

Process Improvement

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Connecting Principles of Process Improvement to Farm Safety & Resilience

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Activity Based Management
*Process Improvement +
 Activity Based Costing (ABC's of Ag)*

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Biosketch

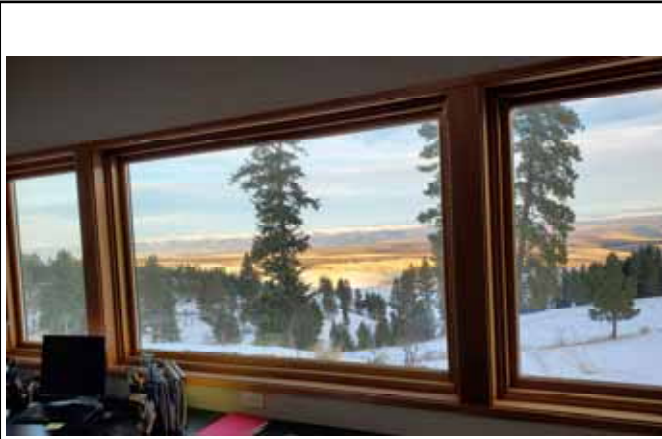
- ◆ Ag Lender – FCS (1972-1980) – Spokane, WA & Washington, DC
- ◆ Partner in 20,000 acre diversified family farm business (1980-present)
 - *New title – Jan. 1, 2017 – Board Chairman/Transition Coach*
- ◆ Farm management consultant (1980-present)
 - Farm family transitions and formalization of governance structures, financial planning, managerial accounting, process improvement, consultant training
- ◆ Industry boards/affiliations
 - Farm Financial Standards Council – Past President
 - PNW Direct Seed Association – Director, Past President
 - Director – numerous commodity group and bank boards
 - Faculty member – TEPAP Program (fin mgmt. & process improvement); Texas A&M King Ranch Institute (MA)

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ASK YOURSELF...

Am I running a **PROFESSIONALLY
MANAGED FAMILY FARM
BUSINESS...or a MOB?**

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DEFINITION OF INSANITY

**DOING THE SAME THING OVER AND OVER AGAIN AND
EXPECTING A DIFFERENT RESULT!**

Albert Einstein – March 23, 2017

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Critique – Fixes for future

- ◆ Timing ok with current length...2018 just right; 2019 – finished with 15min to spare. Add Kingfisher to animals
- ◆ 45 min; ck key slides cut. May need 3-4 more slides
- ◆ Consider cutting case study (2018 – did short version in 10 min.)
- ◆ Add: financial quantification of variance (i.e. seeding rate being off... sprayer overlap...
- ◆ Add: JD research on cost of idle time (30+ %); JD has this number
- ◆ Add: Deming's animal photos

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What do these have to do with Process Improvement?

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IQ Test – What do following have to do with Process Improvement?

- ◆ Tractor rollover – flat tire (no fluid); spraying on steep ground; no seat belt; roll bar taken off
- ◆ Skidder kills operator – 500’ slope; no seat belt
- ◆ Employee gets caught spraying ineligible chemical near creek
- ◆ Combine kills grandpa (SK 2010) – grandson kid hits button in cab; 2nd wife sells farm defying sons farm plans
- ◆ Fuel spill – employee fueling implement with auto-shutoff nozzle leaves scene; nozzle fails; big MESS!
- ◆ Employee talking on cell phone while winging out self-propelled sprayer – hits power lines & fries tires!
- ◆ Employee talking on cell phone; tips logging truck over!

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Answer...When you have:

No clearly defined company culture for:

- Documenting and following SOPs
- Auditing Process Improvement objectives
- Rewarding/incentivizing improvements

→ Bad things happen!

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CLASS EXERCISE

Identify situations where a process in your operation could benefit from a standardized operating procedure ...

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Case Studies – #1 – Grain Hauling Efficiency

- ◆ **Problem:** 7 semis; under-loading trucks 40 bu./trip
- ◆ **Analysis**
 - Opportunity cost = \$.15/bu. x 40 bu/trip = \$6.00/trip
 - 6 loads/day x 45 days @ \$6.00/trip x 7 trucks = \$11,340/yr
 - 5% cost reduction => 5% reduction in trucking needs
 - **Motivator:** Port of Entry fines → \$100-500/overload
- ◆ **Solution/Options:**
 - Grain wagon electronic scale - \$3,250 + \$1,500 install
→ Payback in ½ season of harvest!!!
 - Electronic scales – each truck (ok for commercial hauler)

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#2-Convert 40' Trailer to Grain Trains

- ◆ **Problem:** combines waiting on trucks; drivers hard to find; new trailers cost prohibitive. How improve efficiency & lower cost?
- ◆ **Analysis**
 - Haul capacity: 40' trailer = 850 bu; doubles = 1,150 bu
 - Increased capacity = 300 bu @ \$.15/bu x 6 trips/day = \$270/day savings x 45 days = \$12,150/ year
 - 5 trucks haul what 7 did previously
- ◆ **Solution/Options:**
 - Purchase used trailers \$45-50,000
 - Sell old trailer \$10,000; (optional: **SELL** two power units)
 - 3 year net payback, excluding sale of excess power units

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Example of win-win (also good CASE STUDY for Process Improvement)

Out-sourced all trucking to firm who had fleet of trucks; Bulla Barra guaranteed they firm all their business in exchange for assurance they would always be there to haul their grain. Fleet's biggest slow time was Bulla Barra's harvest time. One year when big harvest and everyone short of trucks, BB had all the trucks they needed when many others couldn't find trucks to transport grain.

