Balancing Trade-offs

Okala Practitioner

A proposed solution can have clear advantages for all stakeholders:

- the environment
- the user
- society at large
- the manufacturer/client

Often, however, making one choice compromises another, and decision--making becomes less clear.

Typical Trade-offs

Making these choices:	Can sometimes mean:
Using recycled materials	Lower tolerances & specifications
Increasing energy efficiency	Higher electronic design costs
Extending product life	New product sales reduction
Design for disassembly	Higher production costs
Biodegradability	Shorter life, lower strength
Local production	Fewer choices / less selection
Leasing instead of owning	Increased transport impacts
Dematerialization	Fragility / shorter life
Aggressive green marketing	Potential perception of inferior quality

Case studies

The Liberty Ridge Parka climbing jacket was produced by Recreation Equipment International (REI).

The parka is made primarily of Nylon 66, in several laminated layers (making it difficult to recycle)**, with zippers, storm flaps, and hood.**

The following examples show how the jacket shown at right was redesigned and discusses the tradeoffs of each approach.

The projects shown in this series were developed by several students at the University of Washington's Whole Product Design Project.

Functional simplification

A change in the ventilation system of the jacket resulted in more efficient venting and used less material. By eliminating the pit zips, pockets, and storm flaps, the overall weight of the jacket was reduced by 6.3 oz. Climbers appreciate the lower weight. Watertight™ zippers eliminate the need for cumbersome zipper flaps, Velcro and metal snaps.

↑ Increased functionality benefits user.

↑ Reduced material usage benefits client and user.

↓ Increased hardware cost challenges both client and user.

Climbing jacket design by Richey and Rafie

Re-use material in different product

This redesign proposes a system of collec.on and reconstruction, whereby the jacket is cut apart and reassembled into a rope bag. The durability, light weight, and waterproof qualities of the material provide service over an extended period of time.

The return system fosters loyal customers. This positive environmental practice also builds brand which benefits the client.

Makes new product from old with minimal processing, a benefit to environment.

The costs of the collection and reuse system must be attractive to both the client and the user.

Rope pack design by Chung & Szabo

A consumer returns jacket to REI.

The jacket is die–cut and re–sewn into a rope pack.

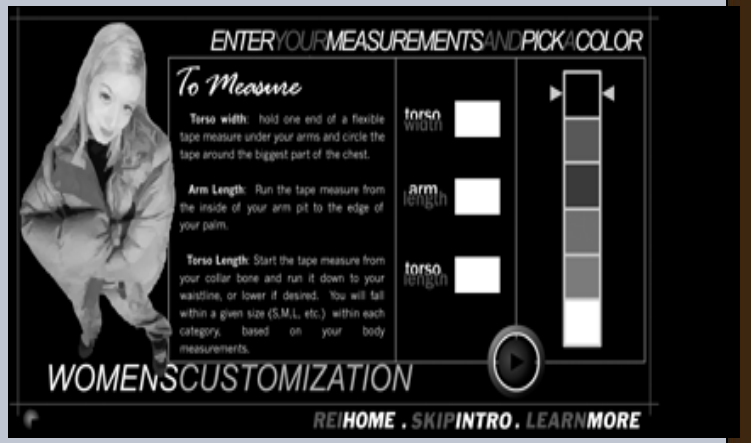
The rope pack is returned to owner for a nominal fee, or the consumer receives store credit and the rope pack is sold as an alternative to other packs.

Customized product

An online ordering system allows people of non--standard sizes the to fit a jacket exactly to their specifications. Further, this gives the opportunity to “create” a jacket uniquely their own.

- Reduces the amount of stock held and unsold, a benefit to the client.
- Requires the organization and expense of an administrative and production network to manage customization.
- Fosters product stewardship, and lifespan of a jacket would increase, benefit to the environment.
- Increases customer loyalty, a benefit to the client.
- Provides products for a neglected portion of the population.

Climbing jacket design by Rotondi and Gunderson



Coating Service Program

This service applies a water–proof coating to the jackets.

- ↑ Useful life of product is extended.
- ↑ Company can control effluent from the cleaning and coating products.
- ↑ The consumer feels secure that the coating was professionally applied and with service guarantee.
- ↑ Many jackets can be coated at one time, reducing waste of the water--proofing compound.
- ↓ Service program would require initial company investment in facilities and promotion.
- ↓ Consumer must make the effort to return product for servicing.

Climbing jacket by Richey and Gunderson

1. Initial purchase

2. Use

3. Return for servicing

4. Apply coating

5. Next phase of use

Material Change

Change in material to hemp was justified by REI's client data, that indicated 97% of purchasers bought a climbing jacket to **look like** a climber, but they do not use it for climbing.

- ↑ Except for its hardware, the jacket can now be composted.
- ↓ Jacket loses functionality for climbing.
- ↓ Shorter life, because the hemp degrades faster than nylon.
- ↓ Hemp costs more than nylon.

Climbing jacket by Ando, Balagot

Industrial hemp

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Trade-off discussion

1. You will be assigned to a group of three.
2. Each group must identify four products with design problems where there is an environmental trade--off.
3. You must be specific about the product (or product system) and the tradeoffs.
4. Each team describes each of the four product features that have trade--offs in complete sentences on a piece of paper.
5. Hand in the paper with your names on it.

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Integrating Ecological Design

This presentation is part of an educational presentation series that supports teaching from the *Okala Practitioner* guide.

Okala Practitioner and these presentations were created by the Okala Team to disseminate fact–based knowledge about ecological design to the design disciplines and business.

Unless provided in the presentations, information sources are found in the *Okala Practitioner* guide.

The Okala Team initiated the collaboration with the US EPA and the Industrial Designers Society of America (IDSA) in 2003. The team developed Okala Practitioner with support from Autodesk, IBM, Eastman Chemical and the IDSA Ecodesign Section.

Okala Practitioner is available through amazon.com.

More information can be found at Okala.net.

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