symbiotic wood

Pelin Asa, Judith Marlen Dobler, Peter Fratzl, Jessica Farmer, Johannes A. J. Huber, Florent Jouy, Nuri Kang, Rahel Kesselring, Anna Kubelík, Karin Krauthausen, Inka Mai, Sakiko Noda, Stefan Neuhäuser, Julia Rhein, Robert Stock, Kerstin Wolff, and Karola Dierichs – June 27, 2025

• *anthropocene* • *architecture* • *bark beetle* • *symbiosis* • *timber* • *wood*

Symbiotic Wood is an exploration on diversity and non-predictability. As humans share the natural world with others (living and nonliving entities), coexisting with forests and understanding wood means more than merely living with a useful material (Lemke 2019, Jaque 2021). Here, we consider spruce as a crucial example, shared between bark beetles and humans, among others.

Currently, climate change in combination with monocultures is causing increasingly greater areas of forests to be affected by insects and fungi (Statistisches Bundesamt 2022, Bentz et al. 2022). The harvested material from these areas is often devalued economically. Spruce forests are particularly susceptible in this respect, as they are not able to adapt to drought-stricken soil with their shallow roots (Puhe 2003, Netherer et al. 2014) and due to monoculture, insects can find hosts easily and spread quickly (Hlásny et al. 2019). Forests that include large areas infected with bark beetles are cleared prematurely to prevent the insects spreading further but the felled trees are often left on the forest floor or outside subject to the weather conditions because the amount may be larger than anticipated, and thus difficult to transport, store, or process (Hömberg and Kubelik 2023). During this time, they might be further populated by other organisms or rot fungi, often detectable through surface damage and discoloration. Almost all the affected material processed by local sawmills is currently sold as highly devalued timber. The material is mostly burned for energy extraction or sourced for packaging. Although stains from beetle and fungal infestation are only aesthetic and do not change the wood's properties if detected and stopped early (Clay et al. 2024, Hýsek et al. 2021), the affected material is not preferred for sale.

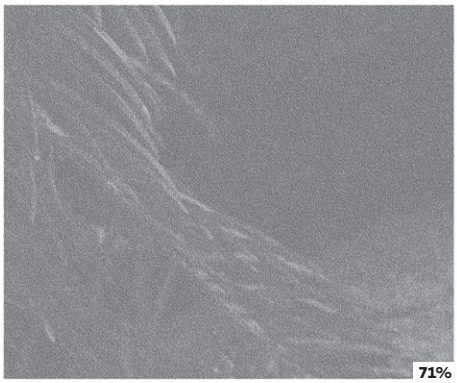
Spruce monocultures were originally planned to make wood that would be fully predictable in its availability and properties for human use. As a nonhuman agency with massive impact, bark beetles render the predictability of timber harvesting almost impossible, creating economical and logistical problems. There is, however, something to learn from this: in our damaged environments, it will be necessary to find new modes of planting, processing, and harvesting. Learning how to use infested wood will hopefully encourage human communities to embrace non-predictability in designing wood products based on what is available. Thus, the current flourishing of bark beetles is confronting us with the need to envisage situated design concepts for coping with the diversity and lack of predictability caused by contamination.

Symbiotic Wood instigates a revaluing of wood as a material that we co-use with other species, a material that might be different from our expectations, thus inviting new forms of design for "multispecies worlds" (Tsing 2015). Our interdisciplinary team—material science, cultural history, art and computational design and construction— investigates this condition through a series of epistemic images, unfolding symbiosis through three spatially articulated layers: matter, cognition, and creation:

Layer 1: Matter. Spruce wood is introduced in its ecosystem, a forest in Feldbuch, Franconia, Germany. The stem shows the so-called "galleries" of the bark beetle (*Ips typographus)* and the blue stain the beetle typically induces in the stem.

