



Shelters for earthquake victims are designed and organized by physicists in Pakistan.

Pakistani army is using it for their relief efforts, says Abdul Hameed Nayyar, a retired physicist who is working with Hoodbhoy on the building project.

The biggest problem with these structures is insulation, Nayyar says. "Hay is a fire risk, using

and nearly all of them were destroyed. Costlier brick buildings survived in slightly higher numbers, but even they lacked reinforcements such as concrete bond beams, according to researchers at the earthquake engineering center of the University of Engineering and Technology in Peshawar, Pakistan. Shoddy workmanship and poor materials had made nearly every building in the affected region a death trap, the researchers say.

After the earthquake Hoodbhoy persuaded his university's president to let him use the physics department's trucks to ship supplies to the disaster zone. He and his team deliver materials and plans, and locals build their own homes. "Working through reliable local groups and individuals is fundamental to our efforts," Hoodbhoy says. The team's regular visits to monitor progress, he adds, "are crucial for ensuring that the most deserving get the materials we have obtained for them."

The cost of a sturdy house designed to better survive an earthquake is \$1000, Hoodbhoy says. But demand is making materials scarce and driving prices up, and the onset of winter is causing delays. At sub-zero temperatures, Hoodbhoy says, "cement does not set well, or at all. The urgent thing now is to protect the maximum number of people from snow, rain, and biting cold winds."

"If we build primitive temporary shelters constructed from corrugated metal sheets and nailed into wooden frames, we can reuse the materials in the spring for permanent houses," Hoodbhoy continues. "Each shelter costs \$300, minus the frame wood, and we hope to build several hundred with the money at our disposal." Locals scavenge the wood from collapsed buildings and surrounding forests. More than 132 shelters, each big enough to house six to eight people, have been built already. The shelter design is proving so popular that the

nets and mud has been abandoned as locals think the mud would rust the iron, so they suggest using a layer of wooden planks." This would increase the shelter cost by about 20%, he adds, but would definitely save the people from bitter cold.

"We can't handle any more money for homes," says Hoodbhoy. "The need for spot allocation and inspection requires us to be there physically. Otherwise massive pilferage is certain." Instead, he is contemplating the relief team's next step: rebuilding schools. Nearly 16 000 schools were destroyed in the earthquake and those that have reopened are holding classes outside.

Paul Guinnessy

Democrats Offer Innovation Plan

Democrats in the US House of Representatives unveiled an "innovation agenda" in mid-November intended to maintain US leadership in science and technology through a blend of scholarships, a doubling of federal research funding, universal broadband internet access, and greater steps toward using alternative energy. The agenda, announced at a press conference by House Democratic Leader Nancy Pelosi (CA), closely mirrors the recommendations of a recent National Academy of Sciences report that warned about the waning of federal support for science research and education.

Pelosi said the US blueprint for creating powerful public-private partnerships and investing in "long-term, high-risk ideas" has made "the US the breeding ground for the innovations and inventions that increased our prosperity, enhanced our lives, and protected and advanced our freedoms." But, she said, the US has departed from that blueprint while other countries are copying it by "investing heavily in improving their ed-

ucational systems, and establishing world-class universities especially focused on science and technology." Federal support of basic research peaked in 1987, she said, "and has been flat or falling ever since."

Although the National Academy of Sciences report received bipartisan praise when it was released last October, the Democrats' innovation agenda quickly brought criticism from Republicans. Senator John Ensign (R-NV), chair of the Senate Republican high-tech task force, issued a statement saying, "Republicans have clearly led the way in the pursuit of a tech agenda," and called the Democrats' record on high-tech issues "dismal."

Rep. Rush Holt (D-NJ), one of two physicists in Congress, said the innovation agenda was "in process" well before the National Academies report came out and is a reflection of about a dozen recent reports that warn about the weakening of US science and technology leadership. "This isn't just a list of recommendations," Holt said. "This is a commitment."

The agenda doesn't have cost figures attached to it, but the National Academies report estimated the cost of implementing a similar set of recommendations at between \$500 million and \$5 billion. When asked about the cost of the Democratic proposal, Pelosi would say only, "We must not contribute to the debt. This is a pay-as-you-go plan."

Speaker of the House Dennis Hastert (R-IL) said the Democrats' science and technology plan would lead to "higher taxation, litigation, and regulation." Both Hastert and Ensign said Democratic opposition to "junk lawsuit" reforms shows that they aren't serious about helping high-tech companies. Many Republicans have tied general support of science to legislation on class-action lawsuit reform and other legislative bills they say are needed to free the high-tech industry of government regulations.

Jim Dawson

Physicists Protest US Nuclear Policy

Do not undermine the Nuclear Non-Proliferation Treaty (NPT). That's the message two physics professors at the University of California, San Diego, are trying to spread with a web-based petition they launched last fall.

Kim Griest, an astrophysicist, and Jorge Hirsch, a condensed matter physicist, started the petition after reading newspaper accounts of changes in US nuclear policy. The policy is re-

capped in the “Doctrine for Joint Nuclear Operations,” a document from the Joint Chiefs of Staff, a body composed of the highest-ranking member from each branch of the military. The policy, says Griest, blurs the distinctions between nuclear weapons and other weapons and endorses preemptive nuclear strikes on non-nuclear states.

