Look for precision agriculture demonstrations at Ag Expo

Precision agriculture — if you’re tired of reading about it and want to see it first-hand, and actually talk to somebody who knows a little more than the average self-professed expert, then take note when you enter the MSU Ag Expo grounds this year.

Attendees to this year’s event can see demonstrations on field mapping, crop monitoring, computer-controlled spraying, a Global Positioning System (GPS) guided variable rate anhydrous applicator, and an all-terrain vehicle (ATV) equipped with GPS and soil sampling equipment. Demonstrations will be held at noon and 3 p.m. each day at the main entrance to the Expo grounds, according to Rich Huchep, MSA manager of expenses agents.

“Interest in precision ag is growing by leaps and bounds,” Huchep explained. “We hope to be able to help educate some producers, answer some questions, and then be able to direct them to specific exhibitors for additional information, if so desired.”

Each demonstration will last approximately one hour, says Huchep. Individuals can also talk one-on-one with company representatives on products, including John Deere’s GreenStar System and yield monitors; Raven Variable Rate Sprayer Control, sponsored by FMC; TMAs GPS and Grid Soil Sampling; and Raven Control and John Blue/Blue Jet System’s variable rate anhydrous systems, sponsored by Cale Marketing.

Variable Rate Anhydrous

Producers will be able to see a variable rate anhydrous system so new it’s still considered a prototype, according to Ray Glinz, sales representative for Cale Marketing. Using a Raven control and rate tied into a John Blue/Blue Jet pump and tool bar and GPS units, the system will be able to vary the application rate of anhydrous based on soil tests.

Continued on page 8

Tell them what you think!

About 600 farm families visiting Ag Expo will be asked to comment on the quality of the show and the various demonstrations that will take place each day.

“For all is to make sure that we are in tune with visitors’ expectations of the show and its intended educational content,” says Ag Expo Director Tim Harrigan. “The survey is the best way we can keep in touch with the needs or informational needs that producers have in light of the rapid changes occurring in agriculture. We want Ag Expo to be as beneficial as possible to our visitors.”

The survey will be conducted at various times of the day during all three days of Ag Expo by students from the College of Agriculture and Natural Resources, and will take less than 10 minutes to complete.

Less compaction and more precision focus at Ag Expo

Animal handling demonstrations to focus on managing total mixed rations

“TMRs are an essential aspect of good dairy management — everyone ought to be aiming toward feeding TMRs to every animal on the farm,” Bickert said. “However, we feel there are some opportunities for producers to improve their feed utilization and TMR practices.”

With those goals in mind, the animal handling demonstration at MSU’s Ag Expo June 25-27 will focus on improving TMRs, paying close attention to ration variation, moisture levels, particle length, ration balancing and mixing management guidelines. Livestock producers will also have a unique opportunity to bring in their own TMR samples and have them tested for particle length.

Signs will be posted at the entrance to the Ag Expo grounds giving instructions on where to drop off TMR samples and schedule an appointment for testing and consultation with a nutritionist on their TMR. “We plan to have 10 commercial units, marked by NASCO, available for producers to use in conducting their own partial length test,” Bickert explained.

Producers should be aware that the TMR test will focus on particle length only and will not test for protein or energy levels. Bickert estimates that producers should allow 10 to 15 minutes for the testing and consultation procedure.

Twice a day, at 11 a.m. and 1:30 p.m. each day, there will be 15 minutes to drop off samples, which will then be tested for particle length, and farmers will be able to pick up their results at the MSU Botany and Plant Pathology Field Laboratory. The commodity office located at 5226 W. Beal Rd. on the Ag Expo grounds will be open from 9 a.m. to 4 p.m. June 25, 26 and 27.

“We want to ensure that our testing is as beneficial as possible to the producer,” says Bickert.

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Cover Story

ow tires and rubber belt tracks on tractors and other field equipment can reduce soil compaction will be the focus of the Ag Expo field demonstrations, June 25-27 at Michigan State University. The three-day event will be open from 9 a.m. to 5 p.m. June 25 and 26 and from 9 a.m. to 4 p.m. June 27.

“Tire compaction has been an increasing concern among many farmers during the past few years as equipment has become larger,” explained Tim Harrigan, Ag Expo Director. “There are a number of things farmers can do to minimize soil compaction and yet still get optimal performance from equipment. We will show how that can be accomplished.”

According to Harrigan, the field demonstrations will run from 9:30 a.m. to 12:30 p.m. each day and will feature equipment and soil experts from MSU, John Deere, Ford New Holland, Caterpillar and the Goodyear Tire Company.

Included in the field demonstrations will be tractors on electronic scales to show how farmers can balance them for optimum weight distribution, and a demonstration on tire selection and ballasting for minimum ground pressure. In addition, two tractors using an evinrude hitch (to which tractor is pulling the most efficiently) will pull a third tractor or tillage unit to demonstrate traction capability.

Animal Handling to Include

Free Feed Particle Analysis

The animal handling demonstration at Ag Expo’s main exhibition site will be on dairy and animal behavior, feed bunk management and feed mixing. The sessions will be held at 11 a.m. and 1:30 p.m. each day.

Dairy and beef producers are invited to bring gallon-sized samples of fresh TMRs to the demonstration for free TMR particle analysis and consultation. The samples should be pulled from the TMR mixer wagon delivery chute or from the feed bunk.
Tires, tracks, traction and flotation

by Tim Harrigan, Associate Professor, Agricultural Engineering Department, Michigan State University

The focus of MSU's Ag Expo field demonstrations this year will be on alleviating soil compaction. Demonstrations will illustrate the range of tire and track options available for tractors, combines and other equipment. The events will also show how decisions regarding tire selection, tire pressure and ballasting influence machine performance and compaction.

Effective compaction control restricts soil development, increases soil and water runoff and decreases crop yields. While some soils are naturally compact, most compaction problems in Michigan are caused by heavy and repetitive loads from large tractors, combines, manure spreaders and other implements.

Since compaction is influenced by contact pressure at the soil surface, as well as total soil load, large equipment should be managed to achieve optimal performance and minimal soil compaction.

**Minimizing Soil Compaction**

Symptoms of compaction include soil crazing, cloudy seedbeds, standing water and an absence of plant nuzzles in the soil profile. Variable plant emergence and growth, disturbed seam slopes, lodging, and depressed yields.

A successful management strategy includes all aspects of the crop production system: velds, soil, crop rotation and machinery management. The first step in developing a plan to manage compaction is to take stock of what we already know:

- Most soils — including sandy and sandy loams — can suffer compaction, but the most susceptible are usually poorly drained and fine-textured soils such as clay loams.
- Most problems are caused by traffic on what is already home.
- Air passage improves water infiltration, reduces crusting and increases seedling emergence and growth.
- Increasing soil organic matter with additions of crop residue and manure adds stored energy to the soil, allows for better water infiltration, reduces bulk density and improves aggregate stability.
- Compaction is generally confined to the upper 12 inches of soil, and the greatest ground contact pressure is similar to that of lighter loads.

