

www.ag.ndsu.edu/extension-aben/irrigation/water-spouts

water spouts

No. 302

October 2018

In this issue:

- Irrigation Workshop in Bismarck – Thursday, Dec. 6
- Irrigation Association Annual Show
- Mondak Ag Research Summit
- How Long Would You Expect a Center Pivot and Its Components to Last?
- Now is the Time to Fix Center Pivot Wheel Tracks
- Fall Irrigation Maintenance Checklist

includes seminars, various irrigation design and management certification classes, and two-day technical sessions on agricultural irrigation and landscape irrigation. Visit <https://irrigation.org/2018Show> for more details.

Mondak Ag Research Summit – Nov. 14 **Richland County Event Center, Sidney, Mont.**

More information at:

<https://www.ars.usda.gov/plains-area/sidney-mt/northern-plains-agricultural-research-laboratory/>

Irrigation Workshop in Bismarck – Thursday, Dec. 6

The workshop will be at the Best Western Ramkota Hotel as part of the North Dakota Water User Association's annual convention. NDSU Extension, the North Dakota Irrigation Association and North Dakota Water Users Association sponsor the workshop. The convention will include an irrigation and water products exposition.

Some of the presentation topics include variable-rate irrigation, mapping aquifers using airborne electromagnetic surveys, updates from irrigation research sites and a special technical innovations session with presentations from various manufacturers and dealers about new and coming technologies.

Irrigation Association Annual Show

The Irrigation Association will hold its annual Irrigation Show on Dec 3-7 in Long Beach, Calif. In addition to more than 400 exhibitors, the show

How Long Would You Expect a Center Pivot and Its Components to Last?

Just like any piece of machinery that is exposed to the weather continuously, center pivots have a recognized period of useful life. In economic terms, the useful life would be the period of time to depreciate the pivot to a value of zero dollars.

Generally, the useful life of a pivot is expected to be 25 years or more. However, several factors can change that prediction drastically. Corrosive water, lack of preventative maintenance, ice storms in the fall and spring, tornadoes and lightning in the summer, pumping sand and obstacles (parked tractors, etc.) affect the life of a pivot.

Not all the component parts of a pivot have the same life span as the structural members of the pivot.

Tires

You should expect the tires on a pivot to last at least 15 years, provided you keep the tire pressure at recommended levels. However, the quality of the tire really has a large effect on its life span. Poor-quality tires will crack and split. Recaps, which are reworked truck tires, can last 20 years or more.

Gearboxes and U-joints

Generally, gearboxes and u-joints on the pivot towers are the most common cause of pivot breakdown. With good maintenance, they should last 15 years.

NDSU

EXTENSION

To achieve this life expectancy, accumulated water in the gearboxes should be drained and replaced with new oil every year, preferably in the fall before freezing weather arrives.

Quite often, irrigators check the water and oil level on the gearboxes driving the wheels but forget about the center drive gearbox. The oil in the gearboxes should be replaced every three to five years, depending on hours of use each growing season.

The gearboxes on the last tower of a pivot will accumulate more wear than the towers near the pivot point. The gearboxes on the first and second towers usually will accumulate more water.

The hills associated with irrigated potatoes are very hard on gearboxes and u-joints. The up-and-down motion puts added strain on the gears and causes them to wear faster.

Older pivots (more than 10 years old) used to irrigate potatoes for the first time most likely will have gearbox and u-joint problems. Deep wheel tracks, high hills and muddy low spots also reduce the useful life of gearboxes.

Tower Drive Motors

The drive motors (electric and hydraulic) should last the life of the pivot. Lightning and submergence in water are probably the biggest factors that affect their useful life.

Tower Control Box

Barring lightning, contactor and micro-switches in the tower control box should last from 10 to 15 years. However, a good preventive maintenance program would replace them about every 6,000 hours of pivot operation.

Sprinkler Heads

Sprinkler heads, including pressure regulators, are probably the most important part of a pivot. Properly spaced and with correct nozzle sizes, the sprinkler package will apply the proper amount of water uniformly over the field.

