BARNYARDS & BACKYARDS

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Calculator tool gauges repair, operation costs

In a previous installment, Fremont County producers Jim and Sally Butler* were evaluating a possible upgrade for their windrower. They have the option of purchasing a used, self-propelled disc mower-conditioner for $75,000. We assume a 5,000-hour useful life, 250 hours per year, and a 10-year useful life.

The Machine Risk Calculator (MRC) tool determines repair and operation costs by using various cost factors (contained in the tool) related to the desired machine. For a detailed explanation and formulas to determine your own more specific cost factors, view the MRC Technical Guide at RightRisk.org.

In this example, we assume $2/gallon diesel fuel, with a 200 horsepower machine, operating at a 75 percent load factor. The MRC tool generates a cost summary page after all the data is entered (Figure 1).

From these results, we move to the field operation input page and enter the field capacity and accomplishment factors: 16-foot head, 13 miles per hour speed, and a 90 percent field efficiency resulting in a calculated 22.69 acres per hour. From this, the MRC tool generates a per-acre operating cost (not including operator labor and return to management) of $3.31 per acre and a total annual cost of $18,803.

We compare these results to the Butler's current windrower: a 16-foot, sickle-head machine with 2,500 hours useful life remaining and a $35,000 value. This machine is considerably slower when compared with the potential disc mower machine. Assume a 6 mile-per-hour average field speed, 80 percent efficiency, 550 hours annual use, and a 75 percent load factor. The total field cost per acre (not including operator labor and return to management) is $3.66 per acre. The total annual cost for this machine is estimated to be $17,048, including repairs/maintenance, fuel/oil, depreciation, and opportunity (interest) cost (Figure 2).

WINDROWER, SELF-PROPELLED
CAB, AIR, 16FT DISC HEAD

Purchase Price:	$ 75,000		Year Quoted:	2017	
Hours to Wearout:	5,000		Maximum Life:	10	Years
Cost Factor 1:	0.791		Annual Use:	500	Hours
Cost Factor 2:	0.091		Repair Factor 1:	0.060	
Cost Factor 3:	0.0000		Repair Factor 2:	2.00	
PTO Horsepower:	200		Fuel Price:	$2.00	Per Gal.
Fuel Type:	DIESEL		Percent Load Factor:	75.0	percent
Fuel Consumption:	11.53	Gal/Hr	Oil Consumption:	0.05	Gal/Hr
			Percent of Average Investment Charged for Opportunity Interest:	6.00	percent
			Percent of Average Investment Charged for Tax, Housing & Insurance:	2.00	percent

ESTIMATED ANNUAL COSTS AND COST PER HOUR

		ANNUAL COSTS						COST PER HOUR					
Annual Use HOURS	YRS TO TRADE	TOTAL COST	DEPR	OPP COST	THI	REPAIRS	FUEL & OIL	TOTAL COST	DEPR	OPP COST	THI	REPAIRS	FUEL & OIL
500	10.0	$33,870	$5,601	$2,820	$940	$11,250	$13,260	$67.74	$11.20	$5.64	$1.88	$22.50	$26.52

Figure 1. Self-propelled windrower (disc head) information

WINDROWER
16FT SICKLE HEAD, CAB, AIR

Purchase Price:	$ 35,000		Year Quoted:	2017	
Hours to Wearout:	2,500		Maximum Life:	5	Years
Cost Factor 1:	0.791		Annual Use:	500	Hours
Cost Factor 2:	0.091		Repair Factor 1:	0.060	
Cost Factor 3:	0.0000		Repair Factor 2:	2.00	
PTO Horsepower:	120		Fuel Price:	$2.00	Per Gal.
Fuel Type:	DIESEL		Percent Load Factor:	75.0	percent
Fuel Consumption:	6.92	Gal/Hr	Oil Consumption:	0.03	Gal/Hr
			Percent of Average Investment Charged for Opportunity Interest:	6.00	percent
			Percent of Average Investment Charged for Tax, Housing & Insurance:	2.00	percent

ESTIMATED ANNUAL COSTS AND COST PER HOUR

		ANNUAL COSTS						COST PER HOUR					
Annual Use HOURS	YRS TO TRADE	TOTAL COST	DEPR	OPP COST	THI	REPAIRS	FUEL & OIL	TOTAL COST	DEPR	OPP COST	THI	REPAIRS	FUEL & OIL
500	5.0	$17,048	$4,584	$1,412	$471	$2,625	$7,956	$34.10	$9.17	$2.82	$0.94	$5.25	$15.91

Figure 2. Custom tillage, planting and harvest operation parameters: power unit, implement, and accomplishment rate estimates from survey results

The two machines are very similar in total annual costs but differ in cost per hour. The disc machine provides gains in efficiency through higher field speed, efficiency, and fewer hours of use needed, albeit at a higher cost per hour when compared to the Butler's current machine. This puts to rest one of the concerns of the Butlers: the purchase price of the new machine would not be offset by its efficiency gains.