Consider the following:

- If 90 percent of the tire's weight is on the rear axle, a 2-WD tractor will carry twice the weight as a 4-WD, because the rear wheels are double-loaded.
- Shallow compaction occurs when the ground contact pressure is less than 1 psi, whereas the tire contact area is less than one inch.
- Loosening the soil reduces soil strength, increases air space and reduces water infiltration.
- Deep compaction occurs when the ground contact pressure is greater than 10 psi, whereas the tire contact area is less than one inch.

Shallow compaction can hurt yields every year in all tillage systems.

Managing machinery to alleviate soil compaction

A basic machinery management strategy to control soil compaction is to select and operate available equipment in a way that applies the lowest possible pressure to the soil, advises Tim Harrigan, associate professor in MSU's Agricultural Engineering Department.

With wheel tractors, producers should select a tractor chassis that distributes the load evenly over the axles and decreases ground pressure with larger, low-pressure radial tires. Harrigan explains: "Tracks or low-pressure tires can also be added to combines, grain carts, manure spreaders and other equipment.

**Decrease the Maximum Axle Load**

Chassis type affects axle load, says Harrigan. Two-wheel drive (2-WD) tractors carry 75 percent or more of the total tractor weight on the rear axle. As a minimum, low-pressure radial tires should be used, and maximum radial tire size should be limited to 38 psi. Adding weight, using a larger diameter tire or increasing the ground pressure will further aggravate the compaction problem.

**Increase Travel Speed**

Increasing travel speed decreases soil stress. Harrigan advises: "Power is the product of pull and speed. For example, a 20-foot field cultivator operating at 45 psi requires approximately 1,000 horsepower. Both will cover the same amount of ground in a given hour, and reducing friction will allow a lighter tractor to be used," he suggested.

**Reduced Trides Across the Field**

Newer tillage tools allow multiple operations and a range of control over crop residue that allows reducing the number of seedbed tillage operations. Crops such as dry beans are quite sensitive to shallow compaction created in the spring during seedbed tillage.

**Table 7 — Great Vehicle Weight (GVW) and Maximum Axle Load**

<table>
<thead>
<tr>
<th>Implement</th>
<th>GVW</th>
<th>Maximum Axle Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-WD tractor</td>
<td>39,000</td>
<td>9.75</td>
</tr>
<tr>
<td>4-WD tractor</td>
<td>38,000</td>
<td>9.5</td>
</tr>
<tr>
<td>10-WD tractor</td>
<td>25,000</td>
<td>12.5</td>
</tr>
<tr>
<td>24-WD tractor</td>
<td>16,500</td>
<td>6.0</td>
</tr>
<tr>
<td>36-WD tractor</td>
<td>12,500</td>
<td>4.5</td>
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<td>48-WD tractor</td>
<td>11,500</td>
<td>3.75</td>
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<td>72-WD tractor</td>
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<td>144-WD tractor</td>
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<td>1.5</td>
</tr>
<tr>
<td>156-WD tractor</td>
<td>2,000</td>
<td>1.25</td>
</tr>
<tr>
<td>168-WD tractor</td>
<td>1,000</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Less compaction and more precision focus at Ag Expo

Continued from front page right after delivery to ensure a random representative feed sample.

**Precise Planting**

Demonstrations available

Demos will cover precision planting equipment at the main exhibit site. Several companies will demonstrate precision equipment to help farmers achieve the maximum yield. The demos will be held on field mapping, control yield monitors, as well as other applications.

House makes further cuts in EEP

The House Appropriations Committee has voted in most House bills. Appropriations Committee Chairman George Gekas, R-Pennsylvania, has offered to limit the amount of money available for farm spending. Modern equipment is pre-engineered by Top quality materials and backed by the industry's leading warranty. For handsome, functional agricultural buildings from Lester meet the highest standards for appearance, durability and, reliability, and are affordable. Lester Frame buildings are engineered to meet the highest standards for appearance, durability and reliability, and are affordable. Lester Frame buildings are engineered to meet the highest standards for appearance, durability and reliability, and are affordable.
University study provides answers to managing compaction

W

ich is better for controlling compaction — tires or tracks? The answer may surprise you. Results from a study conducted by Ohio State University's agricultural engineering department could finally put to rest the issue of which is best.

The test was conducted in the spring of 1994 on a compactive soil located at the university's experimental farm near South Charleston, Ohio. Researchers focused on proper tractor weight and weight distribution, tire size and correct inflation pressure. Four different tractor setups were used for testing, with and without an implement (a 41-ft John Deere 980 Field Cultivator), to obtain the highest compactness.

Measures of changes in bulk density, air-filled porosity, air permeability and cone penetration were taken from lowest to highest compaction levels as follows:

- John Deere 8700 with 24-inch radial tires inflated to 24 psi.
- Caterpillar Challenger 75 with 55-inch belt (estimated static ground pressure at 45 to 6 psi).
- John Deere 6820 with 18.4R38 dual tires inflated to 50.0 psi.
- John Deere 8700 with 24.5x32 tires on tandem axles.

Morton Buildings introduces Insta-Lok self-sealing roof panels

Morton Buildings introduces the new Insta-Lok standing seam roof system. This patented, self-sealing system creates a clear, linear appearance, without the limitations of seams. The Insta-Lok design accommodates virtually all types of roof designs, slopes and angles, and even vertical rib applications. Because of the unique interlocking scheme, Insta-Lok means fewer, more precise installations — eliminating the need for crimping or mechanically sealing the seams. It also permits unlimited expansion and contraction of the roof during climate shifts. This versatility allows Morton Buildings to offer a 20-year warranty against red rust, fading, chalking and peeling.

The Insta-Lok panels are secured with a concealed anchor clip. The simple metal interlocking hook and rolling to each metal panel over the previous panel's formed edge. As each panel is installed on the roof, the standing seam self-seals and automatically locks to the adjacent panel, resulting in a secure, watertight fit.

Morton Buildings, headquartered in Morton, IL, employs 100 people, has five manufacturing plants and over 111 construction centers.

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University test results indicate that farmers who want to minimize compaction don't have to invest in a track vehicle. But, they do need to make sure they set the inflation pressures in their radial tires according to the new guidelines and use the largest tire size practical for their farming operations.

Morton Buildings introduces Insta-Lok self-sealing roof panels

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There were statistically significant differences in the amount of compaction generated by each of the four tractor setups. The results remained the same for runs with and without the field implement. Of particular note is the fact that the John Deere 8700 that finished first and last in the test was the same tractor, driving heavy on the important of correct inflation pressure. This underscores the fact that the tractor contributes to compaction from a conventional tractor is tire inflation pressure, not simply the weight of the tractor. That's because the ground pressure on any tractor averages only one to two psi higher than the tire inflation pressure, even under load.

The results suggest that producers who want to minimize compaction don't necessarily have to invest in a track vehicle — just make sure they're using the correct tire pressure setting in their radial tires and that they're using the largest tire size practical for their farming operation.