Given the importance of these components and remembering that the sprinkler package is less than 10 percent of the cost of the pivot, irrigators should pay particular attention to the condition of the sprinkler heads. Under North Dakota weather

conditions, most sprinkler heads have a useful life ranging from 5,000 to 8,000 hours of pivot operation, whether plastic or brass. Sand or rust in the water reduces the expected life of sprinkler heads.

Nozzles

With no sand or rust in the water, the nozzles should last as long as the sprinkler head. Plastic and brass nozzles have about the same life span. If grit is in the water, the nozzle diameter should be checked every two years.

How do you know if grit is in the water? Check the sand trap at the end of the pivot. Any more than a gallon or two of grit will justify checking the nozzle diameter.

Endguns

The vertical swing arm design should last the life of the center pivot. However, the bearings sometimes can wear out, which requires them to be replaced.

Endguns have tapered bore nozzles, so only gritty debris in the water will affect their life. Older endguns with the horizontal swing arm and the whipping return motion usually last about 10 years or less.

Endgun Booster Pumps

The endgun booster pump should last the life of the pivot, barring any lightning hits. The electric motor on booster pumps can burn out, especially with sprinklers mounted on the top of the span pipe, and may have to be replaced after 10 to 15 years. Pivots with sprinkler heads mounted on drop tubes appear to have less electric booster pump trouble.

Tom Scherer, 701-231-7239
NDSU Extension Agricultural Engineer
Thomas.Scherer@ndsu.edu

Now is the Time to Fix Center Pivot Wheel Tracks

With crops off the field, now is the time to level out or fix the problem areas with deep wheel tracks. Every irrigator with a center pivot knows that the wheel tracks under each tower can turn into ruts in some parts of their fields.

Finding wheel tracks up to 6 inches deep, even on very sandy soil, is common. But when the wheel track is 12 inches or deeper, something needs to

be done. Deep wheel tracks can cause drive wheels on towers to get stuck and trip the safety circuit on a center pivot. They also interfere with tillage and harvesting equipment.

Deep wheel tracks generally are caused by saturated conditions that reduce the weight-bearing capacity of soil. The deepest wheel tracks usually are found where water collects in low spots or under the first and second towers from the pivot point. If you have deep wheel tracks at several locations in the field, now is the time to correct the problem.

Major factors that affect the depth of pivot wheel tracks are:

- **Soil type** – Usually locations with heavier soils (clay, clay loams) have deeper tracks because they remain wet longer due to higher water-holding capacity and slower drainage. Deep wheel tracks commonly form in the low spots where water accumulates. Often, the wheel track acts like a drainage canal, where rain and irrigation water runs down the wheel track to the low spot.
- **Number of revolutions** the pivot makes in the tracks before tillage levels them
- **Weight supported by each tower** – Short spans between towers (130 to 170 feet) have less weight than long spans (180 to 200 feet).
- **Amount of wheel contact area** with the soil surface.

If you have deep wheel tracks only in the low areas of your field, consider filling the bottom of the wheel tracks with crushed rock (1 to 3 inches in diameter). This will provide more load support for the towers.

You can fill in the rut and build a road for the tower wheels using a plow, disc plow or blade to build a ridge where the deep wheel track is located. Be sure to pull soil from both sides of the track.

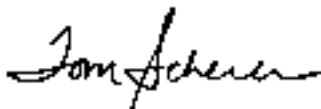
If you have a persistent problem with wheel tracks, manufacturers offer a wide range of solutions, including using taller tires or metal or plastic wheels, and adding tracks and/or additional wheels to the tower. All are designed to minimize deep wheel tracks.

