Cowboys no longer home on the range

By Paul Weingarten
Chicago Tribune

SELIGMAN, Ariz.—Here on the vast Double O Ranch in the high desert of northern Arizona, it is spring roundup time, which means that ranch foreman Mike Landis and six other cowboys camp from May to July in the rocky, red soil, 15 miles from the nearest outpost of civilization.

They sleep in bedrolls on the ground, rise at 5 a.m., and do not bathe for a month at a time.

"There ain't no life better than this," says Landis, 59, a cowboy since he was 14.

But across the West and Southwest, that sentiment seems to be fading as the cowboy, America's archetype, is suddenly in short supply.

From Texas' Big Bend to Montana's Big Sky, the shortage is reshaping life on America's ranches, compelling many ranchers to change the way they operate and threatening the survival of others. It is also spurring a widespread movement by ranchers to legally import Mexican cowboys to take up the slack.

"It's hard to find a good cowboy," laments Jack Huning, a third-generation rancher from Los Lunas, N.M. "A lot of people fancy themselves cowboys, but they aren't."

"It's bad and getting worse," says Edmund Davis, manager of Arizona's Diamond Ace Ranch, the largest in the state. He has 7 cowboys on the 750,000-acre ranch, far short of a full crew of 17.

The crunch actually started decades ago when young people began to flee ranches for the cities, shunning jobs such as the cowboy's, which offer the dubious blandishments of low pay—$500 a month—long hours, few benefits and the opportunity to live dozens of miles from the nearest town.

The coup de grace was the Immigration Reform and Control Act of 1986, designed to staunch the flow of illegal aliens into this country. In the past, hundreds of those aliens were Mexican *vaqueros*, or cowboys, who came across the border to punch cattle.

Last week, the Immigration and Naturalization Service (INS) began cracking down on employers who knowingly hire illegals, levying an $11,000 fine against a Virginia motel owner.

Without the Mexican cowboys, some ranches may fold, according to Rep. Lamar Smith, whose West Texas district is larger than Ohio and filled with cattle ranches.

"Either you get cowboys or you don't work the cattle, and that means economic ruin," Smith said.

In Texas, Arizona, Colorado and New Mexico, ranchers are hoping to head off the cowboy crisis by importing Mexican *vaqueros* legally, under a law called H2a. The law, which has been in effect since 1952, allows certain ranchers and farmers to hire foreign workers if no domestic workers can be found for a temporary or seasonal job.

The program originally was intended to help farmers obtain seasonal workers, and effectively barred cowboys.

But under a revision as part of the 1986 immigration reform package, ranchers can apply to hire foreign cowboys on a case-by-case basis, a complicated and lengthy procedure one observer calls "tortuous."

To date, no rancher has successfully completed the process.

A bill introduced by Rep. Smith last March would streamline the process and expand the program to automatically include cowboys. Congressional hearings on the bill are expected to begin later this month.

"This is a starting point," says Philip Broadbent, legislative director for Smith. "The bill may change, but somehow the problem is going to be dealt with."

Under the current law, ranchers seeking foreign cowboys must first convince the U.S. Department of Labor that the job in question is "temporary and seasonal."

If that hurdle is cleared, the ranchers still must advertise extensively for American cowboys. If that fails, they may be allowed to hire the foreigners, but must agree to pay them a Department of Labor-approved wage, and to provide free transportation and room and board.

Preliminary negotiations between a Texas ranchers' consortium and the labor department remain stalled over proposed wages for the cowboys. The ranchers favor $500 a month, while the government is pushing for a higher figure.

Last year, some 23,000 workers came to the United States under the H2a program, a figure that some labor analysts estimate could soar to 250,000 by 1991.

That worries critics of the program, who contend that it inadvertently allows employers to bypass domestic workers and continue to exploit foreign laborers with low wages and execrable working conditions.

"The law is fraught with abuse from the get-go," says David Hall, executive director of Texas Rural Legal Aid. "If the workers complain, it's back to Mexico, so there's an incredible danger that the program will be abused by ranchers, particularly in the remote areas."

Meanwhile, many ranchers improvise to survive. Some herd cattle by helicopter to cut labor costs. Others tinker with new methods that restrict the grazing area of cattle. Some have enlisted family members and neighbors for the roundups. And still others will continue to employ illegal aliens, until as one rancher put it, "the INS cracks the whip."

During one memorable month last year, the Double O had no cowboys at all, Landis said. He and his wife, Karen, managed until they could hire help.

"A lot of guys come here and they think they're cowboys, but they find out real sudden-like that they're not," he says. "You gotta know about cattle. If you don't you can get hurt bad, maybe killed."

