New again and again

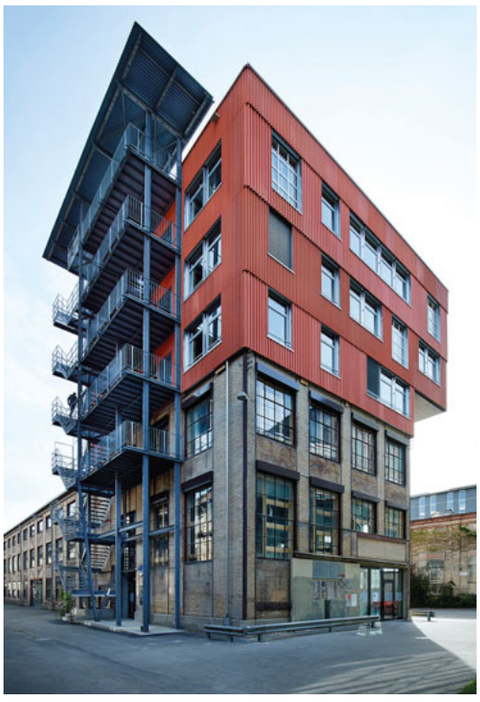
Extending the Cycle in Switzerland

Re-use is the order of the day in the face of climate change, increasing resource scarcity, and the gradual shift away from a throw-away mentality. In the Swiss city of Winterthur, an architecture firm shows how high-quality buildings can be constructed primarily using salvaged materials.

“Designing with salvaged building materials does not limit creativity” **Barbara Buser**

Unlimited growth is impossible on a finite planet, so there is no way around the efficient use of resources, at least not in the long run. These axioms were scientifically substantiated at the latest in 1972 with the report “The Limits to Growth.” Commissioned by the Club of Rome and prepared at the Massachusetts Institute of Technology, this report convincingly demonstrated that radical rethinking is essential. Above all, the depletion of raw materials must be stopped immediately, demanded the scientists – otherwise countless systems are in danger of collapse. “Entirely new approaches are required to redirect society toward goals of equilibrium rather than growth,” states the report. “Such a reorganization will involve a supreme effort of understanding, imagination, and political and moral resolve.” That statement is 50 years old, and still sounds as relevant as if it had been formulated today. “The Limits to Growth” sparked fierce debate around the globe when it was published and gave a huge boost to the then fledgling environmental movement.

Objectively considered, the necessary rethinking has not taken place, the “entirely new approaches” have not been implemented. According to the UN International Resource Panel, global resource consumption has since tripled to 90 billion tons per year. It is estimated that this figure will double by 2050. The biggest influence on these impressive figures is the construction industry, which accounts for around 60 percent of global material consumption and over half of global waste. Vast landfills are full of materials that are still valuable. In less developed countries, such wastefulness cannot be afforded. There, materials are not discarded but re-used again and again. The responsibility therefore lies primarily with the industrialized countries. Although the concept of sustainability is part of good practice in those countries, there are still far too few people who are doing something about the everyday mismanagement of materials and the throwaway mentality.



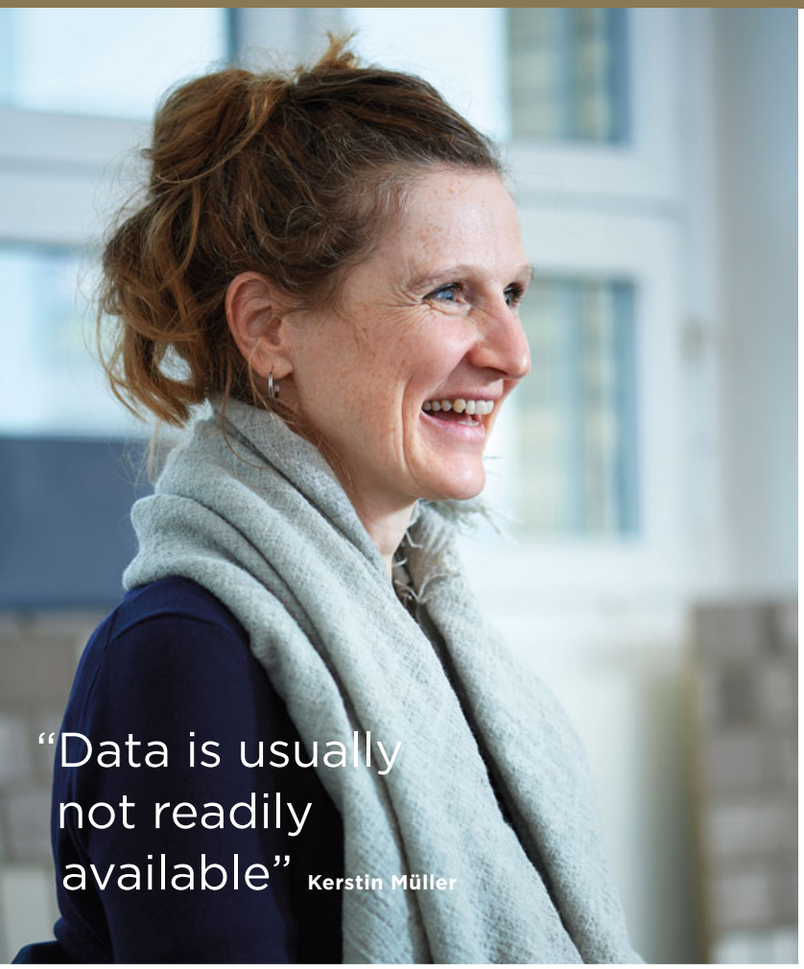
“In Switzerland we’ve always had to make do with what was there” Barbara Buser

