



ELLEN
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CRADLE TO CRADLE
PRODUCTS
INNOVATION
INSTITUTE

**SAFE &
CIRCULAR**

**Product Redesign
Workshop**

DESIGN



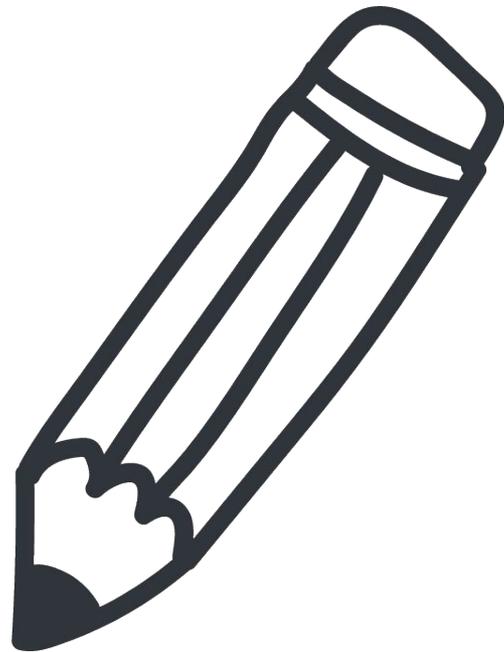
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Design Challenge

Redesign a commercial carpet tile that is safe and circular.

Choose a commercial application for a carpet tile.
Ask yourself, or interview one of the workshop participants
on what value a commercial carpet tile brings.

- What are the needs of the user?
- How is it used?
- What features do users value, and which are essential?





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Primary
Backing

Nylon

Precoat

Polymer

Fibreglass

Polymer



U
S
G
N



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Context

Studies indicate that people spend 87% of their time indoors.

The products we use for indoor spaces can have massive effects on indoor air quality, and on the people involved at every stage: from producing, installing, using, deinstalling, and recovery. Therefore, making products with safer materials can have positive repercussions across the value chain.

Carpet tiles are a trend in commercial floor covering which now accounts for 60% of commercial carpet sales.





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Exercise Overview

1. Split into groups
2. Explore your application
3. Screen two selected materials
4. Redesign using the Safe & Circular Strategy Cards
5. Reflect on the role of the designer





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WORKSHEET

Safe & Circular Product Redesign Workshop

EXPLORE (5 MINS)

CHOOSE A COMMERCIAL APPLICATION

WHAT ARE THE FUNCTIONAL NEEDS AND REQUIREMENTS OF A CARPET TILE?

For example, the underlying functional need of a car is to get from one place to another.

INTERVIEW A USER

DEFINE THE CHEMICALS OF CONCERN (15 MINS)

PICK & SCREEN TWO CHEMICALS THAT ARE IN THE PRODUCT

This is a summary of all the chemicals that can be found in a product like this, and not a complete list. Screen the different chemicals using [MaterialWise.org](https://www.materialwise.org).

WHICH CHEMICALS SHOULD BE DESIGNED OUT?

Highlight the chemicals of concern that should be designed out in the next phase.

- YARN FACE - POLYMER
NYLON 6 | 25038-54-4 TOXIC: Y / N
- STAIN RESISTANCE TREATMENT
PERFLUOROBUTANESULF-ONIC ACID | 375-73-5 TOXIC: Y / N
- PIGMENT FOR DYE
TITANIUM DIOXIDE | 13463-67-7 TOXIC: Y / N
- FLAME RETARDANT
ALUMINA TRIHYDRATE | 21645-51-2 TOXIC: Y / N
- ANTI-MICROBIAL (DISINFECTANT)
ZINC PYRITHIONE | 13463-41-7 TOXIC: Y / N
- PLASTICIZER (ENHANCES FLEXIBILITY)
BIS(2-ETHYLHEXYL) TEREPHTHALATE | 6422-86-2 TOXIC: Y / N

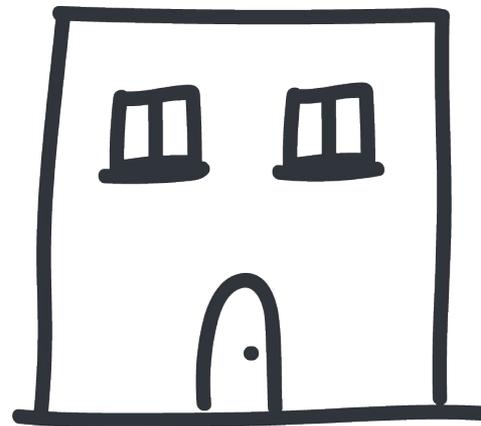
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Examples of applications

- Office building
- Retail store
- School or university
- Library
- Hospitals or care facilities
- Hotel
- Conference centres
- Restaurants
- Sport facilities
- Airports