Layer 2: Cognition. A layer presenting fundamental knowledge from material science and cultural history about beetle- and fungi-affected wood. It includes results from image-based analysis methods conducted at the Max Planck Institute of Colloids and Interfaces as well as historical documents on bark beetles that laid the foundations for applied forest entomology. These are complemented by contemporary art works on artistic practices related to places, habitats, and ecosystems by Rahel Kesselring, as well as transience in plant-worlds by Nuri Kang with Karin Krauthausen.

Layer 3: Creation. This layer features elements from both artistic- and design-based approaches to beetle- and fungi-affected wood. *Wood Kinship* is a design ethnography (Dobler 2025) following the early traces of an infested spruce forest. It features prints made from the beetle galleries by Anna Kubelik. Design studies on architectural material systems that investigate how the material anisotropy and perceived weakness of beetle- and fungi-affected wood can be used to build a spatial structure that fulfills different architectural performance criteria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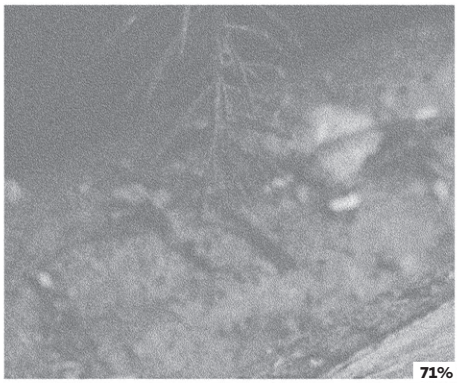
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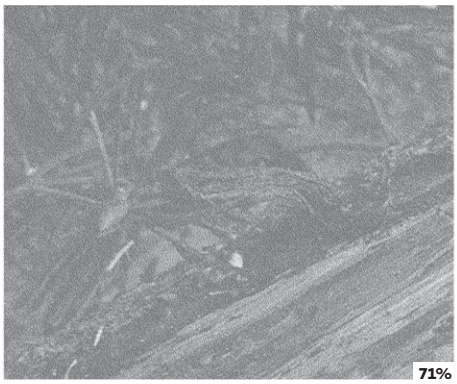
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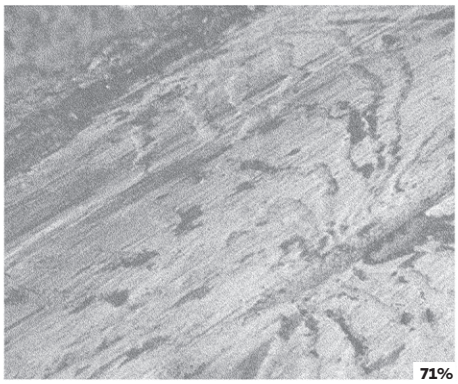
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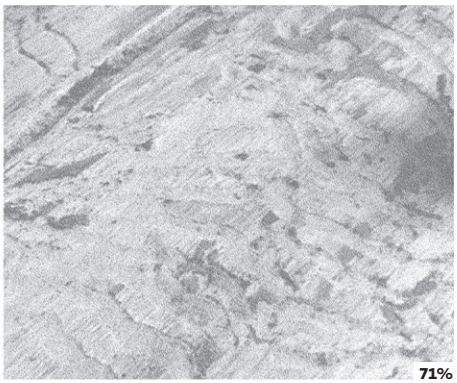