One of the people taking the topic seriously is Barbara Buser. The Swiss architect, who graduated from the ETH Zurich, was involved for many years in technical collaboration projects in Sudan and Tanzania. “In Africa, I learned that what is waste for us in Switzerland is considered a valuable resource elsewhere,” she says. Back in her home

country, she founded the Verein Bauteilbörse Basel (Basel Building Component Exchange) in 1995, a nonprofit company that aims to return as many used but valuable building components as possible back into the service cycle. It is a trading post for finding and selling good building components that are salvaged when a building is demolished. Anyone who is constructing a building can find useful items at this marketplace.

In 1998 Barbara Buser founded the architecture firm baubüro Mitte together with Eric Honegger. This gave rise to baubüro in situ, which today employs around 60 people in Basel and Zurich. The firm's particular strength lies in adaptive re-use and transformation projects. One such project is located in Winterthur, a city of 100,000 near Zurich that was once a bustling industrial hub. With the decline of the secondary sector in Switzerland, vast factory sites became available in Winterthur. Many of the old industrial buildings were converted into cinemas, shopping centers, high-end loft apartments, spacious offices, and so forth. The roughly 50,000-square-meter storage yard directly behind the main train station was abandoned and made available for new uses after machine production stopped there in the 1980s. Initially, interim tenants moved into the various industrial buildings. Then in 2009 the Abendrot Foundation bought the entire site. This pension fund is strongly committed to sustainability. Among other things, it invests the money it manages in real estate that is built and managed with as few pollutants and as little environmental impact as possible.

Due to the size and complexity of the site, the Abendrot Foundation appointed a project management team for the development of the former storage yard. Barbara Buser and Eric Honegger and Klara Kläusler are the members of this team. The objective from the beginning was to preserve all the buildings on the site – and when Barbara Buser is involved in a project, one can always



assume that wastefulness will stop and old things will be put to new use. Nothing on the site was completely built anew. The sensitive treatment of the old building fabric has paid off, the conversion of the site is a success story. Space in the buildings is in demand, the tenant mix is balanced, the outdoor spaces are lively. The great care with which the overall project was conducted can be felt everywhere. The buildings have lost none of their industrial charm, yet are fully equipped for contemporary uses. The phrase “tradition plus innovation” is quite apt here: The old walls are home to future-oriented companies and many startups and creative thinkers.

Most of the construction work at the storage yard has been completed. One of the later subprojects is the conversion of an old warehouse, Building K.118, including the addition of three floors. The project team pursued a particularly ambitious vision for this building: They wanted to use only materials salvaged from demolished buildings. A recycled building – entirely in the spirit of the Bauteilbörse! Numerous experienced employees of in situ were involved in this project.

What is different about constructing a building out of salvaged materials?

Pascal Hentschel (PH): The planning process is reversed. Normally, first you do your design and then you specify the materials to build it. But in this case, you first look at what materials are available and put together a material catalog. Using that, your design takes form and develops constantly as the search for components progresses. You have to constantly analyze how to use what’s available.