The least compaction was caused by the large flotation tires with 24 psi as the inflating pressure and only 55 percent on the front axle. Tractor weight was 38,250 pounds (107 pounds/engine hp) with the correct inflation pressure split (55 percent) on the front axle. Researchers also evaluated a range of tractor setups for a 12-row combine and a loaded 1,200 bushel grain cart with 24.5 x 32 tires on tandem axles. They ranked the setups from least to most compacted on two different soils as follows:

- Combinewith 68x510-32otationtires at 15 psi.
- Combinewith 30.5L-32 singletires at 24 psi.
- Combinewith 24.5x32 dualtires inflated to 50.0 psi.
- Combinewith 50.0-32flotations tires at 24 psi.

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Wall to the leading edge of the tire. Radials are designed to have the least amount of pressure on the soil, which reduces the soil's inherent 'flex' advantage. It increases rolling resistance, and there's the potential for free freezing and corrosion of the rims. Also, it's easier to adjust weight with cast iron.

AerWay — Improving soil condition and absorption rates

by Mary J. Gawenda

I

n soil and minimum till situations, farmers often use themselves in a dilemma — how to deal with surface compaction, and improve moisture and moisture absorption without sacrificing surface residue. Farmers attending the NSM Ag Expo demonstration may find their answer when they see AerWay’s aerator/ cultivator in action behind a liquid manure spreader for the Ag Expo Field Demonstration.

Manure spreaders, grain carts and other heavy payloads can cause compaction, making it harder for soils to absorb nutrients and crops to grow, according to AerWay marketing manager Paul Gillen. “One of the worst complications on the market is a manure spreader,” he said.

The anechoic, which can be run independently or behind other implements, including manure spreaders, loose soil and allows rain, meaner and other nutrients to be absorbed quicker and deeper into the soil. The anechoic’s tire poke holes in the soil and loosen dirt, and can be adjusted to vary the level of tillage, explained Gillen.

The AerWay anechoic is a welcome addition to any livestock-producing farm that deals with pasture renovation, hay aeration, minimum and no-till manure management.

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The Wheel "air pressure" beyond 14 psi to carry the load, recommends using duals or larger tires so you can run with lower air pressure. Radials can function better with less air than the maximum manufacturer guidelines, covering more ground and providing more traction.

Your goal should be to run with the lowest recommended air pressure for the load your tires are carrying. Because the tire’s weight-carrying ability decreases as inflation levels decrease, you need to know how much weight you’re carrying per tire. This requires using scales and an accurate tire gauge, but the results are worth the effort.

For example, suppose you have an MFD tractor. You’ve added several cast iron wheel weights that increase your rear axle weight to 13,900 pounds. Your tractor, two 18.4 R42s, are each capable of carrying 6,950 pounds when inflated to 16 psi. At this pressure and weight, statically, each of these two tires will give a footprint of 335 square inches and 22.17 pounds per square inch on the soil surface.

Duals would be a much better choice. Adding two more 18.4 R42s will reduce the weight carried per tire to only 3,475 pounds, so you can drop the inflation pressures to 9 psi. The footprint of each tire stays the same — 335 square inches — but the pressure on the soil is reduced to just 10.37 pounds per square inch. Tractor is improved because the tires are more flexible (so you might be able to remove some weight and still have acceptable traction) and less speculation is greatly reduced.

Of course, most people already use duals for heavier loads. But what often overlooked is the opportunity to drop the tire pressure in all four tires because the pressure load is much less. “We usually find tire inflation levels on duals are far higher than they need to be,” Sevier explains. Ball four of those 18.4 R42s are carrying only 3,475 pounds but kept at 24 psi, they won’t spread out into that big, undesirable tire footprint. Because they’re overinflated for the load, their footprint is only 125 square inches, and the pressure on the soil becomes 26.5 pounds per square inch.

By adding duals, but failing to reduce air pressure to the lowest possible level, you lose all the benefits of low soil compaction and much of the radial’s traction advantage.

Radials deliver their best performance at the lowest rated air pressure for the load. Assuming tire loads are not exceeded, radial tires can be operated at inflation pressures as low as 6 psi.

Higher inflation pressures did not benefit the traction and penetration advantages of radial tires. Consider using larger duals or radials must inflate their tires over 14 psi to meet their weight-carrying requirements.

Your tractor should be weighted to pull implements in the 5- to 6-mph range, even for implements that have to pull at slower speeds. Duals, then more weight, are the key to this traction. If you don’t have enough horsepower, consider a smaller implement or higher horsepower tractor.

Minimize the use of liquid ballast. Cast iron weights, used only when needed, are preferred. A larger tire size can carry more weight. But weight must be removed to get the lowest pressure.

Your goal should be to have the least amount of weight and lowest recommended tire pressures to get the job done.
Schran portable scales to be featured at MSU Ag Expo field demos

To help demonstrate the concept and importance of proper weight and ballast in maximizing tractor performance, producers attending the MSU Ag Expo field demonstrations will see firsthand how convenient and helpful Schran Engineering’s portable scales can be.

Each scale pad, constructed of aluminum, weighs approximately 55 pounds, is 28 inches long by 24’12 inches wide, and measures only 3 inches tall, facilitating quick and easy setup and transport, says Dave Wolf, salesman for Schran Engineering. He says the small size and light weight also facilitate EPA shipment when needed.

Schran Engineering, based in Griswold, Iowa, offers a four-padsystem for weighing tractors, wagons, and single axle trucks with a 60,000 pound capacity, and a six-padsystem for weighing tandem axle trucks with a 90,000 pound capacity. Wolf says that the portable scales are becoming very popular with seed companies in conducting yield checks and test plot work.

Although the scales aren’t “legal for trade,” which would require additional certification and paperwork each time the scales are set up, Wolf says the system is guaranteed 1 percent or better for accuracy.

In addition to factory-direct sales, Schran also provides factory-direct service when needed with turnaround time generally averaging three days. To reduce downtime, Schran will also send a loaner pad when necessary. “It’s a simple fact that you buy it here and we service here,” Wolf said.

Each pad is wired and calibrated, via a 50-foot cord, to a Weight-Trend indicator which also has an optional RS-232 output jack for connecting to a printer, if so desired. The entire system is powered off of a cigarette lighter.

The scale pack can be set up on gravel, cement, or right in the field, provided soil conditions aren’t muddy. “These scales will work well if you simply make a trail with whatever it is you’re going to weigh, to help firm the ground up,” he explained. “This system doesn’t have to be set up in a perfectly level condition either.”

Maintenance and storage requirements are pretty straightforward — keep the units stored in a dry location when not in use, Wolf advises. “That’s not to say you can’t use them when it’s raining — they’re very accurate regardless of the weather — but you need to prevent freezing and thawing of the weight bars,” he explained.

In addition to factory-direct service, dealers also provide easy setup and transport.

Skid-steer tracks move Bobcats through thick and thin

Skid steers are notorious for the back-breaking work they save producers and the ability to get into and out of tight confinements. Unfortunately, they’re equally notorious for being almost useless in muddy conditions.

“Skid loaders without tracks are efficient until you get into heavy mud, then you’ll start getting slippage. They’ll sit there and spin, just like a vehicle in the mud,” said Todd Wilson, Bobcat Central Inc. salesman.