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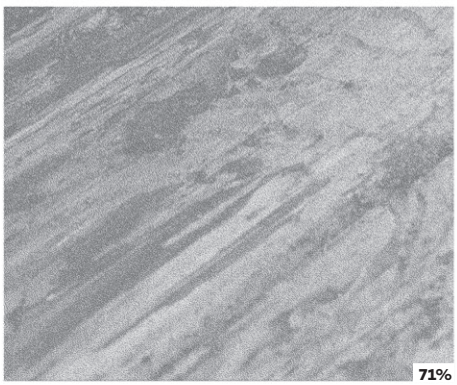
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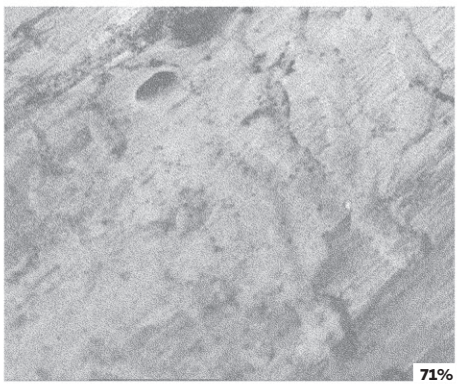
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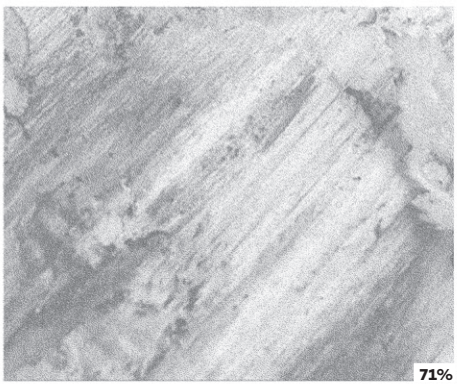
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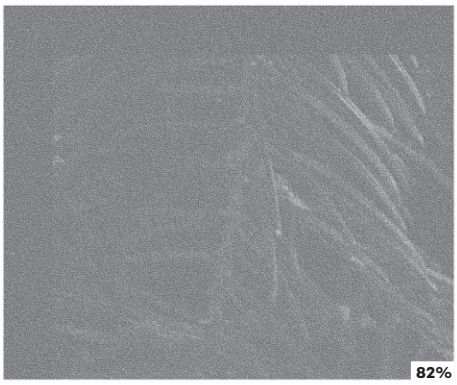
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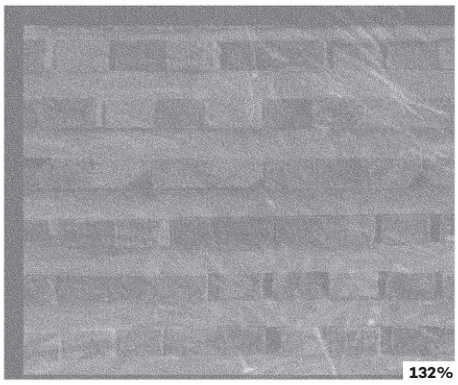
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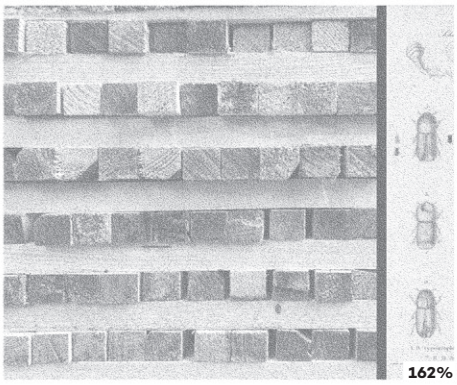
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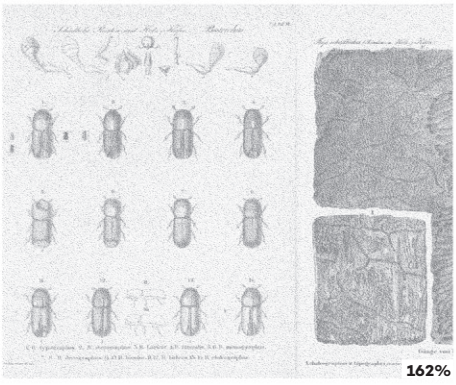
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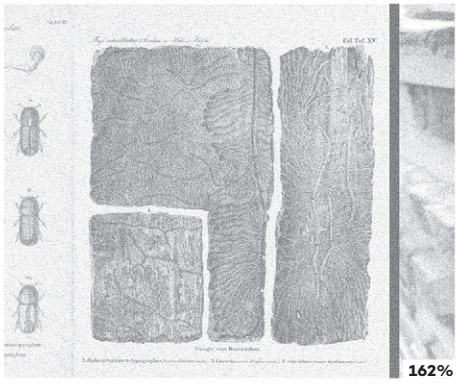
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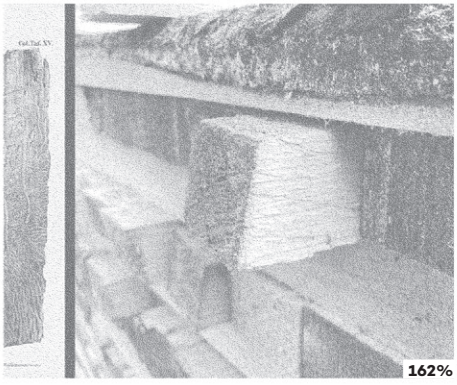