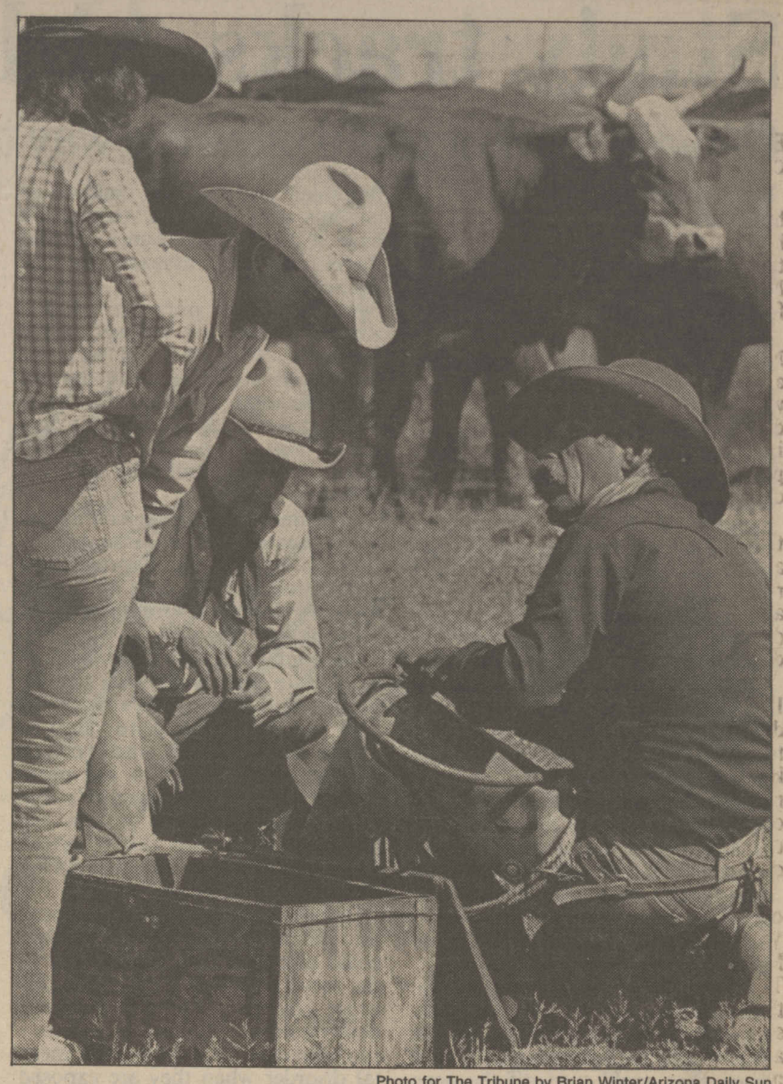


Photo for The Tribune by Brian Winter/Arizona Daily Sun

Rancher Mike Landis (right) and his cowboys prepare for branding during a roundup. He blames the government for a lack of workers.

Fluids may lead to dream machines

By Jon Van
Science writer

Engineers have long dreamed of eliminating moving parts from hydraulic valves, clutches and other basic mechanical workhorses as a way to build machines that are cheaper, lighter and more reliable.

The dream may have taken a significant step toward fulfillment with the recent development of new fluids that become as thick as grease at the flick of a switch, then revert to a watery state just as easily.

Contemporary valves feature mechanical parts that open and close to regulate fluid flow. But because the thickness of the new fluids can be controlled by altering electrical fields, experts are hopeful their flow can be regulated entirely by computer control, making movable parts no longer necessary.

Eliminating mechanical parts from valves would be an achievement on the scale of the development of the transistor, experts say, because it would lead to valves that are smaller, faster and much more precise than anything available today.

A major application for non-mechanical valves and clutches would be in automobiles. An object the size of a dinner plate could replace today's automatic transmissions, experts say.

Several researchers have hailed the development of the new fluids by Frank Filisko, an engineering professor at the University of Michigan. The fact that they are totally free of water and can operate at the high temperatures valves reach without breaking down is particularly encouraging, the researchers said.

But still to be determined is how abrasive these fluids will be during regular exposure to metals, and there could be problems finding appropriate seals to contain the fluid, Filisko said. If the fluids abrade metal too readily, they would be far less useful in valves, experts said.

"I'd want to see how these new fluids do on wear and tear of machinery," Robert Koski, board chairman of the National Fluid Power Association, said.

Fluids that depend on electrical fields for their viscosity were discovered more than 40 years ago. But these earlier fluids broke down at moderately high temperatures and were highly abrasive, which prevented their widespread use for practical applications.

Water has always been a major ingredient in field-dependent fluids. The earliest work with these liquids began with the observation that water containing rusty iron particles could change viscosity somewhat when subjected to strong electrical fields.

Because water evaporates at temperatures of 212 degrees Fahrenheit, field-dependent fluids operating at temperatures above that became unstable, Filisko said. His fluids have demonstrated stability at temperatures as high as 300 degrees Fahrenheit.

"The temperature problem has been the major obstacle to advancing this research," Filisko said. "Now that we've licked that, these other problems should be easy."