Risk Sensitivity Analysis

A unique feature of the MRC tool is the ability to evaluate a range of values for up to six cost categories (risk analysis). This allows for a more accurate reflection of potential costs; "educated guesses" are taken out of the equation and allows the MRC user to account for expected variability in costs.

Suppose the Butlers are anxious about the effect of fuel price on the disc mower's cost per acre. The most likely value estimated by the tool was $26.52 per hour. If we now enter a low value of $10/hour, a high of $35/hour, and $20 per hour each for operator labor and return to management, the tool generates a probability curve (Figure 3), describing a range of $2.20 to $3.30 per acre, with a 50/50 chance of a cost of $2.89 per acre.

**The Butler family and their operation are a case study example created to demonstrate RightRisk tools and their applications. No identification with actual persons (living or deceased), places, or agricultural operation is intended nor should be inferred.*

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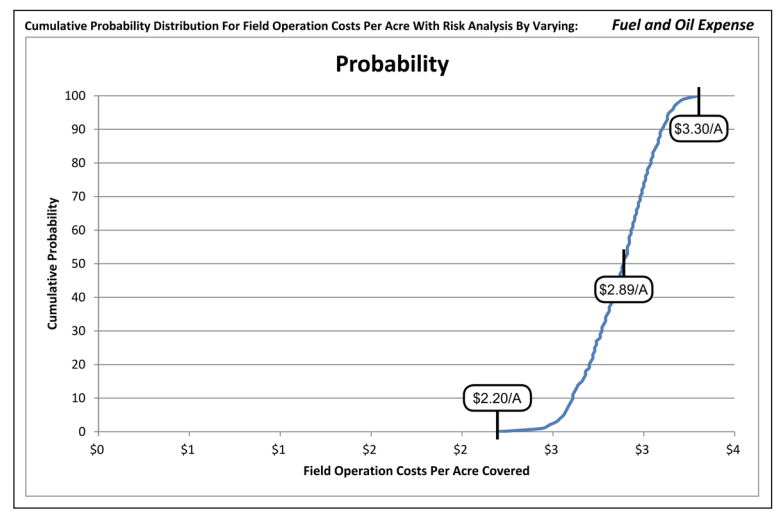

Figure 3. Self-propelled windrower, 16-foot sickle head cost per acre, varying fuel and oil expense

How to assess winter wheat spring freeze injury at joint stage

Looking over winter wheat fields across southeast Wyoming the first of May, there were some yellowing of plants, indications of stress from recent cold and damp conditions.

The May 1 Wyoming Crop Progress and Condition Report from the USDA National Agricultural Statistics Service (NASS) shows this as well, with the condition rated a little below average.

Despite the lower quality rating, the same report also showed 38 percent of winter wheat in Wyoming was jointed compared with 10 percent the week before. Last year at this time, only 6 percent was jointed, and the five-year average is 14 percent. The winter wheat crop will improve with the expected warmer weather.

Wyoming fared pretty well in this most recent cold spell. Looking at weather stations at wheat variety trial sites across southeast Wyoming, temperatures near Albin dropped to 25 degrees April 26, while lows near Torrington were 27 degrees. With advanced maturity, there is an even greater opportunity for freeze damage if temps drop again. Check the stations at bit.ly/wyowheatweather to see real-time weather.

Many factors can affect freeze damage to winter wheat, including air temperature, soil moisture, stand, canopy density, and growth stage. Other factors include duration of cold temps, topography (cold air settles in low spots), and wind speed. Having a good stand combined with soil moisture helps create a microclimate, helps moderate temperature swings, and minimizes exposure to cold temps

Freeze damage at the joint stage typically presents itself as damage to the growing points. At this stage, growing points are moving up as the stem elongates. The growing point is more sensitive than other plant parts, and damage may not be immediately evident. Splitting the stem with a sharp knife will show the growing point. A healthy growing point should be bright yellow and turgid, while a damaged growing point will be brown or white and appear water soaked.

Damage to lower stems can also occur, appearing as discoloration, roughness, lesions, splitting, collapse of internodes, or enlargement of nodes. While not typically a problem, it can invite infection and weaken the stem, possibly leading to lodging issues. Wind or strong rain can easily lodge these plants, possibly decreasing grain yields and slowing harvest.

If freeze damage is suspected, it will take several warm days, up to a week or more depending on temperatures, after damage has occurred before a true assessment can be made. If main tillers are damaged, other tillers may help compensate for some yield loss potential.

If grain yield losses are significant, consider using it as a forage crop. If considering termination, be sure to check with crop insurance, Farm Service Agency, or other pertinent contacts, to ensure you are not missing out on any possible payments.

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