Marc Angst (MA): It takes a lot of ideas, so teamwork is essential. Whenever someone gets stuck, someone else comes up with a promising idea. This kind of work is extremely exciting.

Kerstin Müller (KM): For me, one of the big challenges is to properly evaluate the materials, not only their condition but also in terms of sustainability and embodied energy. No one had any experience with this, there is no real precedent project, and technically it’s all quite demanding. Once we have selected a component, we have to collect a lot of information about it so that we can use it appropriately. Unlike with new products, this data is usually not readily available.

Barbara Buser (BB): Another challenge is the cost. The foundation fully supported our vision but also demanded that the recycled building cost no more than a new building. Designing and constructing a recycled build-

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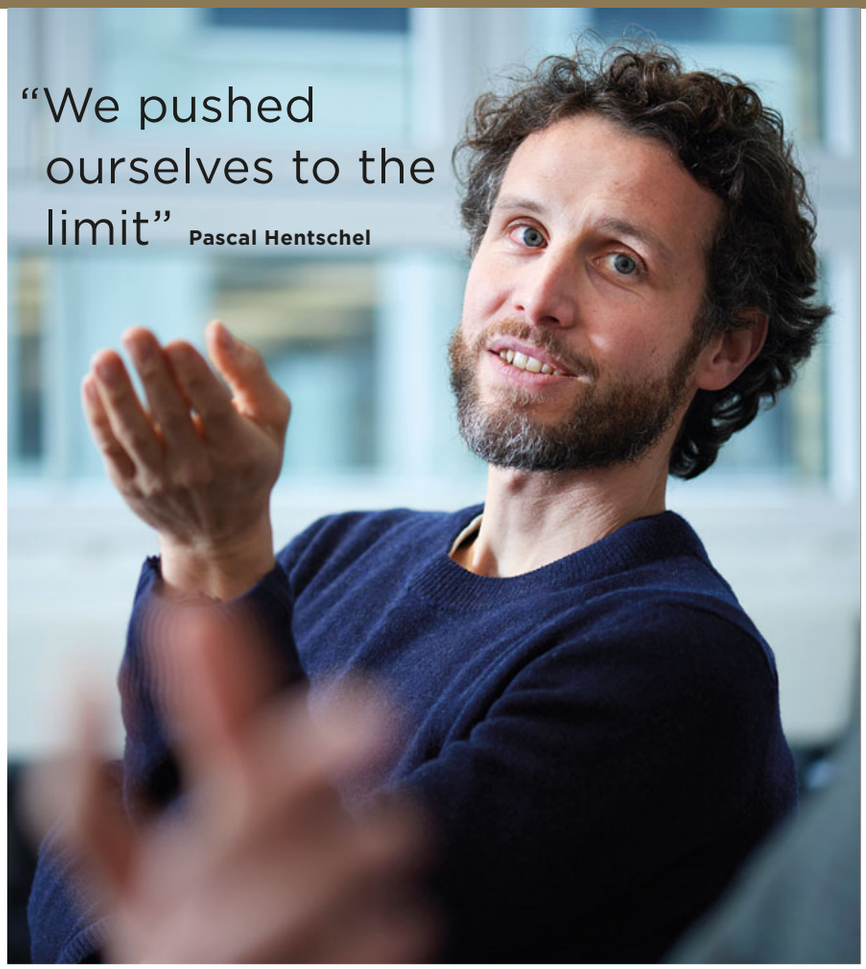
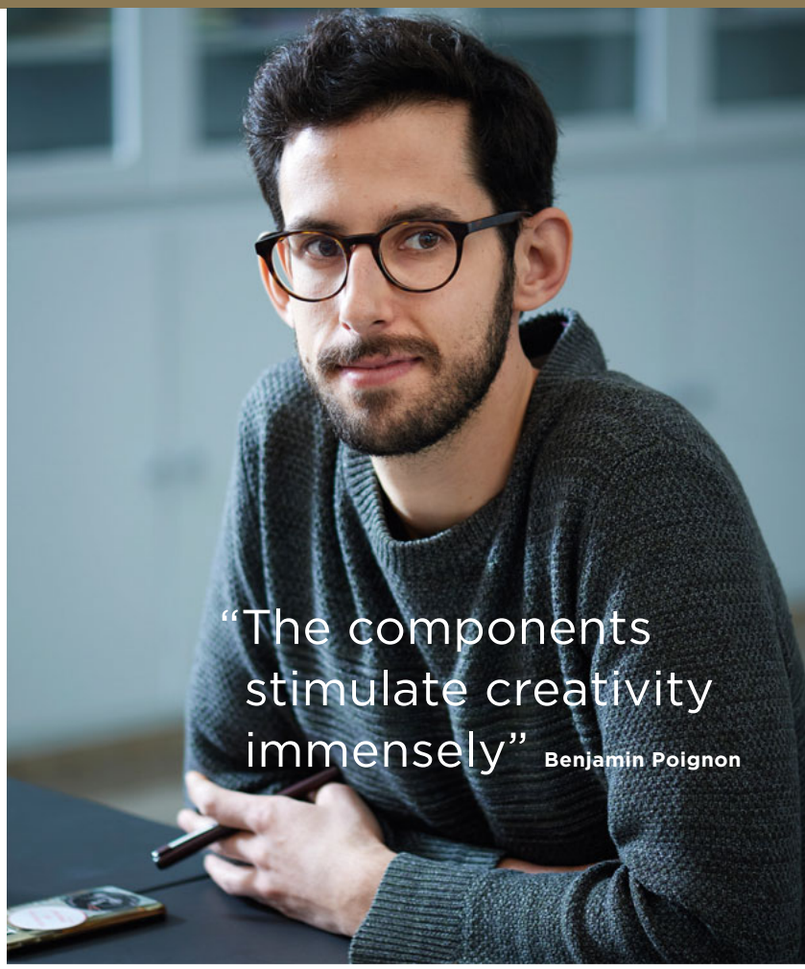