He says that skid loader tracks protect tires and make getting through muddy areas easier. Wilson sells three different types of skid steer tracks out of the family-run business in Lansing.

Melroe, which manufacturers Bobcat skid steers, has 12 different models, ranging from 16.5 hp to 74 hp with dozens of attachments. Wilson said he hopes to have five loaders at the Ag Expo booth.

Cast Trac metal tracks, by Grouser Products, reduce ground pressure, and improve traction and flotation in soft and muddy conditions. To install Grouser tracks, an operator drives the skid-steer onto the tracks and bolts the tracks around slightly deflated tires, Wilson said.

Designed for convenience in installing, the whole operation takes about 30 minutes to put on and 10 minutes to remove. “Grouser tracks can be used in other applications, but dirt, mud and snow are the main things,” Wilson said.

Tire Crawlers, the long-time brand of tracks, also provide better flotation and traction than tires, and the metal tracks are custom-built to fit. Crawlers assemble the same way as Grouser tracks and the pinned, durable carbon-steel tracks have a tighter pivot than tires alone.

GoodYear engineers probably had construction workers in mind when they designed their rubber tracks, but to the advantage of farmers, the all-steel rubber tracks work well in soft, sandy conditions, too. And if an operator needs to drive the skid loader over concrete or asphalt, the tracks won’t damage the hard surfaces.

Grouser and Loegering tracks cost about $2,500 for a Bobcat 763 model, and Goodyear rubber tracks cost about $4,500. “You can buy tracks for tractors, irrigation equipment and pretty much any type of equipment,” Wilson said.

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CAT tracks

by Mary J. Gawenda

Michigan State University

Agricultural Engineering Department.

Tractors on tracks versus wheels

by Tim Harrigan, Associate Professor, Agricultural Engineering Department, Michigan State University

T

ractors on tracks have been popular for decades. Farmers like the flotation characteristics of tracks, however, the older tractors were on rough-riding steel tracks that were hard to steer and transport over the road. In the late 80’s Caterpillar introduced the Challenger model tractors — smooth-riding tractors on rubber belts that could easily travel on either tracks or tires.

Canadian researchers conducted side by side comparisons of rubber tracked and wheeled tractors in the early 90’s at the Alberta Farm Machinery Research Center (AFMRC). They tested a 270 hp Challenger 65 and a 270 hp JD 96 with eight radial tires. The main goal of the test was to measure power delivery efficiency — the ability of the traction system to deliver available engine power to the ground as useful working power.

They also ranked each tractor in terms of pull, optimization, ride, steering and cost with the following results:

Pull a Plus for Tracks

Only the rubber belts were able to deliver 20-dwaw horsepower at speeds as low as 3 mph. Farmers should, however, consider the normal working speed of operation. Drawbar horsepower is a product of pull times speed, which is more important than pull alone. Both tractors were able to deliver 12-20 drawbar pull at 7 mph, a typical working speed.

Optimization a Plus for Tracks

Optimization is the selection of the correct tractor weight and tire setup for a given speed, pull and ground conditions. Optimizing a tire tractor involves changing ballast and tire inflation pressure. Since many farmers don’t understand how to make these adjustments or are reluctant to take the time to do it, tire tractor owners aren’t set up properly for optimal performance.

And if power hop is a problem, some of the adjustments made to eliminate it move the tractor away from an optimal setup. Rubber belted tractors operate near optimum over a wider range of speeds than tire tractors and with considerably less adjustment.

Power Delivery Efficiency a Slight Plus for Tracks

This is a measure of the ability of a traction system to convert available engine horsepower into useful work on the ground. This can make a difference in acres covered per day or fuel burned per hour. Tests showed little difference between rubber belts and rubber tires, when properly set up. Both had maximum efficiencies near 80 percent, but in some tests, the rubber tracks showed a 1 to 3 percent advantage over the rubber tires. On the farm, the difference will depend on how close to optimum the tire tractor is operating.

Ride Equal for Tracks and Tires

There was little difference in average ride quality between the two systems. Shaking a Plan for Tires

When a rubber belt tractor turns, the outside tracks speeds up and inside tracks slows down. The AFMRC noted that under draft loads, a rubber tractor may not steer under the draft load and is reluctant. Tracks also tend to bern soil in a turn, causing ridges and depressions, while tires roll through a turn, causing less disturbance.

Cost a Plan for Tires

While cost can vary, rubber belt tractor generally cost more than equivalent drawbar horsepower or rubber tire tractors.

Self Compaction Unresolved

Soil compaction was not measured in the AFMRC tests.

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**Precision Agriculture**

Perry M. Peterson, C.P. Ag.-CCA, Corporate Manager, Precision Agriculture, Terra Industries Inc.

The history of U.S. Agriculture is a series of technological advances that have boosted farmers' productivity and efficiency. First, there was the move from horsepower to mechanical power early in this century. Then, the power of science contributed improved seed varieties and crop protection chemicals after World War II. Now, information power is making a dramatic difference in the way crops are grown as farmers adopt the technologies associated with precision agriculture.

Precision agriculture may be one of the most significant crop production advances in the last 50 years. It has the potential to revolutionize the way farmers collect, analyze and use information about their crop production systems, resulting in greater productivity. The key word here is information, because that's what precision agriculture is all about. Much of the attention focused on precision agriculture has highlighted technology and equipment. While important, they serve only as tools to either collect information or to perform functions based on the information.

Precision agriculture's real value for the farmer is providing information that allows him to make better decisions. Never before have farmers been able to gather such large amounts of data about their land and crops. All this information gives them the power to identify and take control of variables they face in their operations: yields, soil type and chemistry, fertilizer and chemical application, plant populations, and weed and insect pressures. Terra has a long-standing commitment to offer products and services customers need to maximize the efficiency and profitability of their cropping systems. Many of Terra's Farm Service Centers (including the 17 in Michigan) now make it possible for farmers to take advantage of the information power that precision agriculture offers. To develop its Precision In Agriculture package, Terra studied and analyzed the equipment and technology associated with precision agriculture, global positioning systems (GPS), geographic information systems (GIS), grid soil sampling, variable rate technology and data management systems. Terra eventually selected Rockwell International's Vision System for the integrated GPS/GIS package that forms the backbone of its program.

The fee covers the tour notebook and the noon meal. Tour registration forms are available from MSU Extension county offices. Registration the day of the tour will be $25.

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Cober yield maps make expensive paper!

This conversation from a crop consultant in the Midwest reflects the fascination many producers and ag industry personnel appear to have with the maps produced by yield monitors. Unfortunately, pretty maps alone won't return a dime to the purchaser. Yield monitor data can, however, produce valuable economic benefits when used as a tool to improve crop management.

The first step in using a yield monitor profitably is to identify which factors most significantly impact yields in (your) farming operation. Many of these factors will not be surprising. We all know, for example, that weed escapes hurt yields. However, most farmers have a hard time quantifying those effects in bushels or dollars. One of the most common comments I have heard from my clients who have bought yield monitors is, "Wow, I never realized how much impact weed escapes have on my yields!" Yield monitoring can also identify factors that may otherwise have been overlooked.