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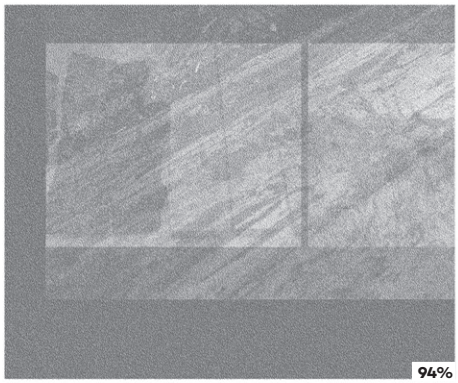
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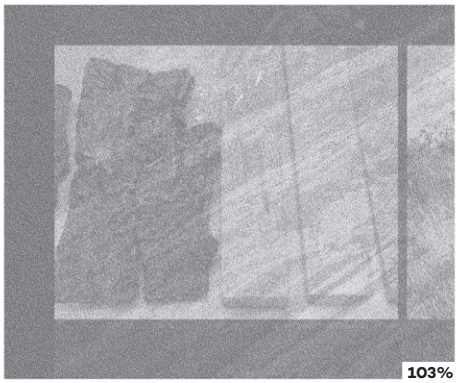
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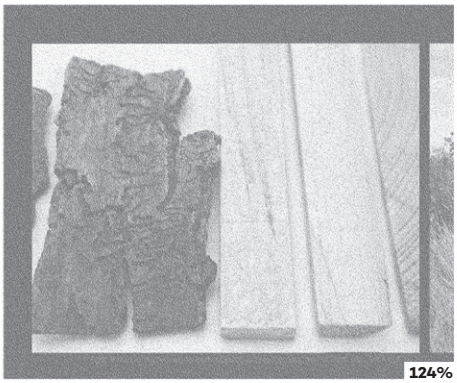
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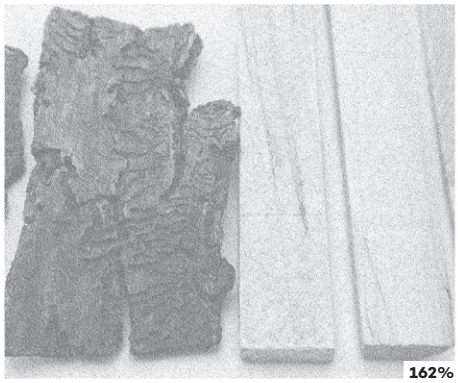
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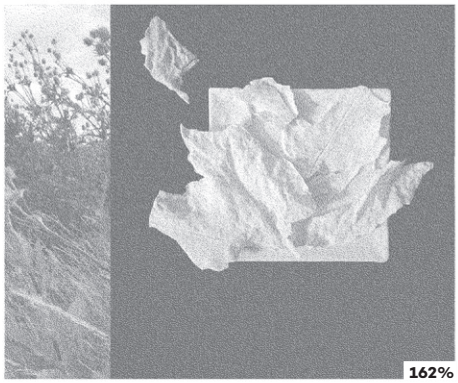
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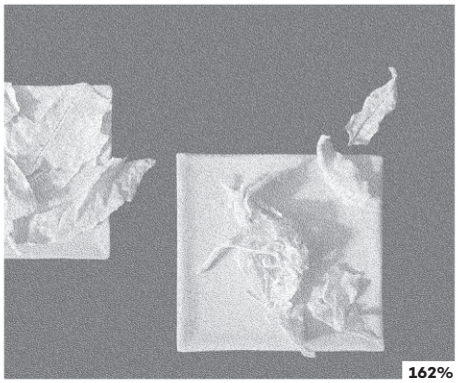
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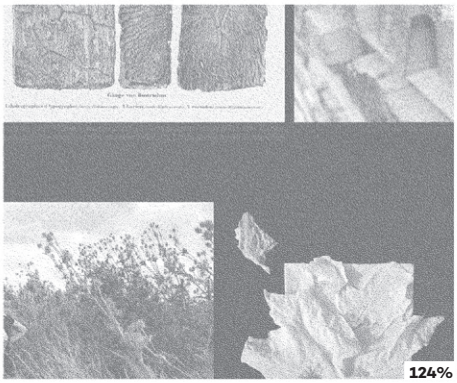
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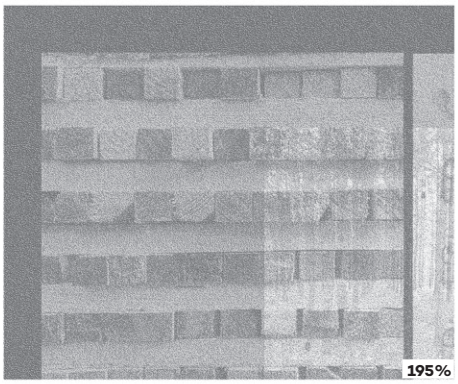