John approached trucking firm with question: "What can we do to add value to our relationship?" Trucker: this is slow time for us; hard to keep drivers hired and trucks on road; also cash strapped. Trucker proposal: up front trucking fees of \$150,000. In return, offered \$1/1 reduction in rates and agreed to haul further downstream since it was a slow time and more efficient to deliver to more distant terminals. Arrangement cost BB \$3,000 interest on borrowed money; but saved BB \$30,000 in trucking costs; and it resulted in a \$30,000 increase in profits for trucking firm.

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How did we solve problem?

- ◆ Defined problem
- ◆ Engaged stakeholders
- ◆ Mapped activity
- ◆ Analyzed cost of inefficiency
- ◆ Identified alternative solutions
- ◆ Implemented optimal solution
- ◆ Evaluated results of new process

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Agenda

- ◆ What is "process management"
- ◆ Motivation and rewards for excellence
- ◆ Consequences when you are lax
- ◆ Models, Applications and Case Studies for putting concepts into practice

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Agenda - MRASH

- ◆ What is "process management" & how does it fit into your vision & culture as a "professionally managed business"
- ◆ What comes first:
 - Creation of Robust SAFETY POLICY & SOP
 - Creation of Professional Management Culture & 100% Buy-in?
- ◆ Models, Applications and Case Studies for putting concepts into practice

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100 Yr History of Process Improvement

- ◆ Scientific Engineering – Frederick Taylor (1911) – summarized 30 years of study in steel industry
- ◆ My 1st exposure to term – *Cheaper by the Dozens*
 - Movie about time and motion studies - Frank Gilbreth
- ◆ "A rose by any other name ..."
 - Total Quality Management (1980's) → Six Sigma → Business Process Re-engineering → Business Process Re-design... and dozens of other buzzwords invented to sell books and provide jobs for consultants!
- ◆ **Bottom Line:** PI is deciding what to measure & manage

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Scientific Engineering – Frederick Taylor (1911) *written after experimenting with concept in steel industry 1880-1910*

Four principles

- Develop "work science" to replace "rule-of-thumb"
 - Manager's job: select, train, develop standards
 - Managers cooperate with workers to insure consistency
 - Responsibilities divided: management and workforce
- Principle Management Objective: prosperity for employee coupled with prosperity for employer

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Pig Iron Case Study


Principles applied to steel millworkers handling pig iron.
 → Assessed motions, capacity of workers
 → Developed process, picked 1st class handlers

- ◆ Baseline – workers loaded 12 ½ tons of steel /day
- ◆ Results–
 - handled 47 T/day – ↑ productivity 400%
 - Worker pay ↑ 60% (\$1.15 → \$1.85/day)
 - Cost of production dropped 56% (\$.072 → \$.033/T)

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Frank Gilbreth – father of “Time & Motion Studies”



- ◆ Studied motions of bricklayers
 - reduced movements from 18 to 5
 - repositioned materials, support systems for maximum efficiency
- ◆ **Results**
 - 350 bricks/hour vs. 120 industry average
 - Bricklayers selected based on performance; given substantial pay increases

→ *Gilbreth's techniques still used today to increase efficiency.*

Trivia ? “Calculate savings (time/\$) laying 800,000 bricks at college health science bldg (360 man-days)”

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Savings – Money & Time

- ◆ 800,000 bricks @ 120/hr → 6,667 hrs
 - 6,667hrs @\$15/hr = \$100,000
 - 4 person crew 6-10s → 6.5 months
- ◆ 800,000 bricks @ 350/hr → 2,286 hrs
 - 2,286 hrs @\$20/hr = \$45,700
 - 4 person crew 5-8s → 71 days/3.3 months
- ◆ Savings
 - \$54,300 ↓ (54.3% lower cost)
 - 49% less time to complete project

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Lessons from Gilbreth/Taylor

- ◆ One man alone can't improve
- ◆ “Soldiering” is big obstacle
- ◆ Takes management working with employees so **both benefit**:
 - Owners: lower cost production
 - Employees: increased pay; better work conditions (more time off, safer environment.)

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Modern Applications of Process Improvement Successes

Health care/pharmacy, fast foods, seeding systems, dairy, timber harvesting, crop production

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Happy Days Corp

Meet my friend Bruce Finch
Fast Food Vendor *par excellence!*

- ◆ Lifetime commitment to Process Improvement
- ◆ Multiple Taco Time outlets
- ◆ Observed time from order window to departure ...*not happy!*
- ◆ Challenged staff to identify solutions...gave \$ incentives
- ◆ Time/Motion Project: engaged team to study Cinco de Mayo



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Imagine clock like this in your shop, drill or sprayer!