Tom Scherer, 701-231-7239
NDSU Extension Agricultural Engineer
Thomas.Scherer@ndsu.edu

Fall Irrigation Maintenance Checklist

- Check all motor and pump openings to see that they are screened properly to keep rodents out.
- Chlorinate the well if you have iron in the water.
- Drain pipes, valves, tanks and centrifugal pumps.
- On center pivots, check all gearboxes on all towers for moisture accumulation, lubricate all fittings, check the water drain valve on each span, drain all water-carrying lines and drain the booster pump case.
- Empty the sand trap at the end of the center pivot.
- Park the center pivot into or with the prevailing wind (northwest or southeast, next to a shelterbelt or downhill).
- Pump out low spots in pipelines and protect the pump-outs from cattle and/or snowmobiles.
- Lubricate all pump motor bearings and shafts.
- Spray electrical contacts with contact cleaner to displace dirt and moisture and prevent corrosion.
- Lock the electric control box in the "Off" position.
- Fix or replace electric panel door seals if they're hard or broken to keep out moisture, dust and rodents.
- Loosen the packing gland if used.
- Loosen belts.
- Remove the flow meter and pressure gauges and store them in a warm place for the winter.
- Inspect the gaskets in portable pipes and make a note to replace those that are cracked and/or broken.
- Winterize stationary engines.

Tom Scherer, 701-231-7239
NDSU Extension Agricultural Engineer
Thomas.Scherer@ndsu.edu



NDSU Extension does not endorse commercial products
or companies even though reference may be made to
trade names, trademarks or service names.

**For more information on this and
other topics, see www.ag.ndsu.edu**

NDSU encourages you to use and share this content,
but please do so under the conditions of our Creative
Commons license. You may copy, distribute, transmit
and adapt this work as long as you give full attribution,
don't use the work for commercial purposes and share
your resulting work similarly. For more information,
visit www.ag.ndsu.edu/agcomm/creative-commons.

County commissions, North Dakota State University
and U.S. Department of Agriculture cooperating.

North Dakota State University does not discriminate on the basis of
age, color, disability, gender expression/identity, genetic information,
marital status, national origin, public assistance status, race, religion,
sex, sexual orientation, or status as a U.S. veteran. Direct inquiries to:
Vice Provost for Faculty and Equity, Old Main 201, 701-231-7708
or Title IX/ADA Coordinator, Old Main 102, 701-231-6409.

This publication will be made available in alternative formats
for people with disabilities upon request, 701-231-7881.

Index of 2018 Water Spouts Articles

May 2018

Welcome to the 46th Year of Water
Spouts, Tom Scherer

ND Water Education Foundation –
Summer Water Tours

Updated Publication on Soil/Water
Compatibility for Irrigation,
Tom Scherer

Irrigation System Maintenance and
Record Keeping, Tom Scherer

June 2018

Nesson Valley Irrigation Research Site
Field Day July 12, Tyler Tjelde

Project Safe Send – Disposal of Old or
Unused Pesticides, Jeremiah Lein

Center Pivot Electrical Safety,
Thomas Marek and Dana Porter

A Video on Center Pivot Sprinkler
Uniformity, Tom Scherer

July 2018

Overspray from Irrigation Systems
not allowed on Roads, Tom Scherer

Soil Water Deficit is Highly Variable
Across ND, Tom Scherer

Watch Your Soil Water – It Can Change
Very Quickly, Tom Scherer

August 2018

Potato Field Day Set for August 23,
Andy Robinson

Oakes Irrigation Research Site Field Day
on August 14, Kelly Cooper

Components of Irrigation
Management, Paul Colaizzi and
Susan O'Shaughnessy

September 2018

Irrigated Corn and Soybeans,
Tom Scherer

Alternative Grain Storage Methods,
Ken Hellevang

Enhancing Soybean Storage Starts with
Harvest Moisture, Ken Hellevang

The Pressure Gauge and Flow Meter,
Tom Scherer

October 2018

Bismarck Irrigation Workshop –
December 6, Tom Scherer

Irrigation Association – Annual Show,
Tom Scherer

How Long Would You Expect a Center
Pivot and its Components to Last?
Tom Scherer

Now is the Time to Fix Center Pivot
Wheel Tracks, Tom Scherer

Fall Irrigation Maintenance Checklist,
Tom Scherer