

Aggs study soil expansion

Four Texas A&M University graduate students spent the summer on a quest that may save American homeowners some \$2.3 billion annually.

The four, working out of A&M's department of geology, took a pickup truck, a car, and a mobile to travel 15,000 miles in 12 weeks studying expanding clay soils which cause \$2.3 billion dollars of damage annually.

This is twice that due to the total energy loss from earthquakes, hurricanes, tornadoes and floods," said agronomy advisor Dr. Christopher Mathewson who periodically joined the team's expedition.

The survey, conducted with the help of many cooperative citizens of local government officials, may help in the ability to successfully predict damage and provide ways to minimize it," he explained.

The project, financed by the National Science Foundation, took Mark Dobson of Houston, Joe Watson of Hammond, La., Larry Dyke of Vancouver, British Columbia, and Brian Powers of Beeville to four cities in diverse parts of Texas.

San Antonio, Amarillo, Beaumont and Waco were the test sites where they inspected 458 homes and took over 800 core samples to do basic engineering tests on the soil," said graduate student Larry Dyke.

"These tests allow for classification of the soil and allow us to determine the shrink-well potential."

All this had to be correlated with the dates the home foundations were put down, building permits issued, along with maps, plats and other essential information that would have been impossible without the cooperation of all the city councils," he said.

The difficulties occur because the soil under the center of the foundation is protected from rapid changes in moisture caused by the weather,"

Dyke said. "Wetting will cause expansion that will tend to lift the edges of the house. Similarly, drying will cause contraction, allowing the edges to sag."

The foundation and walls will crack because they were not designed to withstand these uneven loadings," Dyke explained. "Sampling soil near already damaged homes will allow a determination of soil swelling properties to be made."

Correlating these properties, along with the age and shape of the house, topography, vegetation, climate and others, to the damage we measured in the foundations and outside walls may provide an answer to our questions," he said.

To give some idea of the forces exerted, these soils can apply pressure up to 30,000 pounds per square foot," Dyke added. "This is equivalent to an ocean depth of 500 feet."

Many city and professional engineers, along with real estate professionals, were extremely helpful

in locating these damaged sites," Dr. Mathewson said. "If you think about it, we were almost asking them to expose their dirty laundry. They had to release their misery and problems in order for us to get the data to predict risks in the future."

The team managed to complete 10 per cent of the tests on the soil samples in the field by utilizing the facilities of the mobile laboratory. It comes equipped with water and electricity which allowed them to carry out the soil classification and simple earth materials tests. The lab also had drafting tables and desks to handle map and paper work.

Everything worked and stayed within budget," Dr. Mathewson said. "I guess what is really unusual is that nothing went wrong. Our great impression of the project was the sincere interest and candor with which we were received and aided by the townspeople where we worked."

Heat pump is efficient system

As costs for oil, gas and electricity rise, more Texans are turning to a device which has been used for 40 years — the heat pump.

Young, research associate at the Texas Real Estate Research Center (TRERC) at Texas A&M University, explained that a heat pump does more than just heat.

The heat pump is both a heating and cooling system," she said. "It takes its name from the fact that its principal function is to move heat, either into or out of a home or building."

Most important, heat pumps use

electricity more efficiently and economically, Young said, noting that energy studies show the heat pump operates twice as efficiently as conventional electric resistance heating.

A recent comparison showed that the heat pump system used 47 per cent of the kilowatt hour required by conventional heating in Dallas and only 43 per cent of the kilowatt hour required in Houston.

"The heat pump is like a conventional air conditioner, except it works in reverse," Young said. "During cold weather, it extracts heat from the outside and pumps the natural heat inside. This can be

done even when the temperature is below freezing."

On warm days, heat is removed from the indoor air and a heat-transfer fluid carries it to the outdoor unit where it is expelled.

"The heat pump is a heater and air conditioner all in one," added the research associate. "All the owner has to do is set the thermostat. The heat pump automatically switches direction of the air flow in order to keep the desired temperature level. The heating is even, there is no sudden influx of air and the unit produces no fumes, smoke or soot."

Young said the initial cost of a heat pump is from \$300 to \$600. Although this is more than typical electric furnaces or straight resistance heating, it is less expensive to operate and the added cost is usually recaptured in less than five years, she said.

"The heat pump is particularly suited to Texas," she said. "Homeowners in colder climates

benefit less from the efficiency of the heat pump because they must resort to supplemental heat. This is not required in most areas of Texas."

Young stressed that while the efficiency of the electric heat pump is a prime feature of the device, local utility rates determine the actual cost of operation. If gas rates rise, the heat pump is less expensive. On the other hand, if electricity goes up, the operating costs of the pump rise.

"Homeowners are becoming increasingly concerned about utility bills," Young said. "It has been predicted the price of gas will rise even more rapidly than electricity in the future. While electricity rates have been tied closely to gas prices, this is likely to change as more lignite- and nuclear-powered generators replace gas-fired plants."

"Furthermore," she concluded, "it has been predicted that in the near future, the heat pump will capture up to half the market."

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TEES gets center

Construction has begun on an office and classroom building at the Texas Engineering Extension Service's West Texas Regional Training Center.

Groundbreaking ceremonies for the \$100,000 facility were held Wednesday in Floydada.

"The construction of this building is an important step in our efforts to

better serve the people of West Texas. We feel that this is just the beginning of a long and successful relationship between this area and the Texas Engineering Extension Service," said Bradley.

An estimated 200 persons per week will be trained at the new center, scheduled for completion in early December.

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