GEAPS & Grain Journal Magazine's Grain Operations Webinar Series

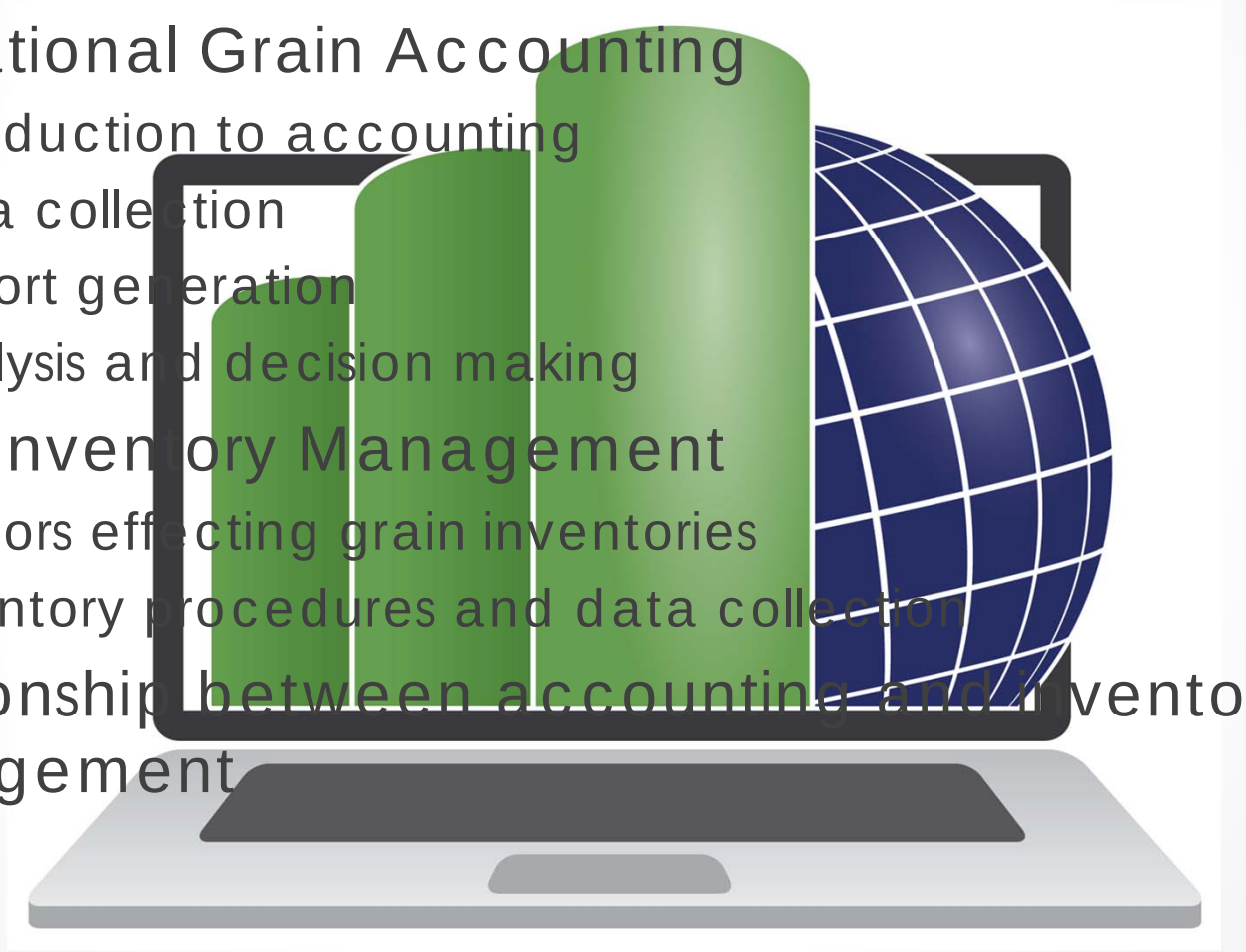
September 11, 2014

Grain Accounting and Inventory Management for Grain Operations Supervisors

Presenter:
Jim Voigt
President
JFV Solutions, Inc.
Mt Zion , IL

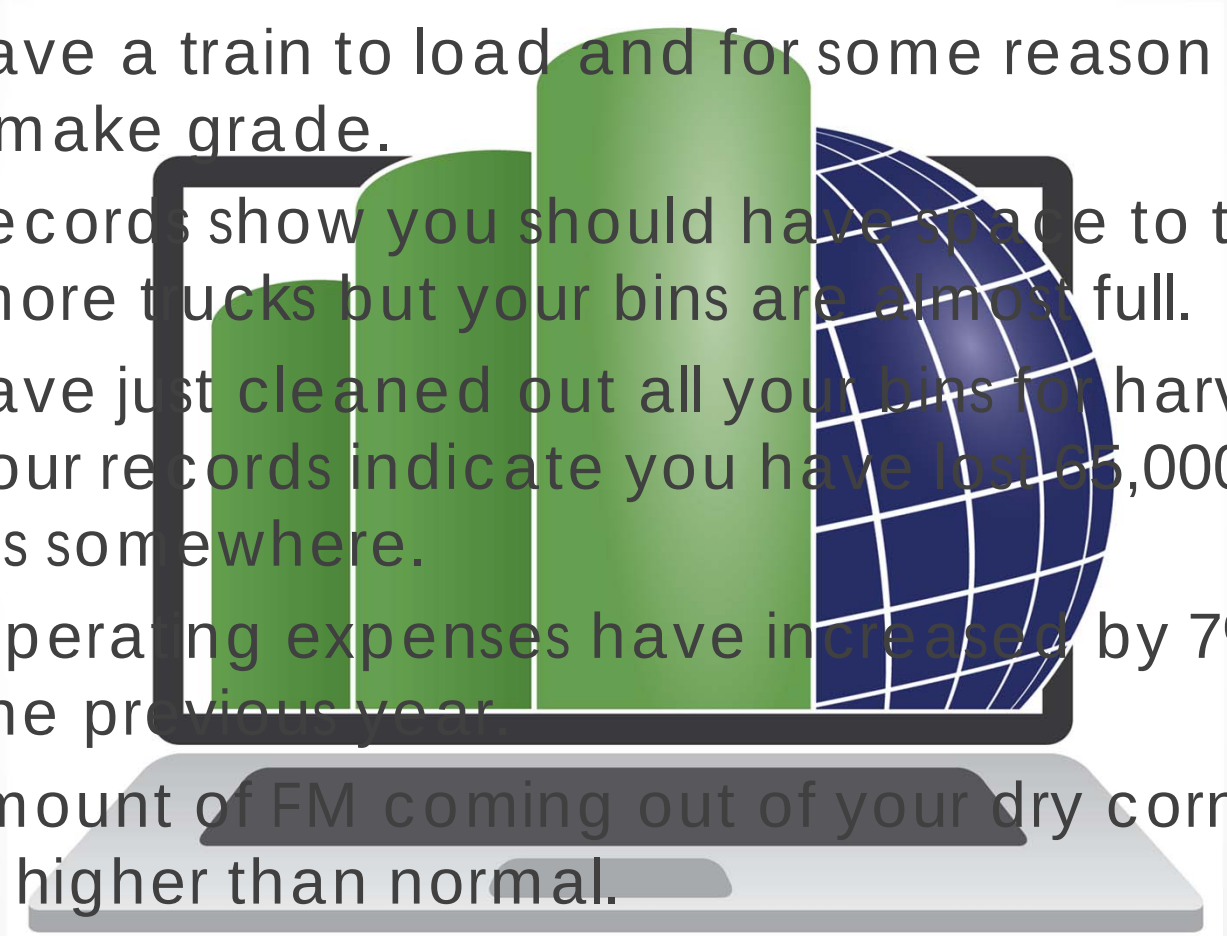
Outline

- Operational Grain Accounting
  - Introduction to accounting
  - Data collection
  - Report generation
  - Analysis and decision making
- Grain Inventory Management
  - Factors effecting grain inventories
  - Inventory procedures and data collection
- Relationship between accounting and inventory management



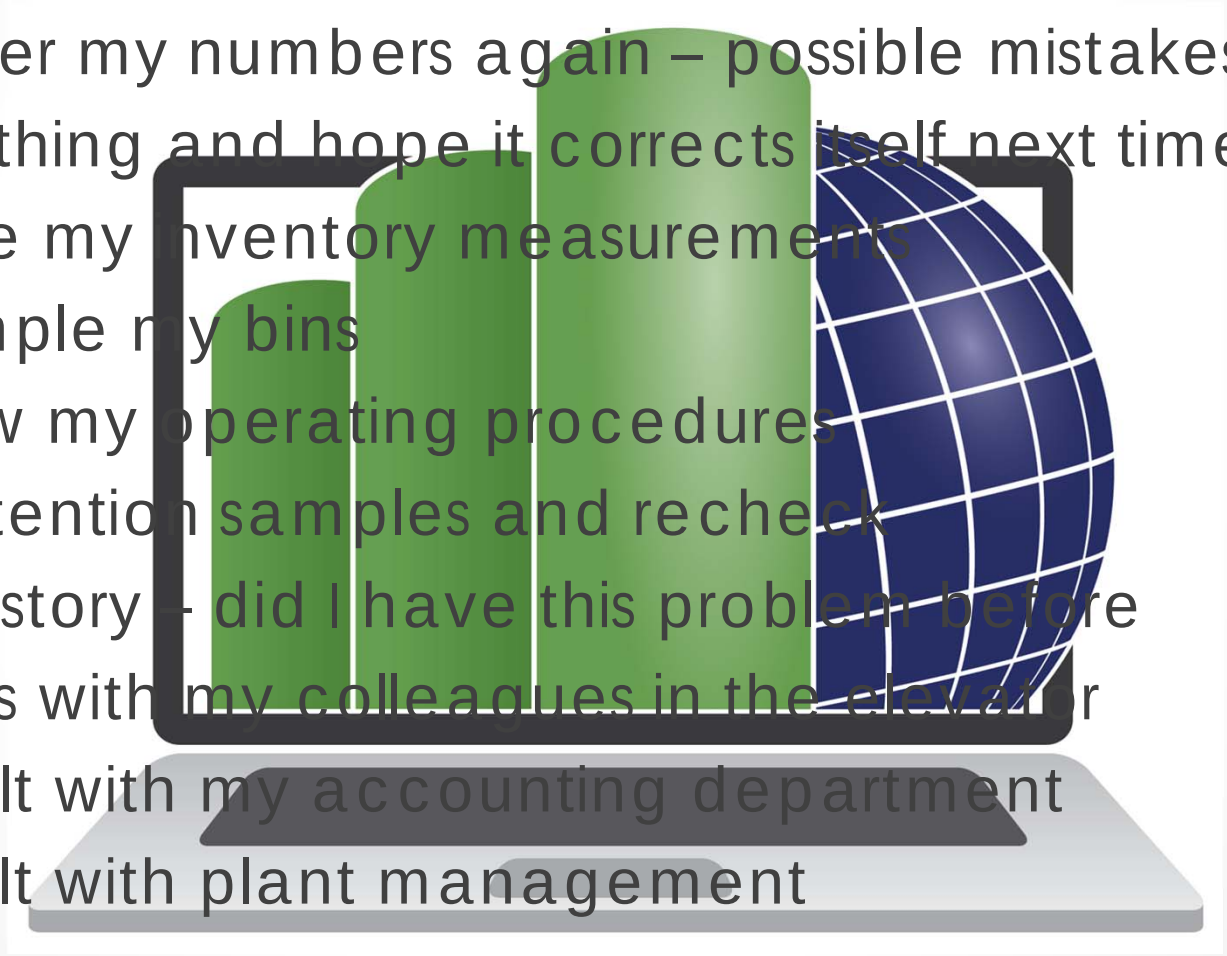
Have you ever experienced?

- You have a train to load and for some reason you can't make grade.
- Your records show you should have space to take in forty more trucks but your bins are almost full.
- You have just cleaned out all your bins for harvest and your records indicate you have lost 65,000 bushels somewhere.
- Your operating expenses have increased by 7% over the previous year.
- The amount of FM coming out of your dry corn bin seems higher than normal.



What do I do next?

- Go over my numbers again – possible mistakes
- Do nothing and hope it corrects itself next time
- Retake my inventory measurements
- Resample my bins
- Review my operating procedures
- Pull retention samples and recheck
- Past history – did I have this problem before
- Discuss with my colleagues in the elevator
- Consult with my accounting department
- Consult with plant management