One farmer I worked with last fall began with the assumption that soil pH management was the principal factor he needed to address in order to improve yields. Yield monitor results quickly convinced him, however, that he also needed to pay more attention to compaction and tillage practices. Crop management issues that can be quantified through yield monitoring include:

- Poor drainage and the need for tiling
- Weed management decisions
- Tillage practices
- Soil compaction
- Fertility programs
- Liability and compensation issues
- Etc., etc., etc.

Computer software can help you quantify these issues with remarkable precision (Figure 1). Furthermore, you can calculate which factors are most closely related to the yields recorded on your farm. These critical factors will undoubtedly vary from farm to farm due to differences in soils, cropping systems and historical management practices.

Once you've identified your critical management issues, the next step is to examine possible remedies. This may be as simple as calculating which weed escapes reduced yields enough to outweigh the cost of responding. Or you might estimate how many years it would take to pay off a tiller, based on several years of yield data from poorly drained areas.

In some cases, accurate management decisions will necessitate controlled strip trials comparing factors such as varieties, tillage practices or fertilizers. Many such trials are possible using weigh wagons to record yields. But yield monitors vastly simplify the process during harvest when time is inevitably at a premium.

In one trial, which I harvested with a client last fall, the only additional time demand over and above normal harvest operations was the 10-15 seconds that the monitor needed to calculate yields at the end of each strip. Yield monitors can also record variation within strips as well as between strips (Figure 2).

Yield monitors can quantify management issues with remarkable precision, particularly when used in conjunction with variable-rate applicators. The Variable Rate Controller, which is installed on the sprayer vehicle, does a remarkable job of synchronizing the sprayer variable-rate system with your grid map. As you travel across the field, the GPS receiver (a GPS receptor itself, according to Emery) is constantly monitoring the location of the sprayer. In this manner, the Variable Rate Controller can adjust application rates in real-time to suit the changing crop requirements (Figure 3). The Variable Rate Controller uses differential GPS to determine applicator location. As positions change, pre-determined application rates are sent to the Raven Console where the variable application rates are stored in an electronic file along with the grid of the field.

This file is created on the user's home computer, then loaded on a flash disk. This disk is then used to transfer information between the home computer and the Variable Rate Controller on-board the sprayer. The Raven system can be bought as a complete unit that includes both the controller and the computer pre-programmed with the system's software and build the grid maps, and can also include the GPS receiver itself, according to Emery.

In terms of practical application, Emery says the Raven System will be used primarily in variable rate fertilizer systems, by large scale crop producers and/or, eventually, more custom applicator rigs. "There's a lot of manpower and legwork needed to prepare the system to work, in terms of soil sampling, and reviewing yield maps," Emery advised. "(Precision agriculture) is still in its infancy so that I wouldn't necessarily encourage somebody to go out and start with a liquid variable rate system," he cautioned. "I think they need to have some of the other parts of their program implemented and documented with some data before they try to introduce this system into. You need to have a record of your soil samples over the course of a few years, as well as your yield monitor samples over the course of a few years before you can start trying to apply that information to treating specific areas of a field differently."


**Precision Agriculture**

By Mary J. Gawenda

With the introduction of its GreenStar Precision Farming System, John Deere is ready to lead farmers off the fields and onto the information superhighway.

The GreenStar System provides some of the most accurate yield data for farmers looking to optimize land, time and profits, said Doug Penny, local John Deere territory manager.

The system is easily operated and can be added to any John Deere combine dating back to 1989.

"Ours is a totally integrative package that ties into the whole machine, where some other systems hang outside (the combine)," Penny said.

The system takes about one day to install and costs about $8,000.

A Global Position Satellite (GPS) receiver is mounted on the top of the combine and acts as an antenna to receive signals from GPS. The satellites were installed by the U.S. military and are scrambled, so 16 other satellites also are used to pinpoint the farmer's location in the field.

Yield measurements are based on a mass-flow sensor, and moisture readings are collected from a moisture sensor hooked to the side of the elevator.

All the information is sent to a display mounted inside the combine cab (see picture). The display shows moisture readings, productivity data, wet and dry bushels per acre, and other information.

Convenience in monitoring moisture is a major attraction of John Deere's system, Penny said.

With the GreenStar system, the moisture is figured automatically, while most other systems require the driver to stop and sample the crop, he said.

Farmers also can use the display to "flag" a spot in the field where there's a problem, such as a broken tile, big rock or water gully. By watching the display, the farmer can learn harvest quality and quantity before leaving the field.

Penny says the information can translate into savings in time and fuel, but farmers won't automatically save money by having the GreenStar system.

Analyzing and applying several years of data is the key to managing a more productive farm.

"GreenStar will not save you any money. However, it will give you the information to better manage your farm and hopefully, that way you'll save money," he said.

Although precision farming is relatively new, Deere engineers are already looking to future applications of their system for next planting season.

"The part that's unique about our system is that we will be able to take the satellite system off the combine and install it on a tractor or onto a sprayer. It's not just a combine mapping system, you can move it to your tractor in the spring when you're planting," Penny said.

But Penny said farmers shouldn't make any planting changes until a few years of data is collected and analyzed, because fields change from year to year.

"The first leg of precision farming is to know exactly what your outputs are. Because without knowing what your outputs are at the end, how do you know what your inputs should be?"

Because all the GreenStar equipment for planters and sprayers hasn't been developed yet, Penny was unsure if it will be compatible with other brand equipment.

Visitors can inspect the display monitor and other components of GreenStar at the John Deere's Ag Expo booth and the Field Demo combine should be equipped with the complete system, Penny said.

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Over $4,000 worth of items including collectible tractors, limited edition artist's prints and computer software have been donated to benefit the third annual FFA Silent Auction at the 1996 Ag Expo. Anyone can bid on the items during the three-day event, with the highest bidders taking home the merchandise.

Auction Details

The auction will run from 9 a.m. on Tuesday, June 25 through noon on Thursday, June 27 on the grounds of the expo site. All items will be displayed or represented with a bid sheet in the Michigan Farm Radio Network tent (lot 507) near the entrance of the expo grounds. Items will be delivered upon receipt of the donation either by mail or through the vending supplying the donated article.

Bid early and bid often! All proceeds will go to the Michigan FFA Foundation to support leadership activities and conferences for FFA students, and agriscience education. The silent auction is being coordinated by the Past State Officers FFA Alumni Affiliates.

Michigan Farm Bureau's Summerfest scheduled for June 26

In addition to Ag Expo, Michigan State University will once again play host to MFB's third annual Summerfest event this year on June 26 at the 4-H youth show facility located at the Farm Service Center on College Road. In addition to the date change, this year's activities will also include a Truck Drive and Ride, replacing last year's Truck Showdown event.

According to MFB Summerfest event manager Mike Kovacic, the Truck Drive and Ride will allow interested MFB members to actually test drive new Dodge pickups off road conditions. This program format will allow more individuals to actually test drive a new truck as opposed to just seeing the truck being driven by someone else," he said, referring to last year's Truck Showdown, which was limited to just 12 drivers.