"It sounds like an excellent fluid," said Charles Zukoski, a chemical engineer on the faculty of the University of Illinois in Urbana.

"Temperature stability has been a key problem in this field. If he has fluids that are stable at high temperatures, that is a very promising development."

Besides being stable at high temperatures, Filisko said, his fluids are also nontoxic and relatively cheap, costing about $3 a gallon to make, as opposed to the $140 a quart for other field-dependent fluids.

Several liquids, including mineral oil, can be used as the medium for his fluids, Filisko said. Small ceramic crystals of alumino-silicate are placed within the medium to make the field-dependent fluid, he said.

Just how the particles work to congeal the fluid isn't totally understood, Filisko said, but microscopic examination suggests that when an electrical field is turned on, the tiny particles begin to line up in rows, building "bridges" through the liquid.

By manipulating the field, the fluid can be made so thick that it stops flowing.

Stephen Carr, director of the Materials Research Center at Northwestern University, said such fluids could lead to robots with manual dexterity that surpasses human abilities.

"You could use these hydraulic hands to do computer-controlled tasks in poisonous or high-radiation environments where humans cannot go," Carr said.

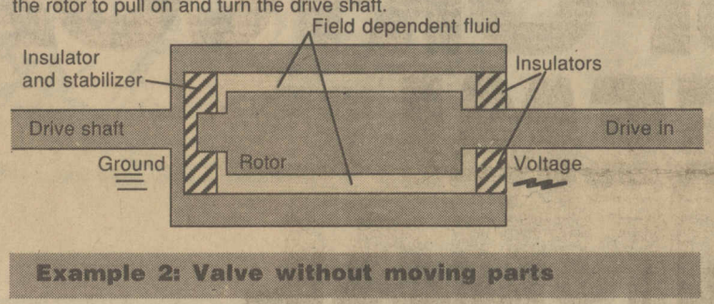
"Doing work in nuclear power plants is one example that comes to mind."

New fluid technology

Field dependent fluids contain alumino-silicate particles suspended in a non-conductive liquid. They become viscous when an electrical field is turned on and regain fluidity when the current is turned off.

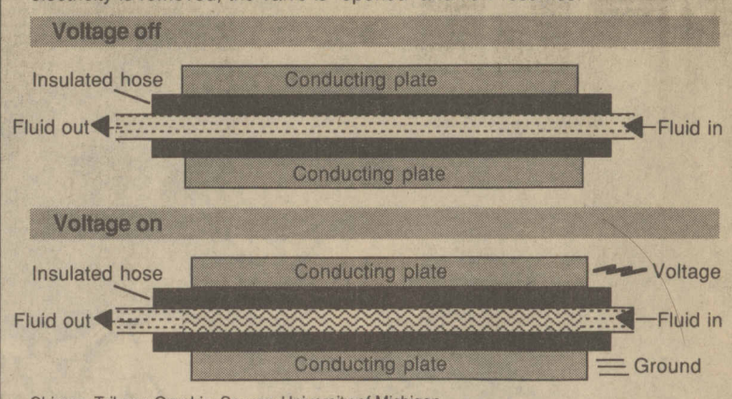
Example 1: Torque transfer

Field dependent fluid can be used in a simple clutch, as in a car's automatic transmission. With no electrical field, the motor-driven rotor spins unimpeded; when electricity is applied,the fluid becomes viscous, causing the rotor to pull on and turn the drive shaft.



Example 2: Valve without moving parts

This type of valve can be used in a hydraulic lift or other suspension systems. The field dependent fluid flows through the hose until the electrical field is turned on, causing it to congeal and block the flow. When the electricity is removed, the valve is "opened" and flow resumes.



Chicago Tribune Graphic; Source: University of Michigan

Italy accepts U.S. jets barred by Spain

ROME (AP)—The Italian government agreed Saturday to a NATO request that it accept 72 U.S. fighter planes being evicted from Spain.

Defense Minister Valerio Zanone said it was important that the planes remain in Europe to protect the North Atlantic Treaty Organization's southern flank. He said moving them to Italy was the "only suitable solution" to avoid an act of "unilateral disarmament."

The United States, under an accord reached in January with Spain, must remove the F-16s from the Torrejon Air Base near Madrid by 1991. The planes make up the U.S. Air Force's 401st Tactical Fighter Wing. The Pentagon has said it would have to disband the unit unless a final decision on moving them to another European base was made by August.

Zanone said there was no reason for the concern over the transfer expressed by the Warsaw Pact, since NATO was only establishing a new "peacetime base." The F-16s can carry nuclear weapons, but Zanone emphasized they will be armed only with conventional weapons.

Warsaw Pact countries are concerned that their territorial airspace could come within range of the aircraft when the planes are moved from Spain to Italy.

The Italian government has reportedly been considering several sites in southern Italy as possible bases for the F-16s. Zanone said NATO will meet the estimated $500 million cost of relocating the planes.