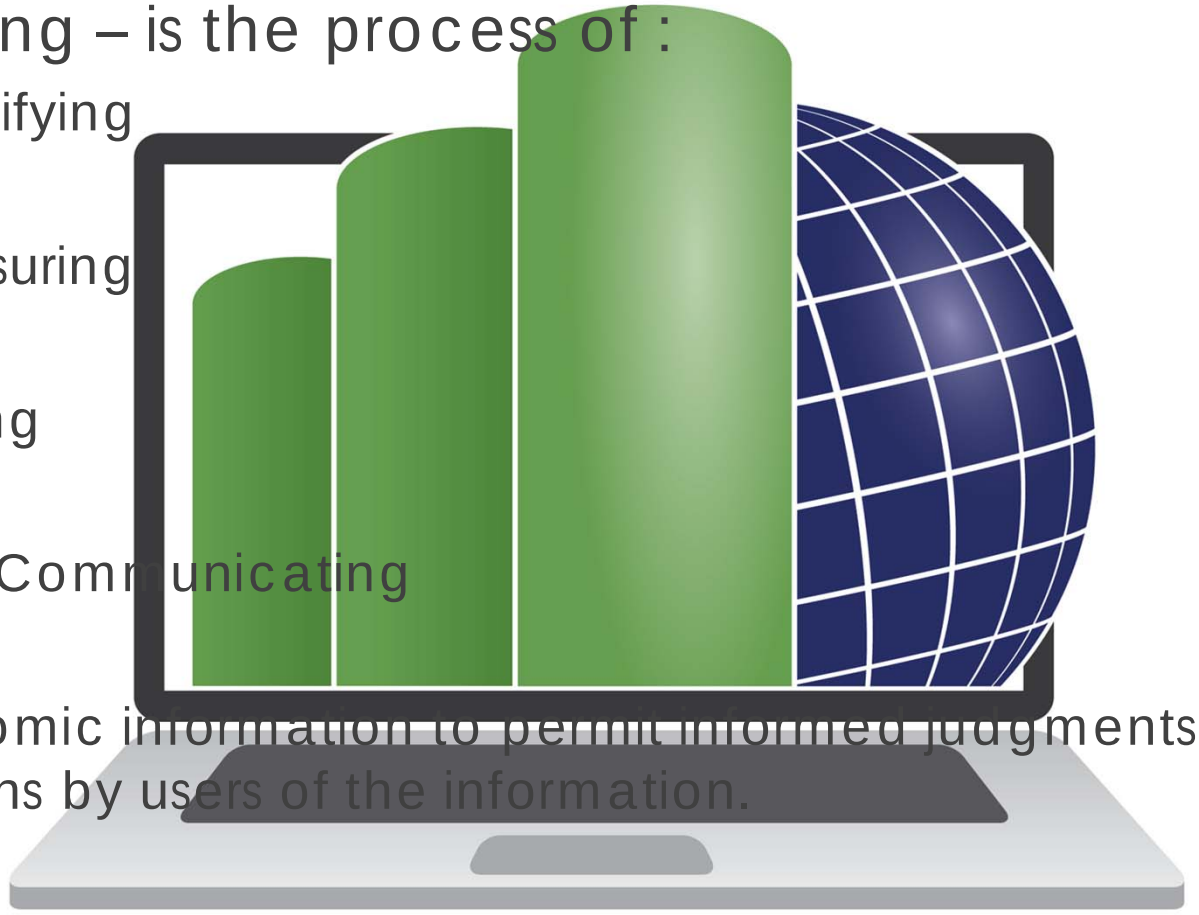



Accounting

Accounting – “ The Language of Business”

Accounting – is the process of :

- Identifying
- Measuring
- Sorting
- And Communicating



- economic information to permit informed judgments and decisions by users of the information.

Accounting Principles

Types of transactions:

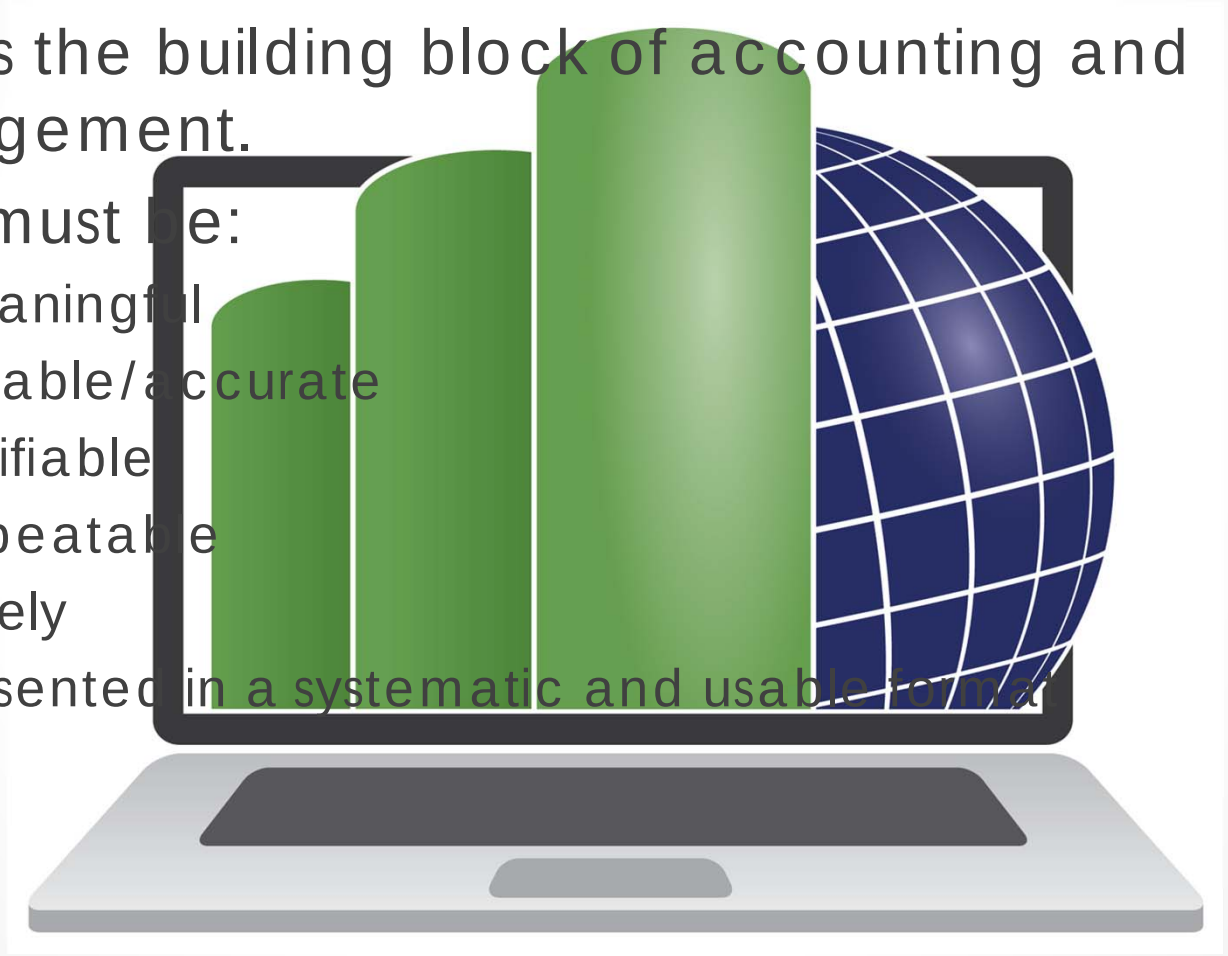
- Income
- Expense
- Capital

or

- Assets
- Liabilities
- Equity

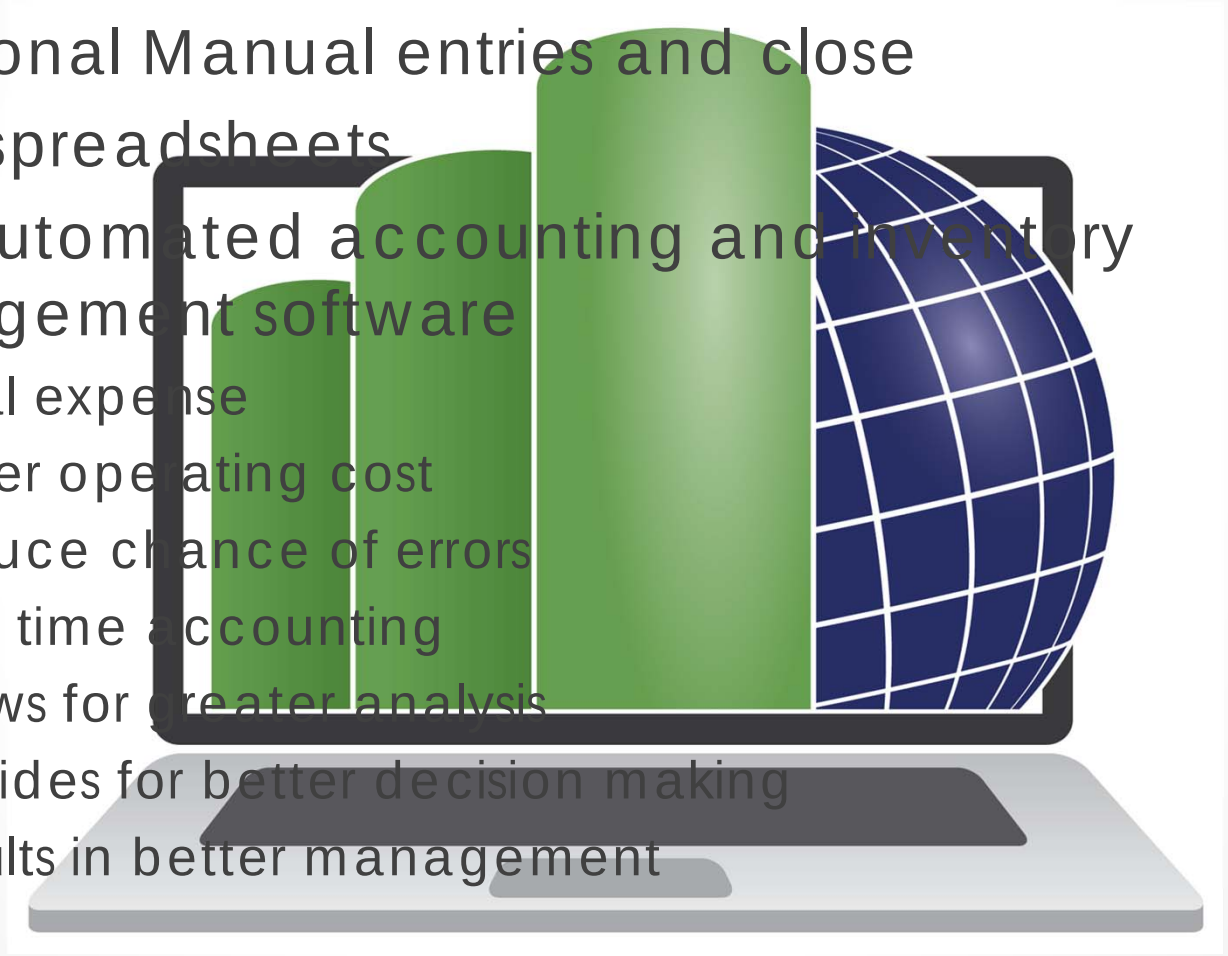
Accounting Principles

- Data is the building block of accounting and management.
- Data must be:
  1. Meaningful
  2. Reliable/accurate
  3. Verifiable
  4. Repeatable
  5. Timely
  6. Presented in a systematic and usable format



Accounting Systems

- Traditional Manual entries and close
- Excel spreadsheets
- Fully automated accounting and inventory management software
  - Initial expense
  - Lower operating cost
  - Reduce chance of errors
  - Real time accounting
  - Allows for greater analysis
  - Provides for better decision making
  - Results in better management



Sourcing and Accounting of Raw Data

What are Manageable Expenses and Inventories?

- Manageable expenses or inventories are those items you have direct control over and would include items such as:

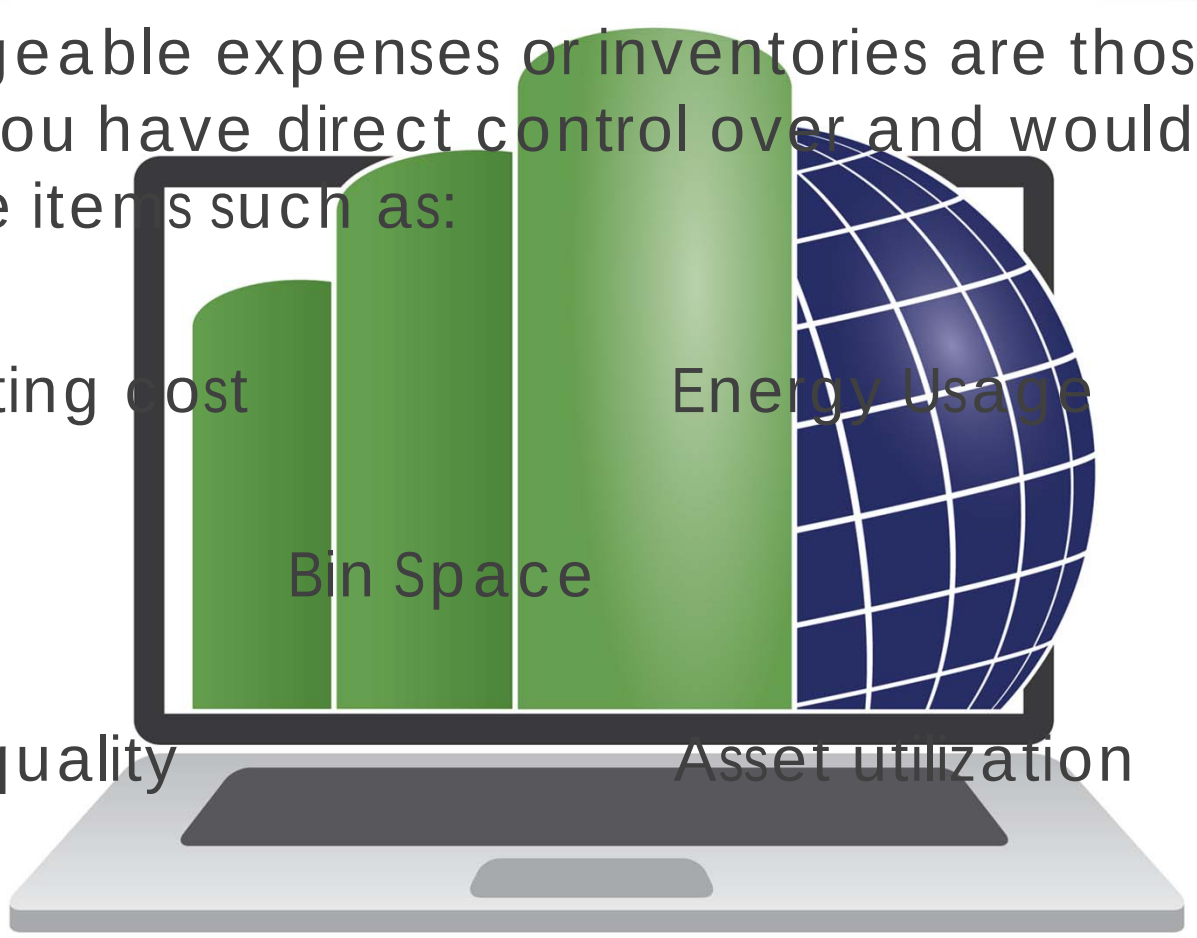
Operating cost

Energy Usage

Bin Space

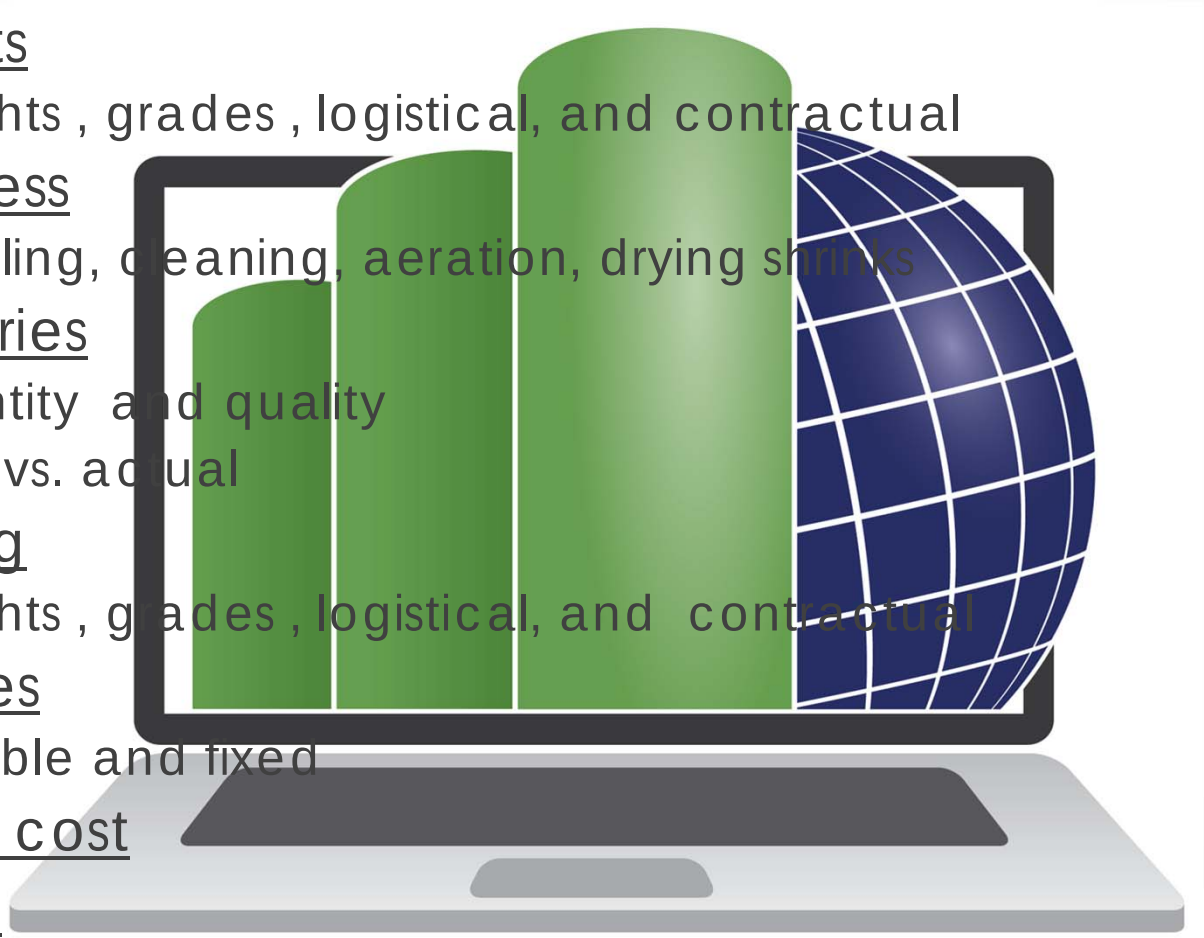
Grain quality

Asset utilization

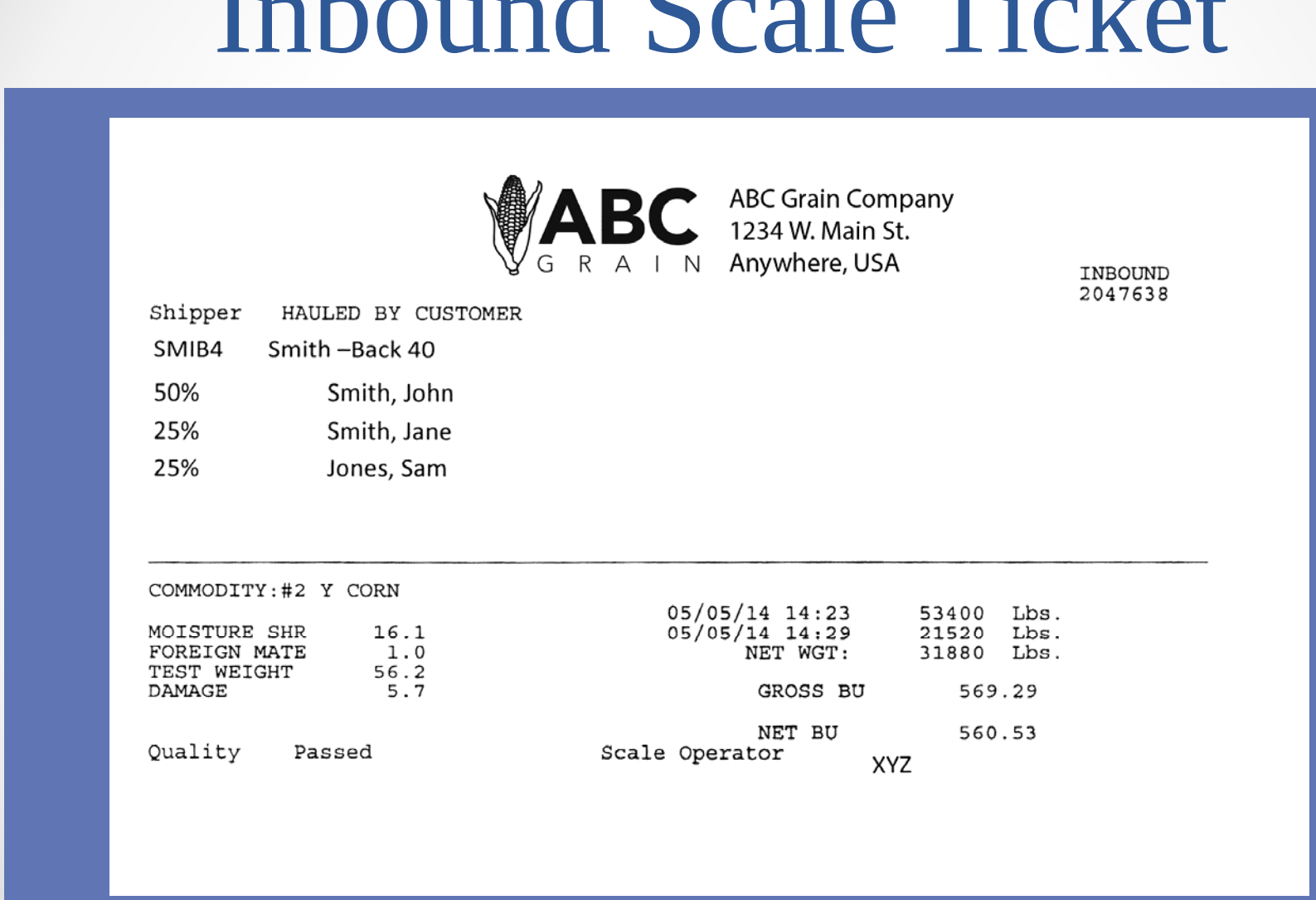


Source Data Documents

- Receipts
  - Weights , grades , logistical, and contractual
- In-process
  - Handling, cleaning, aeration, drying shrinks
- Inventories
  - Quantity and quality
  - Book vs. actual
- Shipping
  - Weights , grades , logistical, and contractual
- Expenses
  - Variable and fixed
- Capital cost
- Income



Inbound Scale Ticket



ABC GRAIN

ABC Grain Company
1234 W. Main St.
Anywhere, USA

INBOUND
2047638

Shipper HAULED BY CUSTOMER

SMIB4 Smith –Back 40