Summerfest participants interested in the Truck Drive and Ride, which is scheduled from 4 to 7 p.m., will need to sign a damage and liability waiver and show a valid Michigan driver license before driving a new Dodge truck on a course around MFB's research farm.

Typical Summerfest activities, including a beer and pork barbecue and games for the kids, will be running in conjunction with the Truck Drive and Ride. You can also kick up your heels to the music of the country rock band, "The Last Ride."

Weather permitting, parking will be available at the Summerfest site this year. However, in the event of rain, Kovacic suggests that Summerfest participants check in at the MFB Ag Expo Test for further parking instructions and transportation to the Summerfest site.

Tickets for Summerfest must be purchased in advance and are just $5. The ticket is good for all of the events, including your choice of a pork or beef dinner, the games, the barn dance and the Truck Drive and Ride.

Make plans to be part of the biggest event of the summer — Summerfest '96 at Michigan State University, June 26.

Contact your county Farm Bureau for more information, or for last minute Summerfest ticket orders call Michigan Farm Bureau at 800-292-2680, ext. 3204.

Michigan Farm Bureau Family of Companies Ag Expo exhibit

Those visiting the 1996 Ag Expo will find the Farm Bureau Family of Companies in the big red and white tent located in the center of the Expo grounds. Renowned from Michigan Farm Bureau and all affiliate companies will be available to discuss a full array of member benefits, programs, products and services.

Expo attendees will be able to learn about membership benefits, programs and services from Michigan Farm Bureau, petroleum and farm supplies from Farmers Petroleum Cooperative; marketing services from Michigan Agricultural Cooperative; Marketing Association, tollgate tools and equipment from MFB Group Purchasing; and insurance services from Farm Bureau Insurance. Dodge trucks will also be on hand promoting Farm

Bureau's $500 cash back on selected Dodge trucks. Just for fun, a racetrack will be set up in the center of the area where individuals 16 and older can test their skills in guiding a remote controlled battery operated truck through an obstacle course. All drivers participating in the Mini Truck Challenge will receive a Family of Companies prize for the efforts — top finishers will receive additional prizes.

The truck will be in operation from 9 a.m. to 3 p.m.
Central Exhibit Area
Avoiding common TMR problems

By most standards, total mixed rations (TMRs) are the preferred method for feeding dairy herds, especially in situations where herd average demand precise feed formulation conditions. But regardless of how good a nutritionist you work with, or the quality of the feed you base on hand, there’s still plenty of opportunity for your ration fall short of expectations, cautions MSU’s Dr. Herb Bucholtz, professor in the Animal Sciences Department.

Although a variation due to changing dry matter or moisture levels, mixing instructions and procedures, scale accuracy, personnel skill level and changes in the formula can provide a recipe for failure.

"If you’re going to make TMRs, we really need to be accurate in measuring the components that go in — which includes testing of our feeds in advance and then measuring these feeds accurately," Bucholtz said. "All of that means that we may need to fine-tune some of our management recommendations.

"If you’re feeding 7,500 pounds of TMR and the cow have it all cleaned up and gone, you think you should add 200 pounds — what do you do?" Bucholtz asked.

"You want something out there on that instruction sheet that doesn’t require the person doing the feeding to make a calculating decision at that time."

Scale accuracy

Although on a pre-concerned problem, Bucholtz says producers often overlook the importance of checking scale accuracy when trying to determine how much feed will be added. For an added margin of safety, he suggests checking the mixer scales for accuracy once per month using a calibrated unit of weight, such as a tractor suitcase weight.

While quick to acknowledge the benefits of mixing, Bucholtz says weighing the individual feed ingredients provides the real pay-off in TMRs.

"Without accurate scales, it’s almost senseless to even balance the ration because there’s no degree of accuracy," he explained.

Feed frequency

While many producers feed twice per day, or more often to encourage feed consumption, Bucholtz says more producers are going to once-per-day feeding as a way to save on labor and to keep an adequate supply of feed in front of the cow at all times. During high summer temperatures, however, feed may need to be heated up and go out of condition, requiring multiple feedings.

"We see many farms feeding once per day and doing very, very well," Bucholtz claimed, "and from a labor standpoint it makes a lot of sense."

Who should balance your rations?

While individual skill level and comprehension of computerized balancing programs obviously vary, Bucholtz recommends that all producers, at a minimum, play an active role in working with their nutritionists to make better rations.

In a ideal situation, he suggests that a producer have his own ration program, such as RSU’s Spartan ration program, to evaluate the nutritionist’s ration recommendations.

"For a producer to tell a nutritionist, ‘you develop the ration and I’ll feed it’, is really saying ‘I don’t want to be involved in a tremendously important part of the dairy management program,’ which is foolish," Bucholtz concluded.

Animal handling demonstrations to focus on managing total mixed rations

Continued from front page

He’ll provide some helpful take-home tips producers can use on the importance of particle length and proper mixing procedures in TMR processing, as well as the pros and cons of various mixer wagons (dress n auger, etc.)

"Bucholtz has done a great deal of work on the importance of controlling particle length," Bickern explained. "Many times, because we’re not filling the mixer correctly or because we’re running the mixer too long, we’re altering the particle size more than we realize."

MSU’s Dr. Herb Bucholtz, professor in the Animal Sciences department, will also provide attendants with some helpful tips on avoiding common problems associated with TMRs, including dry matter and moisture calculation demonstrations, minimizing mixing variation, and avoiding problems with "hot dairy rations" for high-producing herds.

"If we’re going to make TMRs, we really need to be accurate in measuring the components that go in — which includes testing of our feeds in advance and then measuring these feeds accurately," Bickern says. "All of that means that we may need to fine-tune some of our management recommendations."

Although there won’t be a side-by-side comparison of mixer brands, Bickern expects the demonstration to arm producers with enough information to then visit commercial exhibits and ask the right questions to ensure they pick a mixer that best meets their particular need — both in type and size.

The principle behind the "Reel" in Reel Auggie

Since its introduction in 1998, the Reel Auggie mixer, patented and produced by Knight Manufacturing in Wisconsin, has won several high-profile producer awards. The Reel design eliminates the force and pressure inherent in most auger-style mixers, virtually eliminating compaction of feed, resulting in less fiber breakdown and lower fines. Feed ingredients are blended by the gentle lifting, buffing and tumbling action of the patented large-diameter reel which leaves the ingredients loose and whole — not crushed — and in a more palatable condition.

Most nutritionists agree that longer dry hay helps activate the rumen for improved digestion in cattle and improved weight gains, better milk production and improved animal health. The Reel Auggie can easily handle long stem hay in small square bales, wafers of large square bales, and broken up round bales, with an optional hay kit.

Another feature is the faster unloading time thanks to a simple slide discharge chute located next to the lower mixing auger. The Reel Auggie is available in tow, truck and stationary models, with capacities ranging from 147 to 600 cubic feet.

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Want to improve your TMRs? Cut your mixing time!

"Based on my experience, I can't imagine needing to mix a TMR for more than eight minutes — from start to finish!" Dr. Dennis Buckmaster, Penn State University

If you want to improve your TMR, save fuel, time, and wear on your mixer wagon, then reduce your mixing time, advises Penn State's Dr. Dennis Buckmaster, professor of Agricultural and Biological Engineering. He says that while it's not uncommon for producers to run their mixers for the entire time they think they need to feed, they may be good health reasons by seriously reducing particle length.