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Strategy/Results Take homes

- ◆ Digital timers track time from order to handing food out window
- ◆ Tracked average & best times; employees *continually* worked to BEAT times
- ◆ Incentives given for efficiency
- ◆ RESULTS
 - Doubled taco output over 2 years
 - Dropped labor cost per taco 13%

CINCO 2009				
CINCO 5th YEAR TOOK PLACE ON A TUESDAY				
	LTY	CITY	MTT	TOTAL
NET SALES	18,77%	18,62%	18,26%	
TACO'S SOLD	688	688	54	1430
% OF SALES	46,63%	46,51%	43,6%	
BEHIND WORKS	5	5	0	

CINCO 2011				
CINCO 5th YEAR TOOK PLACE ON A TUESDAY				
	LTY	CITY	MTT	TOTAL
NET SALES	18,77%	18,62%	14,5%	
TACO'S SOLD	1284	1284	112	2780
% OF SALES	58,86%	58,16%	46,7%	
BEHIND WORKS	7	6	0	13

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Health Care – Robotic Pharmacy

Applications

- Used 1/3 hospital pharmacies
- Dispenses medications in cassettes, envelopes

Benefits

- Filling accuracy 99.9%
- Checking labor ↓ 90%
- Missing meds ↓ 92%
- Inventory ↓ 10-20%
- Medication costs ↓ 54%






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Milking Robots

Landry Brothers Dairy, St Albert, Quebec
Source: JD Furrow

Three shifts of workers replaced by 10 robots @ \$200,000

- lower mastitis
- less management stress
- more attractive to young workers
- 10% increase in milk production
- better insemination results

"...robots don't take holidays or call in sick, never get tired, lose focus or have a bad day...and they NEVER FORGET important things about each cow...like how many times a day a cow needs to be massaged!"

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Halversons

2012 Top Producer of the Year Award

- 11 state potato operation; major supplier - FritoLay
- Gregg, Eric, John, Leah – two generations TEPAP
- Transitioning to next generation
- Major commitment to GAPs, SOPs, environmental metrics (Triple Bottom Line)
- Use McDonald SOPs as model to improve brand

→ story: JD8400T cost/hour

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Agricultural Gains from Process Improvement

- Conversion to NoTill/Direct Seeding
- Harvest operations—combine and trucks
- Hay harvesting/hauling
- Grain transportation – trucks, unit trains
- Self-propelled sprayers
- Timber harvesting

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Classic Process Improvement Case Study

Transition from Intensive Tillage to Direct Seeding/NoTill

Benefits: improved economic viability and environmental sustainability:

- ◆ Sequesters CO2 → .5T/acre/yr
- ◆ Can ↑ OM 0.1%/Yr.
- ◆ Improves air & water quality
- ◆ Improves wildlife habitat
- ◆ Lowers fossil fuel use
 - ↓ 3.5gal/acre per USDA
- ◆ Increases economic viability
- ◆ Carbon emission offsets 20-25% ↓



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Costs/Acre*- Conventional Seeding - Spring Peas

*From activity based accounting analysis.

Operation	Cost/Acre
Fall Plow	\$15.00
Spring Harrow	4.00
Spring Cultivate	6.00
Cultivate/Spray Incorporate	6.00
2nd Incorporation-Cultivator	6.00
Seed-Conventional Drill	15.00
Harrow	4.00
Roller/Packer	4.00
Total Costs Per Acre	\$60.00

Recreational farming at its best!!!

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Costs/Acre - Direct Seeded Spring Peas

...saves 3 steps & \$25/acre

Operation	Cost/Acre
Fall Heavy Harrow	\$4.00
Fall Roundup-Green Bridge	7.00
Custom Hire-Direct Seed Drill	17.00
Harrow	3.00
Roller/Packer	3.00
Total Costs Per Acre	\$35.50

Qualitative Benefits: less water loss, less compaction, less erosion risk

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New Frontiers since NT...

- ◆ Bio-farming
- ◆ Cover crops
- ◆ Carbon farming
- ◆ Re-introduction of animal ag to mono-cropping systems
- ◆ ...add your latest innovation?

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A Tale of Two Tillage Systems

	1998	2000
ATR	.50	1.05
OPMR	.1275	.1633
ROA	6.47%	17.14%
ROE	3.88%	22.61%

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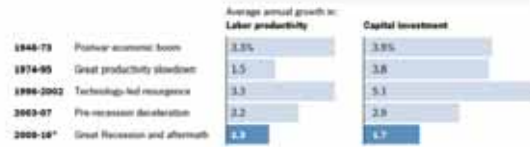
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Why is PI important?

Don't Pin This on Robots

If automation were accelerating rapidly, labor productivity and capital investment would also be surging. Instead, they are growing at the slowest pace in decades.



*Through 2010 quarter.
Source: "Growth: They indicate areas of one century to one hundred of the United States' Bureau of Economic Analysis."
By The New York Times

"...labor productivity and capital investment...growing at slowest pace in decades"

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Shepherds Grain – Food Alliance

- ◆ Value added premiums for wheat grown in Direct Seed cropping system
- ◆ Food Alliance certified
 - Certification Costs
 - S. T. Periodic Audits
- ◆ \$1.00/bu premium → 1,200 ac wheat @80 bu/ac = \$96,000 bonus!