50% Smith, John

25% Smith, Jane

25% Jones, Sam

COMMODITY:#2 Y CORN

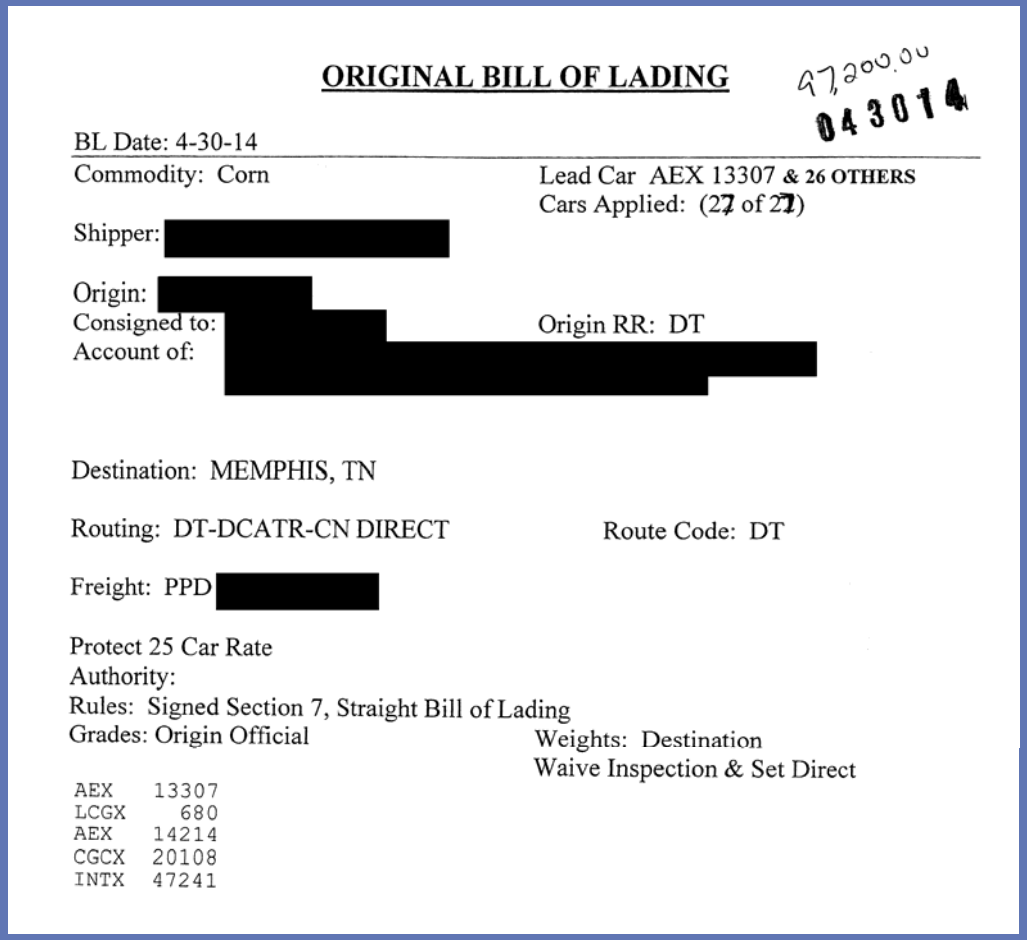
MOISTURE SHR	16.1
FOREIGN MATE	1.0
TEST WEIGHT	56.2
DAMAGE	5.7

05/05/14 14:23	53400	Lbs.
05/05/14 14:29	21520	Lbs.
NET WGT:	31880	Lbs.
GROSS BU	569.29	
NET BU	560.53	

Quality Passed

Scale Operator XYZ

Bill of Lading



ORIGINAL BILL OF LADING

47,200.00
043014

BL Date: 4-30-14

Commodity: Corn

Lead Car AEX 13307 & 26 OTHERS
Cars Applied: (27 of 27)

Shipper: [redacted]

Origin: [redacted]
Consigned to: [redacted]
Account of: [redacted]

Origin RR: DT

Destination: MEMPHIS, TN

Routing: DT-DCATR-CN DIRECT

Route Code: DT

Freight: PPD [redacted]