"It's not uncommon for mixers to be running 30 minutes — that's just too long," Buckmaster said. "My recommendation is to fill the mixer, put everything in there, then turn it on — and depending on the feed being mixed and the brand of mixer being used — start to unload it four to eight minutes later and unload it as quick as you can."

Buckmaster will be presenting TMR mixer tips during the animal handling demonstrations at MSU's Ag Expo June 25-27 at 11 a.m. and 1:30 p.m. each day. While the focus on mixers has generally dealt with the nutritional aspects, Buckmaster says the issue of particle length, credited with improving feed intake and animal performance, is starting to receive its proper attention as well.

"If you've got a group of cows with over 10,000 pounds average, you probably won't have too much trouble meeting their nutritional demands, both in terms of chemical and physical form," he explained. While 20-30 pounds of dry hay, or even 30,000 pounds, we need to pay more attention to the physical characteristics or particle size.

Buckmaster conducted a study on mixing times and measured corresponding reductions in particle length and distribution using a four-auger mixer. The reduction of alfalfa hay, corn silage, ground ear com and a concentrate premix for some of the rations, the hayslicer was replaced with alfalfa hay. During the experiment, the mixer was not running during loading. Mixing times were varied from 40 to 52 minutes. The results were surprising. While uniformity of blend improved with more mixing time, particle size suffered. There was a significant reduction in the percentage of meal consisting of long particles as mixing time increased from four to eight minutes, from eight to 16 minutes and from 16 to 32 minutes.

"This study showed that not only do you break down the larger particles into smaller ones, the smaller particles also get even smaller during extended mixing," Buckmaster warned. "Mixing beyond five to eight minutes isn't likely to improve uniformity."

While the study was conducted using an auger mixer, Buckmaster says the particle size in red and drum mixers can also be reduced with needless mixing time. Decisions affecting which mixer to use should hinge on whether a producer plans to be adding dry hay to the ration to improve particle length. If a producer has other means for chopping dry hay, a drum mixer would be equally suitable to either the auger or red mixers, which can be outfitted with hay kits.

If your ration particle length is less than ideal, Buckmaster says adding dry hay is an excellent way to improve the ration, provided the mixer isn't run too long. "It's amazing what a couple bales of hay in a reliably large ration can do — it really makes a difference," he said.

So what is the ideal particle length? Buckmaster says that storage considerations are the deciding factor in determining length of cut and that there may be a trade-off between getting the right cut for storage versus ideal length for feeding. "Most people talk about a theoretical length of 10% of an inch," he said. "If you chop a 1½ to 1½ inch length of cut, I think you'll be in pretty good shape with either haylage or hay silage."

Test your mixer to determine the actual length cut, and adjust your mixing time accordingly. For more information on this topic, please contact Dr. Dennis Buckmaster at Penn State University. He will be presenting TMR mixer tips during the animal handling demonstrations at MSU's Ag Expo June 25-27 at 11 a.m. and 1:30 p.m. each day.

New GEHL Total Mix mixer feeders

New "Total Mix" TMR mixer feeders let you mix more long-stemmed hay into your ration — up to 50 parts by weight depending on hay type and moisture content.

A breakthrough in four-auger design gives the new GEHL "Total Mix" TMR mixer feeders unmatched hay handling proficiency. The secret is the hay slider auger that incorporates four unique knuckle assemblies as an integral part of the two bottom augers. These augers break up long hay bales into a homogenous mix, with less chance of wrapping, and are standard on the four largest mixer feeder models.

There is no question that for exceptional blending and mixing of all feed ingredients into the most homogenous ration possible in much less time the GEHL mixer delivers the fast mixing action in a wide variety of feed materials.

The GEHL Total Mix line of TMR feeders includes an improved planetary drive to power the four mixing augers, along with a hydraulically-driven unloading conveyor. Choose from five mixer feeder models with capacities ranging from 210 to 455 cubic feet. The two larger models are also available as track-mounted units.

Design considerations for fence-line bunkes

A post and rail feeding fence is usually used for fence-line feeding, such as in a free-through forestall barn, where the design lends itself well to mixer wagons and larger herd sizes. Before rushing out to build a fence-like setup, however, there are a few design basics worth considering.

MSU Ag Engineer Bill Bickert recommends elevating the floor of the feedbunk three to six inches above the cow alley to provide the cow a natural grazing-like position. He also suggests that the floor of the bunk be smooth and clean to encourage feed intake.

In new construction situations, he advises using high-strength concrete (4,500 psi) to prolong the condition of the manger surface used for feeding silage and other feeds that tend to catch the cow. Bickert also recommends the bunk floor with resistant material such as concrete tile. In situations where wood is used, Bickert encourages producers to inspect and repair worn and splintered surfaces as soon as possible.

Spacing is equally important to encouraging maximum feed intake. Bickert recommends that producers use the figures in Tables 1 and 2 in situations where cows are all expected to eat at once. In situations where cows will have access to feed most of the day, 18 to 24 inches per cow should be adequate. Bunk volume is also critical, especially when feeding only once per day. Self-locking headgates, a variation of the divided feeding fence, can restrain animals and permit selective feeding. A lever mechanism opens or closes all headgates simultaneously. Desired features include individual or group cow release, self-locking headgates as the cow lowers her head to eat, and a quick release for downhill cows.

As an added measure to protect your investment in the fence-line feedbunk, consider adding a curb next to the manger wall, says Bickert, to protect it while sparking material. Limit the width of the curb, however, to two to six inches on the cow side of the manger wall to avoid the possibility of the curb being used as a step by the cow.

The manger wall, usually made of poured concrete, should be no more than 21 inches tall from the cow alley floor. In cases where feed panels or headgates aren't used, Bickert recommends that an upper rail, constructed of either cable, pipe or plank, be located approximately 68 inches from the cow alley floor.

For situations where cows are all expected to eat at once, Bickert recommends using a feeder fence with significantly larger spacing. In new construction situations, Bickert encourages producers to have access to feed as soon as possible. Bickert also recommends the bunk floor with resistant material such as concrete tile. In situations where wood is used, Bickert encourages producers to inspect and repair worn and splintered surfaces as soon as possible.

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Visit the Michigan Soybean Programs Exhibit #305 at the MSU Ag Expo June 25-27, 1996
Guide to adjusting your tractor for optimum performance

Your tractor will provide best performance and hop and hop can be readily controlled when it is equipped with tires that are large enough to carry its weight, and it has its proper weight distribution. It is important to note that traction is usually improved with a "soft" (low stiffness) ride. This means that the tires should not be inflated to the maximum pressures recommended by the tractor manufacturer. However, they have been designed, developed, and tested to today's farming practices, tractors, and tires standards. Most tractor manufacturers design tires to be inflated to a specific range of pressures, usually a 6 to 14 psi range. When driven under normal conditions, such as when going up and down grades, these pressures will provide the best traction and stability. However, if the tractor is driven under abnormal conditions, such as when driving on wet or muddy ground, it may be necessary to increase the inflation pressure of the tires to maintain satisfactory traction. In general, the higher the inflation pressure, the less compaction will occur. This is because the tires will be less deformed under load, and therefore, will exert less force on the soil. However, it is important to note that increasing the inflation pressure too much can lead to a "stiffer" ride, which may be uncomfortable for the operator. Therefore, it is important to strike a balance between traction and comfort.