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Timber Harvest Efficiency Trends

- ◆ Horse logging
- ◆ Dozers with winches
- ◆ Skidders
- ◆ Faller-bunchers
- ◆ Stroker/delimiters



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Process Improvement – Wittman Farms

Baseline - 1980	Today
◆ 6 partners, 2,500 ac farm, 2,500 pasture, BIG crew	◆ 3 partners, 20,000 acres
◆ 4 combines; 6 trucks	◆ 100% Direct Seeded
◆ Farming implements covered ground 6-8 times/year	◆ Efficiency compared to 1980 <ul style="list-style-type: none"> ■ 1 combine replaces 6 ■ 1 semi replaces 4-2T tks ■ Sprayer="10x" acres/day

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Definition – *Process Improvement*

Systematic approach to closing of process or system performance gaps through streamlining and cycle time reduction, and identification and elimination of causes of below specifications quality, process variation, and non-value-adding activities.

source: google.com

... doesn't this sound exciting!!!

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Definition – *Time & Motion Study*

(Encyclopedia Britannica): analysis of time spent in going through the different motions of a job or series of jobs. Time-and-motion studies were first instituted in offices and factories in the United States in the early 20th century. These studies were adopted on a wide scale as a means of **improving the methods of work** by subdividing the different operations of a job into measurable elements. Such analyses were to **standardize work... check the efficiency of people and equipment...** and the methodology to achieve results.

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Dick's Definition:

Process Improvement is...

- Identifying jobs that are repetitive
- Documenting how jobs are supposed to be performed (SOP, GAP, BMP)
- Evaluating how to **do it better**:
 - *More efficient and consistently*
 - **Safer**
 - *More economical, and*
 - *Environmentally sustainable*
- Auditing how you're doing & rewarding gains

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Where can Process Improvement be applied?

... and how do we put principles into practice?

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Where does this topic fit in Management System?

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Wittman's Rule –

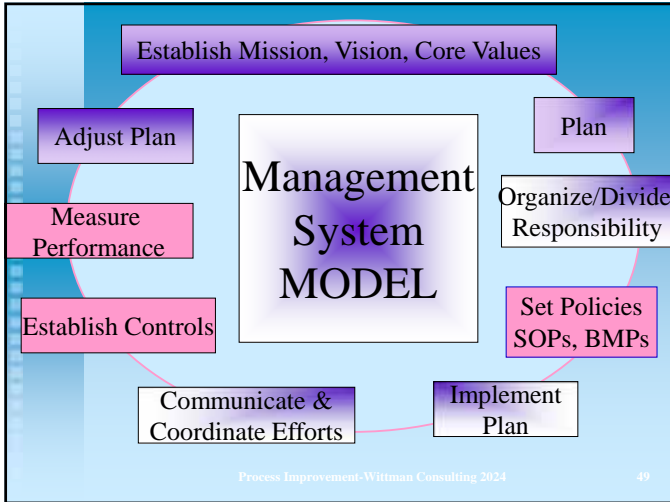
Safety is not a Management Island...

It's part of a systems approach and culture of a professionally managed business.

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SOP's, GAPs*, BMPs*

25% have SOPs in place!



What are they? guidance documents and standards for repetitious or routine jobs

How used?

- Training – new hires
- Leverage communication for multiple employees
- Assures jobs done following BMPs, GAPs
- Increases **safety** & lowers cost of production
- Basis for measuring job performance, auditing
- Accessing markets, value-added premiums

GAP=Good Agric Practice; BMP=Best Mgmt Practice

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Consequences of Undocumented SOPs


- ◆ Inconsistent work
- ◆ Accidents
- ◆ Inefficient processes
- ◆ Food safety hazards → health risks, fines
- ◆ Market demand destruction & loss of market access
- ◆ Excessive turnover



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Food Quality "Hits"



- ◆ Alar Scare-apples
- ◆ E coli-leafy greens, ground beef
- ◆ Salmonella - peanuts
- ◆ Listeria – Colorado & California cantaloupe
- ◆ BSE - beef

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Applications of SOPs/GAPs

- ◆ Office functions
- ◆ Harvest operations & servicing
- ◆ Crop agronomic practices
- ◆ Timber harvest & manufacturing processes
- ◆ Fuel and Supply Storage
- ◆ Worker safety guidelines
- ◆ Food safety practices
- ◆ Herd health & stock handling procedures
- ◆ Value added market access

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Office Management Functions

- ◆ Database management
- ◆ Computer access protocols
- ◆ Internal controls/security
- ◆ Data Backups
- ◆ Network and internet
- ◆ Financial function SOPs



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Where would your business be tomorrow if:

- ◆ You were hit by bus
- ◆ Computer technology expert left country
- ◆ Bookkeeper ran off with hired man
- ◆ Computer fried itself & the backup system
- ◆ NO one else knows your system!

