

**GPS:**

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**HEADLINE:** **Manure Application Goes High-Tech;**

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**BODY:**

A 6-in. pneumatic valve may finally make precise manure application an affordable reality for producers with vacuum-loaded tanks.

University of Illinois agricultural engineer Ted Funk is developing a low-cost, high-tech slurry applicator that will deliver a preset, constant flow for more even and accurate manure flow to fields.

In the past, manure application has been dictated simply by the speed of the tractor. Go slow and the application is heavy. Speed up and the application is light. With increasing pressure for proper environmental management of livestock farms, Funk developed a pneumatic pinch valve to control slurry flow rates. The valve is hooked to a computer and adjusts automatically to changes in air pressure.

Funk and fellow agricultural engineers Matt Robert and Yuanhui Zhang tested the concept in the fall of 2001 by spreading manure in nearby fields at the school's South Farms.

"We can measure the pressure differences in the liquid streams, and by that, we can predict what the flow rates are," says Funk.

With constant air pressure, three different valve air pressures were tested: 14.5 psi, 9.6 psi and 4.75 psi. These air pressures on the valve correlate to 150, 300 and 450 gal./min. manure flow rates, respectively. The slurry stream pressures were stable at all three valve pressure settings, he says.

The 6-in. valve matches the size of the discharge pipe on most tanks, reducing clogging problems. "If it starts to clog, you just release valve pressure and it opens up," he says.

A radar gun mounted on the tractor senses vehicle speed and feeds that information into

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the computer, and manure flow rate is adjusted accordingly.

The basic technology is sound. If the application rate is set at 5,000 gal./acre, the valve system will measure tractor speed and keep flow levels at that rate, Funk points out.

Funk and colleagues are currently working to test a regulator that will take into account tractor vibrations, in order to further refine flow rate.

### Global Connection

The next stage for the project is to add in **Global Positioning System [GPS]** technology. "A **GPS** unit can sense when farmers are getting close to a stream or well, someplace where they can't legally apply manure," explains Funk. "That information will shut the applicator off automatically."

The goal is to use more advanced **GPS** technology to develop maps with calculations based on field soil tests.

"How much manure should go to various parts of the field, based on the fertility of the field?" asks Funk. "Applying manure based on what the crop is going to need - that's the gold standard."

### Economical Price

Commercial systems to control the rate of slurry application can cost as much as \$30,000. Funk wants to develop a cost-effective system for the small producer.

"Most farmers already have a slurry tank," he says. "We're trying to develop a system for that farmer. We want to be able to tell him, 'Here's what you buy. Here's how you put it together.'" Funk estimates parts for the system will cost about \$5,000.

Top Air of Cincinnati, OH, provided the slurry tank and soil injection equipment used in the trials. The Illinois Council on Food and Agricultural Research is providing research funding.