It is also important to note that when adjusting the tractor for optimum performance, the type of implements being used should also be considered. Different implements have different requirements in terms of the inflation pressure of the tires. For example, implements with large contact patches, such as tillage equipment, or implements that require a smooth ride, such as those used for vineyard or orchard cultivation, may require a lower inflation pressure than those used for hay or grain harvest.

Adjusting the inflation pressure of the tires is important, especially when driving on wet or muddy ground, as it can significantly affect the traction and stability of the tractor. Therefore, it is important to monitor the inflation pressures of the tires, and adjust them as necessary, to ensure that the tractor is performing at its best.

Table 1: Total Tractor Weight Percent on Front Axle

<table>
<thead>
<tr>
<th>Tractor HP Range</th>
<th>Dual Tire Size Examples</th>
<th>150-300</th>
<th>20.8842</th>
<th>18.4846</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WD</td>
<td></td>
<td>greater than</td>
<td>300</td>
<td>7107038</td>
</tr>
</tbody>
</table>

Tractor weight and weight split

General guidelines are provided here, which can be used along with your tractor dealer’s specific recommendations. The tractor dealer can usually estimate weights and weights split for your tractor from tables provided by the tractor manufacturer. Since the weight split of a 4WD tractor is especially important in achieving optimum performance, it is recommended to consult with your tractor dealer to ensure that your tractor is correctly balanced. The rear tires should carry 60% of the tractor weight, and the front tires should carry 40%. It is important to note that the weight distribution of the tractor can be adjusted, for example, by adding weights to the front or rear axles. Therefore, it is important to consult with your tractor dealer to ensure that your tractor is correctly balanced.

The optimum inflation pressure for the tires is also important. It is recommended that the inflation pressure of the tires be adjusted to ensure that the tractor is performing at its best. This can be done by monitoring the inflation pressure of the tires, and adjusting it as necessary, to ensure that the tractor is performing at its best.

Table 2: Load and inflation table for conventional size radial drive tires for speeds up to 25 mph.

<table>
<thead>
<tr>
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<th>Tire Size</th>
<th>150-300</th>
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<td>4WD</td>
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</tr>
</tbody>
</table>

Example Worksheet

Tractor: 140 PTO hp MFWD Row Crop

<table>
<thead>
<tr>
<th>Implement: Towed Field Cultivator</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>tractor weight and weight split assessment:</th>
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</tr>
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<table>
<thead>
<tr>
<th>Adjusted Conditions (extra weight on front)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted Weight</td>
</tr>
<tr>
<td>Rear Adjusted Weight</td>
</tr>
<tr>
<td>Rear: 18.4R42 Duals, 2* Rating</td>
</tr>
<tr>
<td>Initial Weight and Weight Split Assessment:</td>
</tr>
<tr>
<td>---------------------------------------------</td>
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Adjustment of the inflation pressure of the tires is important, especially when driving on wet or muddy ground, as it can significantly affect the traction and stability of the tractor. Therefore, it is important to monitor the inflation pressures of the tires, and adjust them as necessary, to ensure that the tractor is performing at its best.

If power hop occurs:

Raise front inflation pressure 2 psi increments until it stops. Usually 6 psi to 8 psi above the recommended pressure for the load will suffice. Rear tire inflation pressures should remain at correct pressures for the load. The maximum front tire inflation pressure is 55 psi, and the maximum rear tire inflation pressure is 45 psi. If the tractor still hops, use 75% liquid fill in both tires, and remove an equal amount of water from both tires, and repeat the process until the tractor is stable.

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New Holland tractors designed with the driver in mind

by Mary J. Gawenda

Lothar Cook says New Holland tractors are the best on the market, and based on recent sales, many farmers appear to agree: "Hopefully we'll have two models (at Ag Expo), but they've been selling very well, so they're in short supply," Cook said of the New Holland tractors.

Although the company changed their main logo from Ford to New Holland, the change hasn't led engineers to sacrifice quality in designing the line of Genesis tractors, Cook said. The Ford name is still on the tractors, but they are known as New Holland now.

Engineers developed a well balanced 7.5 liter, turbo-charged diesel engine with high torque rise and horsepower for the Genesis 8670, 8770 and 8970 series, giving operators more power and convenience in the fields. Genesis 8770 model is rated at 145 hp, the 8770 has 160 hp, the 8870 has 180 hp, and the 8970 at 210 hp.

"The torque rise on these tractors is second to none," Cook explained. "The torque rise of up to 50 percent instead of the typical 28 to 55 percent on other models, making down shifting less frequent and reducing stress on the engine, says Cook. "The torque rise on these tractors is second to none."

Genesis' hood lifts like a car's to expose the engine, allowing for no-hassle maintenance.

Farmers looking for an added lux for farm operations can provide you with a building that is unmatched in convenience and where they need to go. It can help avoid erratic feed delivery problems (see Table 1). Pritchard explained, "Good bunk management can cost component of the diet," Pritchard suggests. It can help avoid erratic feed delivery problems (see Table 1). Pritchard explained, "Good bunk management can cost component of the diet," Pritchard suggests. It can help avoid erratic feed delivery problems (see Table 1). Pritchard explained, "Good bunk management can cost component of the diet," Pritchard suggests. It can help avoid erratic feed delivery problems (see Table 1). Pritchard explained, "Good bunk management can cost component of the diet," Pritchard suggests. It can help avoid erratic feed delivery problems (see Table 1). Pritchard explained, "Good bunk management can cost component of the diet," Pritchard suggests.

The hood lifts like a car's to expose the engine, allowing for no-hassle maintenance. This new feature makes driving less hassle and more efficient. The no-contact to engine components is no longer a luxury, but a necessity for the Genesis model. The hood lifts like a car's to expose the whole engine, allowing for no-hassle maintenance. The cab was also designed with the operator in mind. A swiveling headrest and padded side wiper console provide comfort and convenience. With the touch of a button, the console adjusts to the driver's needs and the seat that allows the driver to check equipment behind the tractor without straining the neck or upper body. Look for the Genesis tractors at the Ag Expo Field Demos.

Costly corn increases importance of consistency

Table 1—4-Point Bunk Scoring System

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No feed left in bunk.</td>
</tr>
<tr>
<td>1</td>
<td>Thin, uniform layer of feed across bottom of bunk.</td>
</tr>
<tr>
<td>2</td>
<td>25 to 50 percent of previous feed remaining.</td>
</tr>
<tr>
<td>3</td>
<td>Crown of feed is thoroughly disturbed.</td>
</tr>
<tr>
<td>4</td>
<td>80 percent of feed remains.</td>
</tr>
</tbody>
</table>

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