ing, however, requires a great deal of labor, which is very costly in our case. The decisive factor is the ratio of material to labor cost. That’s why there is much less waste in Africa, where material is simply much more expensive than labor. In the long term, however, it’s a matter of preserving values. There are also material or workmanship values. I find it disrespectful to simply throw away a window or a door after a depreciation cycle of ten years. And there are also energetic values; the components bind a lot of carbon. Cultural values also matter – and some of them are closely connected to the site.

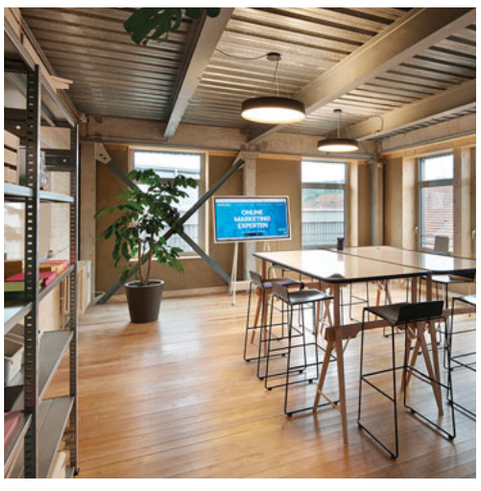
Are you seen as an eccentric if you recycle building components in Switzerland?
BB: No. I feel that in Switzerland there is a sense of unease about throwing things away. That probably has to do with the fact that we’re a country without raw materials. We’ve always had to make do with what was there. That’s why quality and innovation are so important in this country. There were hardly any resources, the winter evenings were long – so people did things like tinkering with a new function for a watch, which required little material.

Constructing a building from used parts first of all requires research. What is available in the first place? Where are windows, doors, flooring, or structural elements that could be used? In a country like Switzerland, where there is a lot of demolition and reconstruction, used material should theoretically be abundant. But you have to find it and get it. Kerstin Müller says they are “component hunters” who seek value in “urban mines.” If they see that a building is being demolished, they pick up the phone to salvage something, if possible. Because the Swiss apparently do not like to throw away material, it often happens that contractors will seak a component hunter of their own accord to offer material. Ideally, building components are deconstructed and immediately re-used on a different site close by. That would be the ideal solution. “It never works out!” sighs Barbara Buser. It would be different if there was a huge market for used components and the materials could be turned over quickly. Now, however, there is still a danger that one simply fills a warehouse with good things that one can never use – and that just generates costs. Broad rethinking and “entirely new approaches” are needed in order to establish the recycling of salvaged building components on a large scale. →

Back to H118: The component hunters made a particularly important find on the Lysbüchel site in Basel, where a large retail company was rebuilding its distribution center. The salvaged steel beams of the distribution center became the structure of the H118 expansion. The four floors are accessed by an exterior steel staircase salvaged in Zurich. It was previously part of the Orion office building, as were the granite façade panels that were converted into balcony pavers. Radiators could be brought in from the surrounding area. Aluminum insulated windows and red siding panels from Winterthur and Zurich serve as cladding. Roof elements come from Aarau, solid wood doors from Uster – all nearby places. All in all, around 50 groups of salvaged components were used, including the photovoltaic system installed on the roof. It's ideal when you can take as much as possible from a single demolition site," says Marc Angst, "then you don't have to negotiate as much."