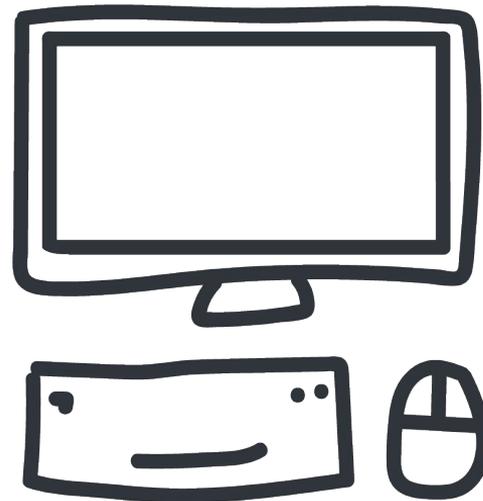




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Screening

1. Go to www.materialwise.org/screen
2. Log-in or register with your email address
3. Create a 'Project'
4. Search for each chemical through its Chemical Abstract Service number (CAS number)
5. Add a concentration for each chemical. When you are unsure, fill in a random number.
6. Press 'Screen' when you are ready
7. Review the output
8. Highlight the chemicals of concern





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WORKSHEET

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REDESIGN (30 MINS)

DEVELOP 3 CONCEPTS FOR IMPROVEMENTS

Are there different or better ways to meet the needs while designing out the substances of concern? Brainstorm to come up with new ideas using the Material Health Strategy Cards

Describe and illustrate 3 concepts for improvements by using the Material Health Strategy Cards. Try to be visual and give it a memorable name.

CONCEPT IDEA

REFLECT (10 MINS)

WHAT NEEDS TO BE INCLUDED IN THE DESIGN PROCESS?

What data would be important to have? What infrastructure is needed?
Who would you need to collaborate with?



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DESIGN

CIRCULAR STRATEGIES

REIMAGINE THE PROPOSITION

What is the value proposition of this product? Design out chemicals of concern by exploring new ways to deliver the value of the product to the user. If you can't design out the chemicals of concern in any other way, use them sparingly. In addition, offer the product as a service or design a take-back programme to keep the chemicals of concern out of the waste stream.

STARTING POINT

Could your product be transformed into a new and better service experience? Look at the Circular Design Guide method 'Service Flip' to explore how you might turn common products into a service model.



STRATEGIES

THINK THE PRODUCT

Consider the functional and emotional needs the product design requirements to achieve them. What materials, materials and parts provide?

Consider the product and its requirements? Stain resistance of certain hard surface materials, like tile, or stone may make them unsuitable for commercial carpet, especially if used in an office space) does not require heavy-duty flooring to be soft or buoyant.



CIRCULAR STRATEGIES

REDUCE EXPOSURE TO THE CHEMICAL

When it is not possible to design out the chemical of concern, make sure that exposure to it is reduced throughout the lifecycle. Exposure includes handling the raw material, exposure to humans during the manufacturing process, exposure to product users, and to the product's recyclers/processors.

STARTING POINT

Use the Circular Design Guide method 'Safe and Sound Systems Mapping' to explore where exposure to chemicals of concern happens in the lifecycle of the product. What can you implement in your design to protect humans and the environment from the harmful effects of chemicals of concern?



STRATEGIES

THINK THE CHEMICAL

Identify the chemical of concern. Question the necessity for the chemical. Explore the possibility of using a different material or product, or substitute it with a similar or better feature.

Consider alternative products - ranging from cleaning products to apparel and textiles - that are antimicrobial materials and chemicals.

Recent evidence has shown that antimicrobials can do more harm than good. They are actually hazardous to human health, cause environmental harm throughout their lifecycle, and have little success in preventing disease and infection. Rather than habitual inclusion, the toxic antimicrobial chemical can be designed out without any need for replacement.



CIRCULAR STRATEGIES

REDESIGN THE PART

Question the functionality of the component that contains the chemical of concern. Improve the component by designing out the chemical, while redesigning the structure and the shape to retain or improve functionality.

EXAMPLE

Many commercial carpet tiles use polyvinyl chloride (PVC) as their primary backing material. PVC is classified as a halogenated polymer, and both the production and incineration of PVC after use can result in the release of toxic dioxins in effluent and into the air. To avoid the potentially hazardous impacts of PVC, one solution could be to use a backing material that is non-halogenated.





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Discussion

- How can you improve the safety of the materials and products you design by making material health a consideration in the design process?
- What kind of information do you need to select safe and circular materials for use in your product? How can you access this information?
- How can you work together with your team members and your supply chain to gain access to information on the chemical composition of a material?
- What information and context must be included in the design brief in order to integrate material health and safety into your design process?
- Who from your organisation needs to be involved?
- What kind of expertise is needed within your team to ensure material health considerations are fully addressed? Where and how can you access this expertise?