→ *How I learned the hard way...*

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Building Office SOPs

- ◆ Define issues needing documentation
- ◆ Write down in SOP
- ◆ File in accessible location
- ◆ Use for training/orientation
- ◆ Update existing/new items as needed

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Semi-Truck Use Guidelines SOP

Source: Barron Farms Inc

1. Daily – inspect complete chassis (brakes, steering linkage, overall truck condition)
2. Drivers may only use cell phones when trucks parked
3. Drivers allowed to have passengers with written approval
4. Inspect field entrances/exits before entry; mark edges clearly
5. Maximum speed limit 7 mph driveways, yards
6. Always park trucks on flat with brakes set; driver stays in truck while loading
7. Drivers expected to obey all traffic & weight limit restrictions
8. Drivers required to have minimum 10 hours rest before next shift
9. All truck loading at bins requires one helper assist while loading
10. At end of day, all trucks to be parked in designated parking areas

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ABCs of Farming

Activity Based Costing

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What is ABC?

Activity based approach to tracking cost of production

Examples

◆ Crop Operation:

- Pre-plant ground preparation
- Seeding/Fertilization
- Pest Control
- Harvest
- Mowing, Harrow

◆ Hay Harvesting

- Swathing
- Raking
- Turning
- Baling
- Hauling & Stacking
- Tarping

◆ Silage Harvest

- Chopping
- Hauling
- Silage pit receiving
- Tarping

◆ Harvest

- Combining
- Trucking
- Grain Wagon
- Support Crew Services

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Uses of ABC Information

- ◆ Identifies costs of separate activities
- ◆ Enables comparisons
 - Industry or competitor costs
 - Custom rates
- ◆ Helps optimize
 - In-source
 - Out-source
- ◆ Sets basis for pricing
 - hiring or providing custom services

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Information Needed for Analysis

- ◆ Ownership costs
 - Cost of power unit/implement
 - Planning Horizon/useful life
 - Salvage value
 - Cost of capital or borrowing
 - Insurance & housing costs
 - Tax rates
- ◆ **WARNING: Use YOUR costs**
 - NOT economic costs from someone else's data
 - NOT replacement cost
- ◆ Annual usage of power unit – all operations
- ◆ Operating costs
 - Fuel
 - Consumption/hour
 - Cost of fuel
 - Labor cost
 - Primary operators
 - Support personnel
 - Repairs and Maintenance
 - Other Equip Support Overhead Costs (combine labor vs parts example)
- ◆ Productivity of Operation
 - Working width
 - Speed
 - Field efficiency %

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Custom Mowing Example

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Field Description	Power unit or self-propelled unit	Implement 1
Machine Description	Tractor - Front Wheel Assist 250 HP	Rotary Mower 20' Wing type
A Purchase price	15000.00	10000.00
B Planning period (years)	10	10
C Residual Value (at end of planning period)	10000.00	15000.00
D Annual hours of use (total use all operations)	400	280
E Fuel Usage (liters per hour)	7	
F Fuel Cost (\$ per liter)	2.4	
G Labor cost (\$ per hour)	25	
H Annual repair cost	1500.00	1000.00
I Expected Return on Capital (%)	8	
J Marginal tax rate (%)	25.00	
K Rate of inflation (%)	1.00	
L CGA class rate (%)	20	20
M Working width (m)	26.00	26.00
N Working speed (mph)	9	9
O Field Efficiency (%)	90.00	90.00
P Acres per hr	17.001	17.001
Q Insurance and housing (\$ per year)	250.00	270.00

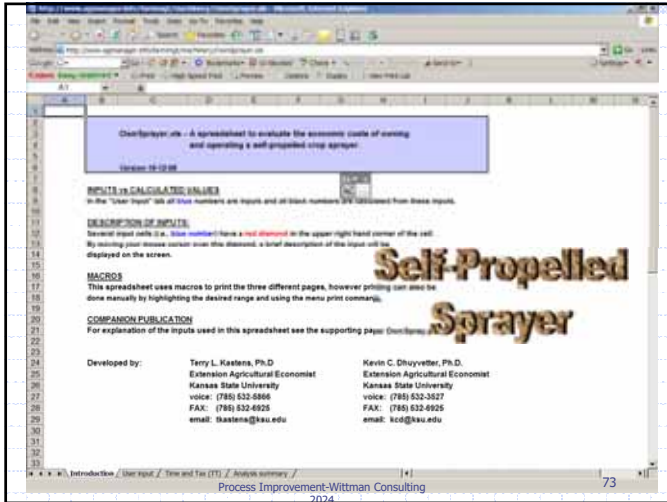
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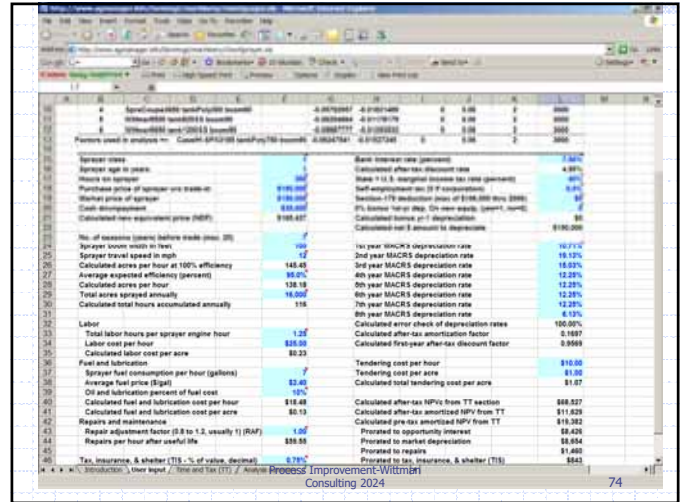
Category	Tractor - Front Wheel Assist 250 HP	Rotary mowers 20' Wing type	Total
Ownership Costs			
1. Capital recovery (\$ per year)	\$616.00	\$195.11	
2. Insurance and housing (\$ per year)	\$250.00	\$270.00	
3. Total annual ownership costs	\$866.00	\$2086.10	
4. Total ownership costs per hour	\$17.41	\$7.45	\$24.86
Operating Costs			
1. Fuel Cost	\$5040.00		
2. Lubrication	\$756.00		
3. Repairs	\$1500.00	\$1000.00	
4. Labor	\$10000.00	\$1500.00	
5. Total annual operating costs	\$17296.00	\$3577.00	
6. Total annual operating costs per hour	\$43.24	\$13.57	\$56.81
Total Costs			
1. Total annual costs	\$24956.00	\$3086.10	
2. Total cost per hour	\$60.65	\$11.02	\$71.67
3. Total cost per acre	\$3.56	\$0.64	\$4.20