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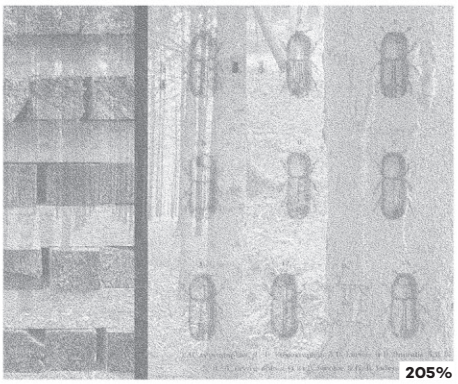
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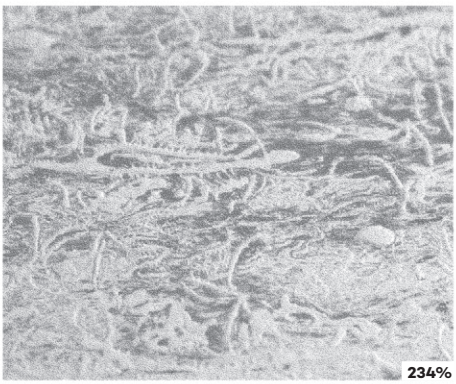
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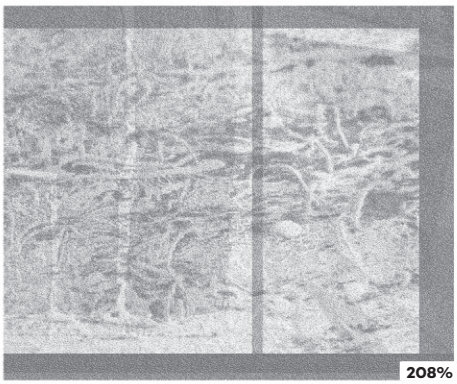
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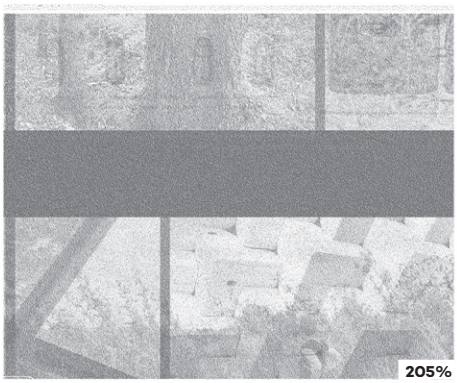
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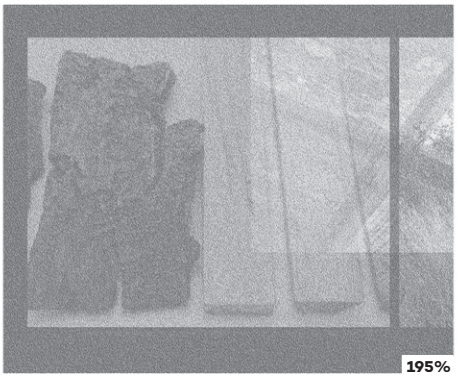
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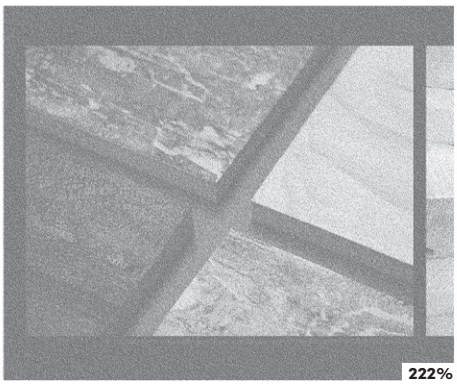
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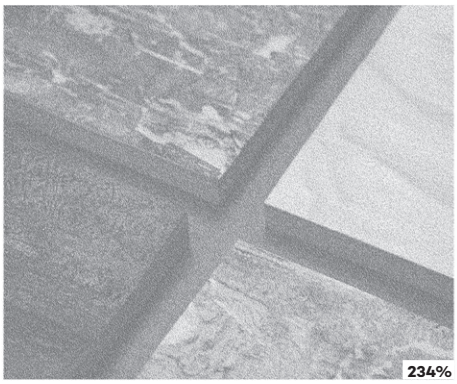
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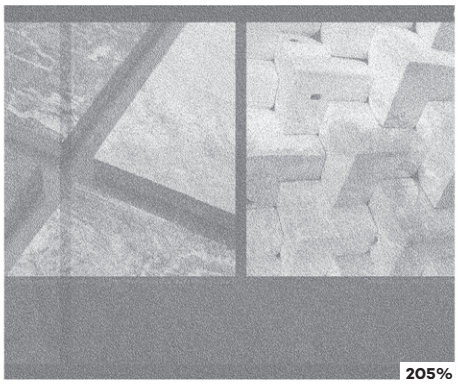