Among the reasons listed in the doctrine for which “combatant commanders may request presidential approval for use of nuclear weapons” are “to counter potentially overwhelming adversary conventional forces,” “for rapid and favorable war termination on US terms,” and “to demonstrate US intent and capability to use nuclear weapons to deter adversary use of WMD [weapons of mass destruction].” (The petition, with links to the doctrine and other documents, is at <http://physics.ucsd.edu/petition>.)

“This policy is much more dangerous than people think,” says Griest. “It will destroy the NPT. If the US can attack a non-nuclear state, then the only defense is to make your own nuclear weapons. Every country will want to build their own.”

Under the NPT, the official nuclear weapons states—the US, Russia, the UK, France, and China—have made “negative security assurances”: They have promised not to strike non-nuclear states. “Those promises are part of what is being called into question now,” says Hans Kristensen, director of the nuclear information project at the Federation of American Scientists. Under the new policy, he says, a member of the NPT that has no nuclear weapons “but may have developed biological or chemical weapons can be attacked, or threatened with attack, by US nuclear weapons.”

Steven Weinberg, one of the nine Nobel laureates among the more than 1600 physicists who had signed the petition as of press time, says, “I think it’s a terrible thing for our country to weaken the taboo against the use of nuclear weapons.” Pointing to Congress’s decision in October 2005 not to fund the Robust Nuclear Earth Penetrator, which was intended to be used preemptively on buried chemical or biological weapons, Weinberg adds, “I think the bunker-buster case is an example where public opinion did have an effect.”

“We are physicists,” says Hirsch. “We made these weapons. We work on these weapons. We benefit from the defense establishment—they give us money. Physicists need to take a stand as a community.” Adds Griest, “Our goal is to generate enough discussion so that the policy is revised.” **Toni Feder**

News Notes

SALT inauguration. “We are feeling elated to be where we are today,” says David Buckley, project scientist for the Southern African Large Telescope. “We built this telescope on schedule and on budget and we are starting to get science out of it.” On 10 November 2005, South Africa’s president, Thabo Mbeki, officially inaugurated the \$19 million telescope, which is sited near Sutherland, about 260 km north-east of Cape Town (see *PHYSICS TODAY*, November 1999, page 61).

With an effective aperture of about 9 meters, SALT is the largest single telescope in the Southern Hemisphere. So far, it has two instruments, an optical imager that extends down to 320 nm in the UV and records images at 12.5 Hz, and a spectrograph capable of tunable filter imaging

and polarimetry.

Parts of SALT’s instruments are actually made of salt: For efficient UV transmission, the spectrograph has two lenses, each about 20 cm in diameter, that were ground and polished from salt crystals and are sealed and sandwiched between other lenses to prevent water absorption.

SALT was conceived as a replica of the Hobby-Eberly Telescope in West Texas but, says Buckley, “we made significant design alterations.” SALT has 11 partners in 6 countries: South Africa, Germany, New Zealand, Poland, the US, and the UK. **TF**

China joins XFEL. On 24 November 2005, China became the first non-European country to join the x-ray free-electron laser (XFEL) to be built at the German Electron Synchrotron lab (DESY) in Hamburg, Germany. By mid-2006, the 13—and still counting—partners aim to set forth details on the mode of collaboration, technical design, schedule, cost breakdown, and financing for the project. Germany will pay roughly 60% of the projected C908 million (\$1.1 million) construction cost.

The XFEL will produce x rays in the wavelength range 0.085–6.0 nm with pulse times less than 100 femtoseconds (see *PHYSICS TODAY*, May 2005, page 26). The x-ray pulses will be used to observe molecular and atomic processes in materials and biomolecules in real time. Construction begins late this year and the facility is supposed to go on line in 2012. **TF** ■



SALT: The Southern African Large Telescope.

WEB WATCH

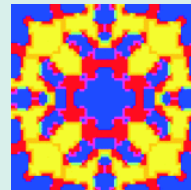
<http://www.archive.org/details/FindingH1929>



In its 10-minute span, the 1929 cartoon **Finding His Voice** explains the then-new technology of putting sound into movies. With remarkable clarity and accessibility, the cartoon follows the recorded sound energy through its conversion to electricity, light, electricity, then back to sound.

<http://www.univie.ac.at/virtuallabs>

Game theory’s origins and applications lie in physics, economics, ecology, and other fields. To navigate this rich, interdisciplinary terrain, visit **VirtualLabs**, a set of online tutorials put together by Harvard University’s Christoph Hauert.



<http://whyfiles.org>



From the University of Wisconsin–Madison comes the **Why Files**, an online news magazine devoted to explaining the science behind topics of current interest. Recent installments have covered earthquakes, high gas prices, and teaching (or not teaching) evolution.

To suggest topics or sites for Web Watch, please visit <http://www.physicstoday.org/suggestwebwatch.html>.

Compiled and edited by Charles Day