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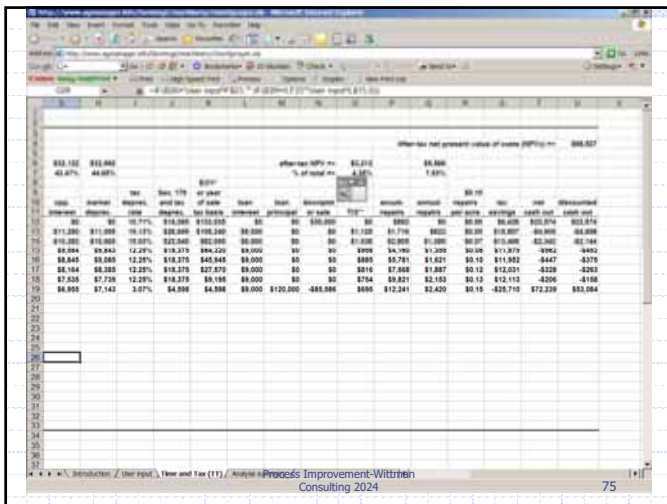
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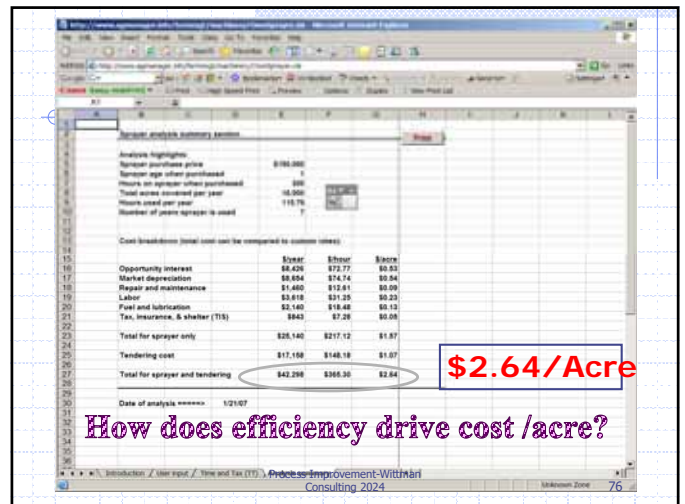
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Sprayer analysis summary section

Print

Analysis highlights:

Sprayer purchase price	\$300,000
Sprayer age when purchased	0
Hours on sprayer when purchased	0
Total acres covered per year	20,000
Hours used per year	229
Number of years sprayer is used	10

Cost breakdown (total cost can be compared to custom rates):

	\$/acre	\$/hour	\$/acre
Opportunity interest	\$1,952	\$39.04	\$0.45
Market depreciation	\$15,619	\$312.38	\$0.78
Repair and maintenance	\$9,059	\$181.18	\$0.45
Labor	\$7,191	\$143.82	\$0.36
Fuel and lubrication	\$5,672	\$113.44	\$0.29
Tax, insurance, & shelter (TIS)	\$1,679	\$33.58	\$0.08
Total for sprayer only	\$48,142	\$962.84	\$2.41
Tendering cost	\$29,729	\$594.58	\$1.49
Total for sprayer and tendering	\$77,872	\$1,557.42	\$3.89

Date of analysis: 2/19/17

16,000ac → \$4.03/ac
25,000ac → \$3.83/ac

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Let's examine a baler purchase analysis...using Ag Manager

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- Modeling Example: Transition from Round Baler to Big Square Baler
- Map process – swath → double rake → bale → load → haul → storage efficiency
 - Analyze cost of each step – labor, fuel, equipment to bale & haul
 - Quantify efficiency savings
 - 42% ↓ ($\$18.87 \rightarrow 10.86/T$) = \$27,500/yr. @2,500T
 - Invest in new system!
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Baler purchase summary section

Print

Analysis highlights:

Large square baler

Baler purchase price	\$75,000
Baler age when purchased	0
Hours on baler when purchased	0
Estimated hours on baler when purchased	0
Average weight of bales in lb	1,000
Bales made by baler per year	4,000
Time of bale loaded per year	2,000
Hours per ton on baler per year	\$4.75
Hours per ton on baler (operator per year)	\$0.72
Total acres baled per year	1,000
Number of years baler will be used	0
Baler value when used	\$30,000
Residualized repair cost-Maxima	\$100

Cost breakdown:

	\$/acre	\$/hour	\$/ton	\$/hour	\$/ton
Opportunity interest	\$0.764	\$1.53	\$2.31	\$100.00	\$0.01
Market depreciation	\$3,699	\$73.97	\$1.09	\$171.07	\$0.11
Repair and maintenance	\$2,007	\$40.14	\$0.59	\$48.00	\$0.03
Tax, insurance, & shelter (TIS)	\$1,900	\$38.00	\$0.55	\$100.00	\$0.01
SubTOTL	\$10,000	\$20.00	\$4.45	\$198.00	\$0.06
Torque on net input	\$2,010	\$40.20	\$1.41	\$44.00	\$0.03
Tender rental charge	\$3,000	\$60.00	\$1.50	\$170.00	\$0.06
Labor	\$2,000	\$40.00	\$0.80	\$40.00	\$0.02
Fuel and lubrication	\$1,000	\$20.00	\$0.70	\$30.00	\$0.02
SubTOTL	\$11,000	\$22.00	\$4.47	\$212.00	\$0.08
Total for baler operator*	\$21,000	\$42.00	\$8.92	\$410.00	\$0.14

*Can be compared to baler rental rates above tractor, labor, and fuel & lubrication are excluded.

Can be approximately compared to custom rates for baler operators (not including operator's own labor).

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\$8.95/T owned vs. \$18.00/T hired
\$9/t x 2500T = \$22,500

Challenges to ABC

- ◆ Predicting obsolescence, econ deprec
- ◆ Estimating inflation in capital replacement costs & technology change
- ◆ Which pricing strategy is right?
 - Cover actual costs + margin, or
 - Cover replacement costs + margin
- ◆ Capturing indirect OH/support costs essential to specific equip operations

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Conclusions

- ◆ Critical information for making incremental decisions - expansion
- ◆ Identifies when it's best to in-source vs. outsource
- ◆ Sets accurate base for pricing in custom work & trade relationships
- ◆ Can be reasonable alternative to cost center tracking & allocation approach

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Resources

- ◆ Machinery Cost Calculator – Alb Ag
www.agric.gov.ab.ca/app24/costcalculators/machinery
- ◆ AG Manager Information – Kansas St
www.agmanager.info/decision-tools
- ◆ Machinery Cost Calculator – Iowa State (William Edwards)
www.extension.iastate.edu/agdm

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Safety Procedures

- ◆ Exposures – too many to list
 - PTO, conveyors, hoists
 - Grain bin deaths
 - "riders" – truck, combine, tractor
 - Equipment rollovers – dozers, skidders, tractors
 - Transport – cargo strapping
 - Runaways-vehicles, implements
 - **Story:** Partner's wife allowing kid to play in potato shipping yard
- ◆ What is your "safety policy"?




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Think Proactively ...what's this? →



Lee Gilbert, ID St Insurance Division


- ◆ Conducts safety audits, on-site training
 - Supervisor Workshops on Accident Investigations
 - Shop Audits – inspects for potential hazards
- ◆ For every \$ in insurance claim, employer spends \$4-5
- ◆ Incentives for thinking proactively; insurance premium modifications

Best line: "...supervisor needs to communicate on near misses/close calls"

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Interesting stats...



1 Disability/death
↑
10 Minor injuries
↑
30 Property damages
↑
600 Near misses/close calls

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"Predictable Surprises..." – Mike Mullane, NASA Astronaut, author of Riding Rockets*

- ◆ Success = doing things well over & over consistently
- ◆ Recipe for success = managing "processes"
 - Be aware of "normalization of deviance"
 - Take responsibility for adherence to standards
 - Be courageous leader in alerting to deviations
 - Beware of "false feedback" – absence of something bad happening ... (it didn't cause wreck last time!)
 - Listen to people closest to the scene or front line
 - Archive, review and learn from "near misses" and disasters

**chronicled 1986 Challenger Space Shuttle explosion*

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Grain Bin SOPs

What are YOUR SOPs for:

- ◆ Storing grain at proper moisture
- ◆ Bin entry & monitoring
 - Harness, extraction equipment
 - Buddy systems
- ◆ Employees, family and guests riding in grain transport implements

Grain Bin Entrapment Deaths

- 2009 - 41
- 2010 - 59
- 2011 - 33
- 2012 - 21
- 2013 - 33
- 2014 - 38
- 2015 - 24
- 2016 - 29
- 2017 - 23
- 2020 - na (8 explosions)
- 2021 - 01 (7 explosions)


Source: Purdue University

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SOPs for entry and working in manure storage facilities?

