to rely upon older, conventional methods and are slower and more costly. These approaches are not endorsed, or normally practiced by LTB. Some of these approaches include:

- Developing hard, concrete specifications as a first step
- Following strict institutional new product development procedures
- Minimizing contrary customer data in favor of organizational knowledge
- Design changes that occur well along the development cycle, which are onerous and expensive.

LTB Advantages:

The 'guerilla engineering' approach produces manifold advantages over conventional approaches:

- Faster time to market
- Faster reduction of uncertainties of customer acceptance and technical feasibility
- Lower development cost

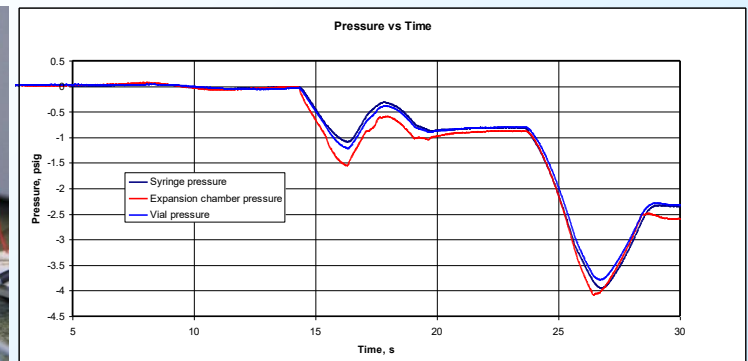
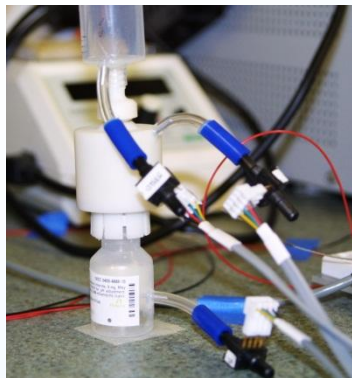
Case: Cancer drug transport system

Challenge: Chronic exposure to cancer drugs produces long term illness in health care workers.

Objective: Develop system that negates emission of drug during transfer.

Solution: System that develops negative pressure during entire transfer procedure (see graph). 3 weeks to empirical validation.

Impact: FDA approved product, patents issued and pending.



Summary

Though directed to new product development, these approaches and engineering methods can be applied to any technical endeavor, including cost reduction, process improvement, etc. They have the further benefit of instilling an engineering sense of *esprit de corps*, which pervades and energizes the organization. These are a few of the aspects that make this approach ideal for both companies with designs for year-over-year growth as well as turn-arounds.

About the principal



Greg Lyon has been involved in R&D, new product and technology development and deployment since 1980. Greg is a graduate of Northeastern University, and is registered as a Professional Engineer in New York and South Carolina. He has held positions in engineering and management at General Electric, Leviton Manufacturing, Thomson Industries, and American Standards Testing Bureau. He founded LTB Engineering in 2000. Greg is the inventor on 38+ patents, in a wide range of industries.