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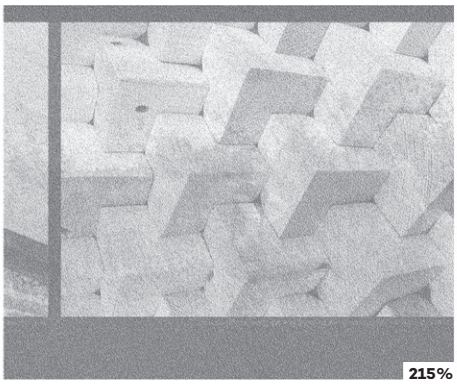
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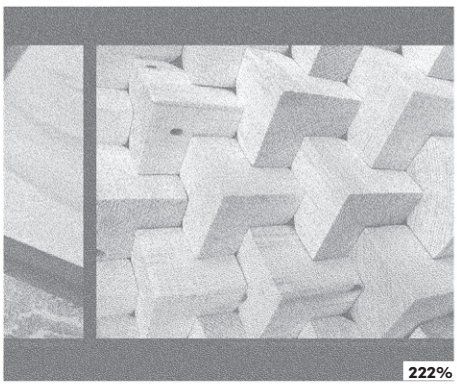
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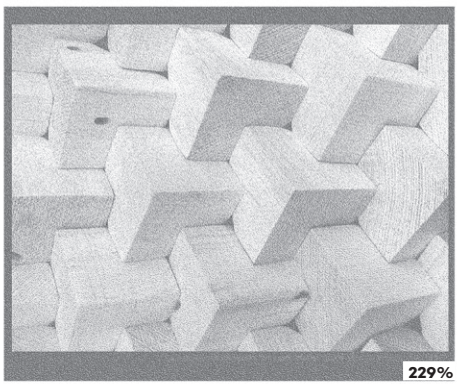
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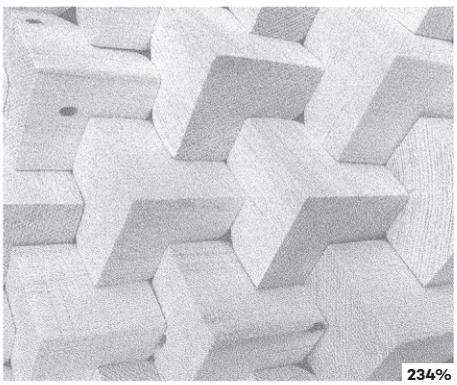
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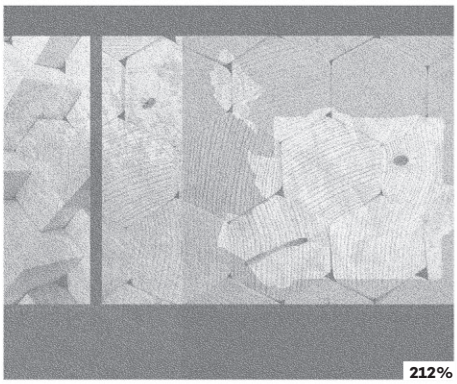
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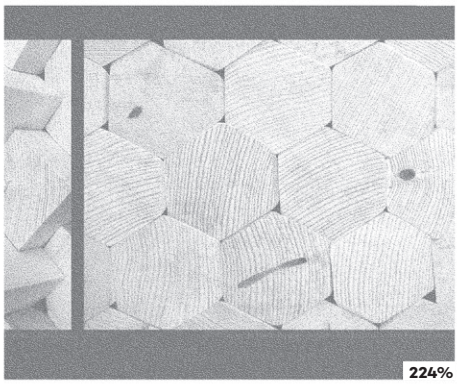
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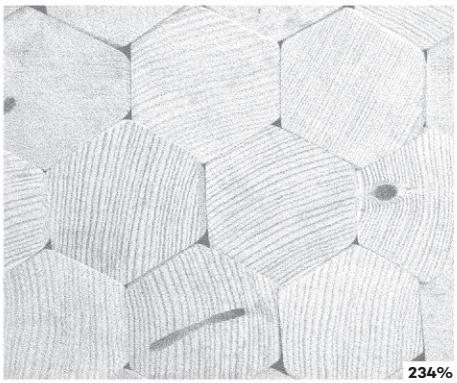
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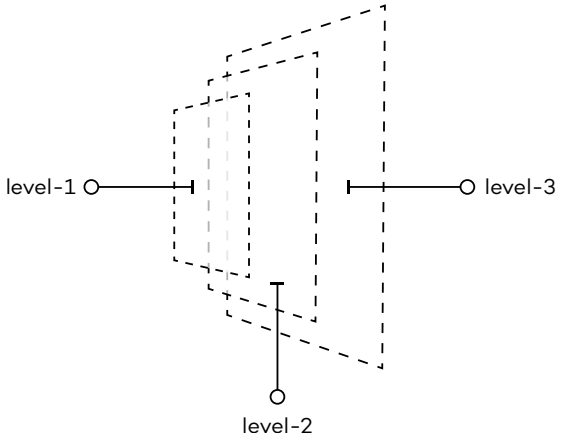

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