Media release

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Planning of Empa's building laboratory in full swing

«NEST» makes experiments with buildings possible

Buildings are here to stay for a long time, but it is exactly this point that hinders experimentation on them. With its «NEST» building laboratory, Empa offers a way out of this dilemma. In NEST, only the supporting structure is permanent – all the rooms, including their facades, are interchangeable. The individual research modules allow experimentation and trials with varying spatial concepts, energy management techniques and materials of the future to be conducted. By the end of the year NEST should be ready to submit its designs and apply for planning permission.

The building construction industry is considered to be conservative and therefore "resistant" to visionary concepts. This is not surprising, considering that owners demand that their buildings must offer full functionality from the day construction is finished. When architects or construction contractors allow themselves the luxury of experimentation they may be quickly faced with legal action for compensation.

But this is a problem which can be solved, according to Peter Richner who is a member of Empa's Board of Directors and head of the Civil and Mechanical Engineering Department. Richner, together with colleagues, came up with the idea of NEST and he believes the project could lend a new impulse to the field of building research, beginning at the Duebendorf site. The core of the idea consists of a steel-reinforced concrete framework with five open stories in which research modules can be placed. These modules must prove their value in everyday use and operation. Both living and office rooms can be accommodated, either as single or two-story constructions, or even multiple floor modules based on lightweight construction techniques. Leadership of the project is shared between Empa, Eawag, the ETH Zürich and the EPF Lausanne.

Proving trials for visionary building concepts

The reinforced concrete skeleton–the «backbone» – provides the necessary infrastructure for the room modules. Staircases, service lifts, water, heating, power and internet connections are all installed in the backbone, and this infrastructure is linked to the modules by a kind of umbilical cord with special standardized connectors.

Each floor has more than 600 square meters of usable area on which research modules can be installed and tested. In form and design the modules are completely independent of one another. Visionary and pragmatic

ideas can exist side-by-side, as can modernistic and traditional living concepts. Unusual ideas would be possible, such as the «Flat screen loft» – a radical concept where windows are replaced with flat screen displays showing webcam views of the outside world. Located immediately adjacent to this might be a completely passive living module for scientific guests, constructed from modern ecological materials and offering natural comforts created with the minimum of technology. And next to this there might be the absolute opposite – a cutting edge high-tech module with the latest heating and ventilation electronics, all controlled via a smartphone.

The modular research building should, however, not just encourage wild ideas but also lead to useable future concepts, and much faster than would be possible in any other setting. What works well catches on, and what is flawed will be replaced by another module after two years. Quite simply it will be survival of the fittest in building construction.

What will life be like in tomorrow's apartments?

Of course, a selection of purely showcase modules would have little scientific significance. That's why the intention is for people to actually move into NEST and report on their experiences. Plans call for a mixed usage, with large open-plan offices, conference rooms and apartments. NEST inhabitants will thus have the chance to experience how the houses of the future will affect people.

Department Head Richner wants to solicit proposals for various project phases on a competitive basis. Topics such as «building automation vs. passive climate control» would be possible; a number of options for renovating older buildings could be investigated. Because each module is connected to the core structure with a type of umbilical cord, it will be possible to record and accurately compare the flow of thermal energy, the need for chilled air in summer, and electric power and water consumption. Not least NEST also serves as a research laboratory for Eawag, the Swiss national water research institute. Water supplies and waste water treatment methods will be investigated, while new options for recycling so-called gray and black water can be tested in practical, real-life settings and under defined conditions.

Industrial partners being sought

NEST is veritably the most ambitions construction research project in Switzerland, but at the moment it exists only on paper. Currently, detailed construction plans are being finalized for the backbone, which will submitted for approval at the end of 2012 if everything runs on schedule. At the same time, the search is on for industrial partners in Switzerland and abroad who would like to take part in the first round of experiments. Even after this first test phase, NEST will be constantly changing shape and will investigate the hottest topics concerning our living and working environment. This knowledge will then be passed on to the building and construction industry in seminars and conference series.

Further information

Project website: www.empa.ch/NEST

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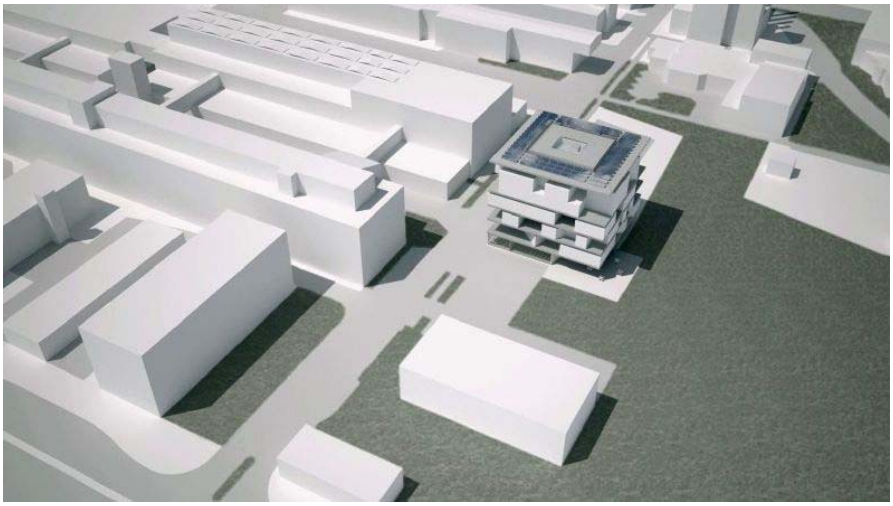

The planned NEST research building on the Empa site in Duebendorf.

(Graphics: Empa / Gramazio & Kohler)

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