Gas From Manure Pit Kills 5 On Dairy Farm



Journal of Emergency Trauma, and Shock

PMCID: PMC4166666 | J Emerg Trauma Shock. 2012; 2012:202. doi:10.1186/1749-7922-2012-202

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Table 1
Case series associated with deaths in livestock manure handling

Case	Age	Sex	Occupation	Type of incident	Cause of death
1	46	Male	Manure pit manager	Rotating storage tank to the basement of manure pit	Asphyxiation and drowning
2	37	Male	Trag farm worker	Entered empty liquid manure transport tank	Asphyxiation
3	22	Male	Trag farm worker	Entered empty liquid manure pit in indoor platform	Asphyxiation
4	31	Male	Trag farm worker	Entered empty liquid manure pit	Asphyxiation
5	32	Male	Trag farm worker	Slipped and fell hitting his head on the falling	Asphyxiation and drowning
6	44	Male	Manure pit worker	Rotating storage tank over to manure storage tank	Asphyxiation
7	35	Male	Manure pit worker	Checking underground power for dairy with manure worker	Asphyxiation and drowning
8	34	Male	Trag farm worker	Collapsed in long building after agitating manure pit	Asphyxiation



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What is your cell phone policy?

- ◆ Rules on texting, calling
- ◆ Technology free zones
- ◆ Time and place for use
- ◆ Consequences for violations

→ What's driving increases in auto insurance

Are you asking for predictable surprise?

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Social Media Policy & SOPs

- ◆ Is your company using Twitter, Facebook
- ◆ Policy and SOPs should address:
 - What to include on sites
 - Who's in charge of updating and/or answering inquiries
 - When posts are "personal views" vs "business views"

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Implementation Strategies for Safety Process Improvement (SOPs)

- ◆ Identify hazards unique to farm situation
- ◆ Document SOPs –
 - Include rewards for "quality improvements" and
 - Punishments for "violations"
- ◆ Define protocols for employee training, orientation (meeting dates, agenda, participation logs)
- ◆ Appoint safety officer; fix duties in job description
- ◆ Conduct safety audits (i.e. State Workmen's Comp)
- ◆ Define Zero Tolerance Policy – worksite rules

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Hazard Areas – Dairy Dozen

Sept 2014 Successful Farming –
OSHA Local Emphasis Program –
New York

→ Collaborative effort: Farm Bureau,
NE Dairy Producers, NY Center- Ag
Medicine & Health, Cornell University

DAIRY DOZEN

1. **Manure storage facilities/ collection structures.** Does your plan include warning signs and worker training?
2. **Dairy bull and cow behavior/worker positioning.** Do you offer animal handling programs that address physical hazards in barns, pens, holding areas, crowd gates, and parlors? Is Spanish offered?
3. **Electrical systems.** Have you eliminated open circuits, exposed wiring, improper use of extension cords, debris, and storage close to electrical panels?
4. **Skid loaders.** Do you hold regular training and inspection of safety mechanisms?
5. **Tractor operation.** Are all safety mechanisms working properly? What about ROPS?
6. **PTO guards.** Are PTO drivelines and master shields in place?
7. **Power transmission and functional components.** Are shields in place for grain dryer auger, fan, gears, and other moving parts?
8. **Lockout and hazard-control procedures.** Do you follow these while servicing or maintaining equipment?
9. **Chemical safety.** Do you conduct on-farm hazard communication training for storage and retrieval of chemicals? Do you fit-test respirators?
10. **Confined space safety.** Are appropriate worker safety procedures being followed?
11. **Horizontal bunker site safety.** What procedures and equipment are needed?
12. **Noise/hearing protection.** Have you made engineering changes to reduce noise levels and to determine appropriate situations for workers to use hearing protection? **OSHA**

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Job Site Safety SOPs – *Think like Seattle, WA contractor*

- ◆ Pocket size “little red book” with rules
- ◆ No access to jobsite until go thru training & sign-off
- ◆ Once on site, hard hat with “sticker” required
- ◆ Zero tolerance for violations of rules
- ◆ Lesson to farmers: is your farm a playground or work site?
- ◆ Challenge: how maintain our “culture” AND be safe?



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Resources – Safety SOPs

- ◆ iAuditor – build checklists, conduct inspections, file reports
 - <http://sfty.io/q4Af/LOcHr6VzOx>
- ◆ Farm Safety Hazard Checklist
 - <http://fyi.uwex.edu/ag/safety/employer-resources/farm-hazard-inspection-checklists/>
- ◆ Great Plains Center for Ag Health
 - 10 health centers focused on farm safety/health
 - www.cdc.gov/niosh/oep/agctrhom.html

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Sample Apps – WA State Department of Labor and Industry

- ◆ *Good Observation, Near Miss and Accident Reporting*
 - Documents safety incidents in workplace
 - Uses: training, hazard recognition, risk analysis, process improvement
 - ◆ *Safe Me (Retail industry focused)*
 - Tool for on-boarding new employees
 - Uses: safety lessons, videos, hazard ID
- <https://ohsonline.com/articles/2017/02/27/wisha-touts-new-safety-apps.asp>

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Safety Models – Putting Principles into Practice
Progressive Ag Foundation (PAF)

- ◆ PAF supported by CHS Foundation
- ◆ Role model: Brian Kuhl, volunteer
- ◆ Father injured in fall on farm; recovered
- ◆ Organization hosts 400 safety days/yr for kids age 4-12
- ◆ What local resources can we tap in our local communities?



Break !!!!!

Enjoy the slide show...