A striking amount of material comes from industrial buildings. Aren't residential buildings suitable sources for salvaged materials as well?

PH: In residential buildings, materials are often fastened invisibly, whereas commercial buildings are usually constructed in such a way that the elements can be separated more easily.
BB: The big drama is composite materials. There have been phases in recent construction history when people simply didn't think about the entire life cycle of a building. But I believe that sooner or later it will become the norm to make not only a pollutant concept for a building but also a recycling concept. It must become standard practice to assemble buildings in such a way that they can be taken apart again.



And that means, for example, screwing instead of gluing. Buildings like H118, designed to be taken apart again, can only become standard practice in the long term if the entire industry rethinks material life cycles. But even in the best-case scenario, it may never be possible to construct a building entirely from recycled parts.

logistically feasible. At some point, however, it simply no longer makes sense to insist on using salvaged materials because of the cost. For example, if you tried to salvage all the kilometers of cable needed in this building from demolition sites, you would find that the undertaking is simply unaffordable. Even if it would be possible to create a completely recycled building, this doesn't seem necessary to me.

H118 was not a pure learning exercise, it was about showing what can be done with expertise – without breaking the budget or finishing behind schedule. Incidentally, in situ always looked for the lowest-impact

"The big drama is composite materials" Barbara Buser

What percentage of your recycled building actually consists of salvaged materials?
PH: At the beginning, we were aiming for 100 percent – but now we don't even know how to measure that exactly. In terms of visible surfaces, we are certainly close to 100 percent, but in terms of mass tonnage, we may achieve only 50 percent because the new components, like most of the concrete decks, are very heavy. According to our calculations, the carbon savings are about 60 percent. I would say we have certainly saved 500 tons of carbon emissions through our approach. We pushed ourselves to the limit, we tried to realize everything that was

solutions, even with new materials. Natural materials such as wood, straw, and clay were used as the primary new building materials.

You said that the design process is reversed in a project like this: The architects don't develop an idea and then specify the materials but rather select from the available materials and develop the idea based on that. Doesn't that restrict your creativity?
Benjamin Poignon: Not at all. The components stimulate creativity immensely. You simply let yourself be inspired by what you have available.
BB: In a university course we once presented a material library to 20 students and gave them the task of designing a project based on that. The result was 20 totally different and exciting projects. No, designing with salvaged building materials does not limit creativity.

Nevertheless, there must be limits: If you want to have a façade with 200 identical windows, this may not be feasible.
BB: Granted, you probably won't be able to find 200 identical windows, but you don't need to! We will not be able to save the world if we continue to build on the same scale as before. It cannot be the goal to realize such monotonous superstructures.

At the latest when you enter one of the 12 rental units in H118, you sense what Barbara Buser's last statement means. The spacious rooms on the four floors are bathed with light and have modern lines – the material palette exudes something venerable. There is history in every visible part. And each part continues this history into the future. You sense the great appreciation of the materials utilized in the building. In situ applied an extraordinary amount of understanding, imagination, and political and moral resolve in this project – as was called for 50 years ago!

Project appraisal by the Global Holcim Awards jury

Quality towards which the building industry should aim

The Global Holcim Awards jury highly commended this project for the disruptive construction methodology it proposes to achieve carbon neutral buildings and enable circular economy models in the field of design and construction. Energy savings here are achieved on three levels: demolition is minimized in favor of adding new elements to refurbish an existing fabric; construction material mainly consist of re-used components; when new materials are needed, the project opts for low carbon or carbon negative ones. In contexts like Switzerland where demolition is still a rather frequent practice that precedes new construction, this project shows how much potential exists – and is lost – in buildings that are torn down, to the point that dismantled elements are re-used as brand-new components for new construction. The ability of the building to be easily assembled and disassembled to allow for future modifications and re-use was also highly commended by the jury and recognized as a quality towards which the building industry should increasingly aim.

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