Protect 25 Car Rate
Authority:
Rules: Signed Section 7, Straight Bill of Lading
Grades: Origin Official

Weights: Destination
Waive Inspection & Set Direct

AEX 13307
LCGX 680
AEX 14214
CGCX 20108
INTX 47241

Grade Sheet

Grain Inspection Grades

	ID	U.S. No.	TW	M	DKT	BCFM	AFLATOXIN
21851	INTX 75970	3YC	57.2	15.3	1.4	3.2	
21852	CGCX 20287	3	59.1	14.0	0.7	4.0	
21853	INTX 77026	3	58.8	13.6	1.6	3.6	<5PPB
21854	AEX 13391	3	58.8	13.8	0.6	4.0	
21855	LCGX 739	2	57.9	12.9	1.2	2.5	
21856	PMRX 150824	1	58.2	12.5	1.8	1.4	
21857	INTX 75960	1	58.3	12.6	1.1	1.6	
21858	AEX 11899	1	57.9	12.7	1.1	1.6	<5PPB
21859	AEX 13307	1	58.3	14.1	1.0	1.8	
21860	LCGX 680	1	58.1	14.2	0.7	0.8	

Temperature Cable Report

ABC GRAIN

Remarks _____

_____

Location ____

Bin # ____

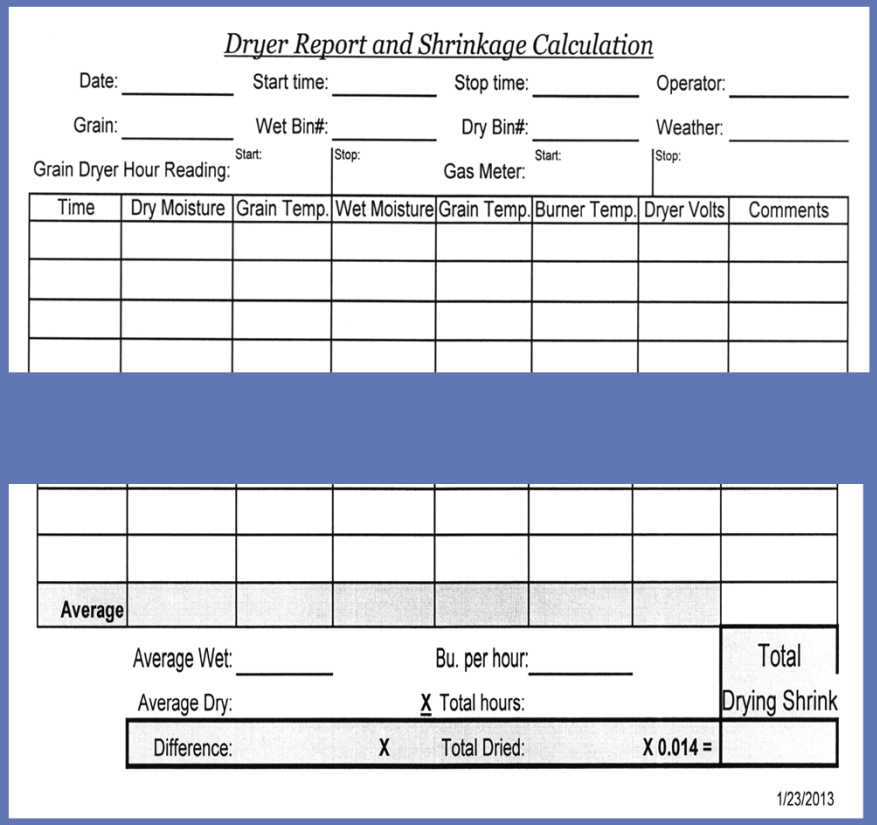
Cable No. ____

Spacing ____

Number One (1) Thermocouple 1.5 foot from Bottom of Cable

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Dryer Operating Report



Dryer Report and Shrinkage Calculation

Date: _____ Start time: _____ Stop time: _____ Operator: _____

Grain: _____ Wet Bin#: _____ Dry Bin#: _____ Weather: _____

Grain Dryer Hour Reading: Start: | Stop: Gas Meter: Start: | Stop:

Time	Dry Moisture	Grain Temp.	Wet Moisture	Grain Temp.	Burner Temp.	Dryer Volts	Comments
Average							

Average Wet: _____ Bu. per hour: _____ Total Drying Shrink

Average Dry: X Total hours:

Difference: X Total Dried: X 0.014 =

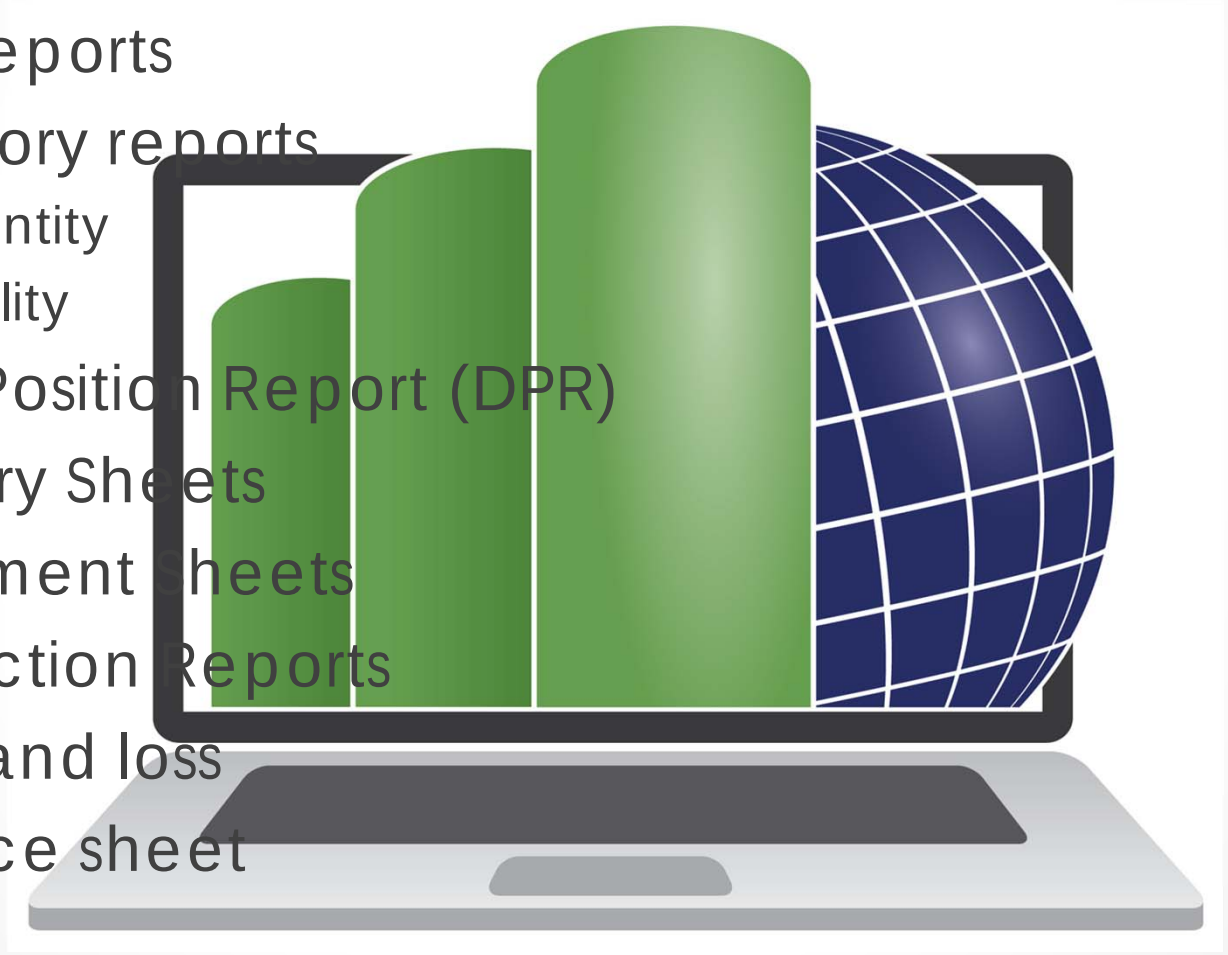
1/23/2013

Importance of Source Documents

- Provide input for contractual activities
- Component of customer service and satisfaction
- Provide input for regulatory activities
- Provide input for managerial reports
- Basis of management analysis and decisions
  - Critical for continuous improvement
  - Critical for profitability
  - Critical for sustainability

Typical Management Reports

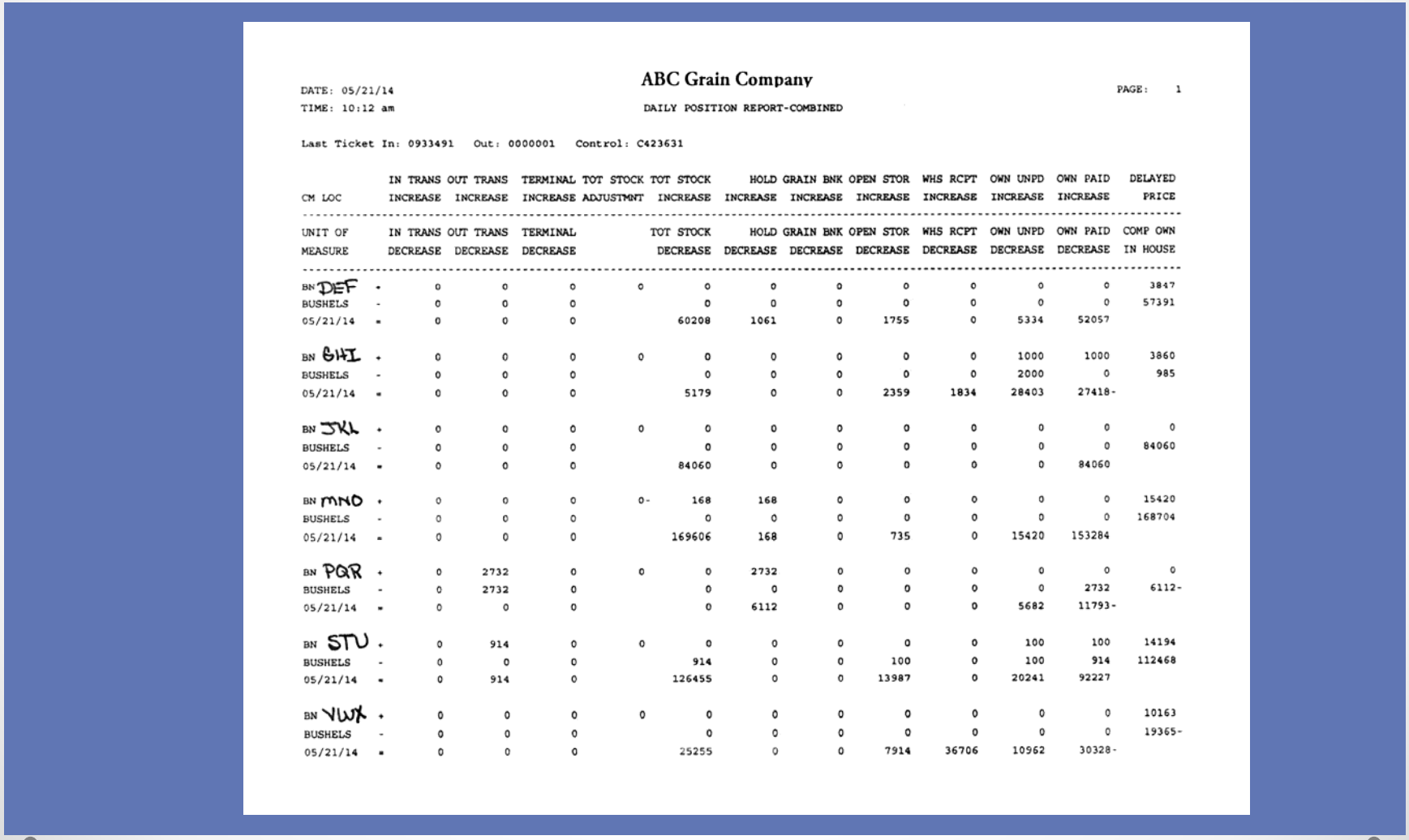
- Cost reports
- Inventory reports
  - Quantity
  - Quality
- Daily Position Report (DPR)
- Delivery Sheets
- Settlement Sheets
- Production Reports
- Profit and loss
- Balance sheet



Operating Expenses

Acct #	Labor	This Month	Month $ Cost /bu.
xxxx	Salaried		
	Hourly		
	Overtime		
	Maintenance		
	Maintenance Overtime		
	Contracted		
	Payroll Taxes		
	Benefits		
Acct #	**Plant Expenses**		
	Maintenance Repairs		
	Plant Supplies		
	Office Supplies		
	Utilities		
	Telephone and data services		
	Vehicle expense		
	Postage		
	Data Processing		
	Travel and Meetings		
	Dues and Subscriptions		
	Trucking Expense		
	Rail Expenses (demurrage, switching, etc)		
	Barge Expense		
	License and Fees		
	Permits		
	Professional Fees		
	Advertising		
	Misc.		
Acct #	**Fixed Expenses**		
	Rent / Lease Expense		
	Interest Expense		
	Insurance		
	Property Taxes		
	Depreciation		

Daily Position Report



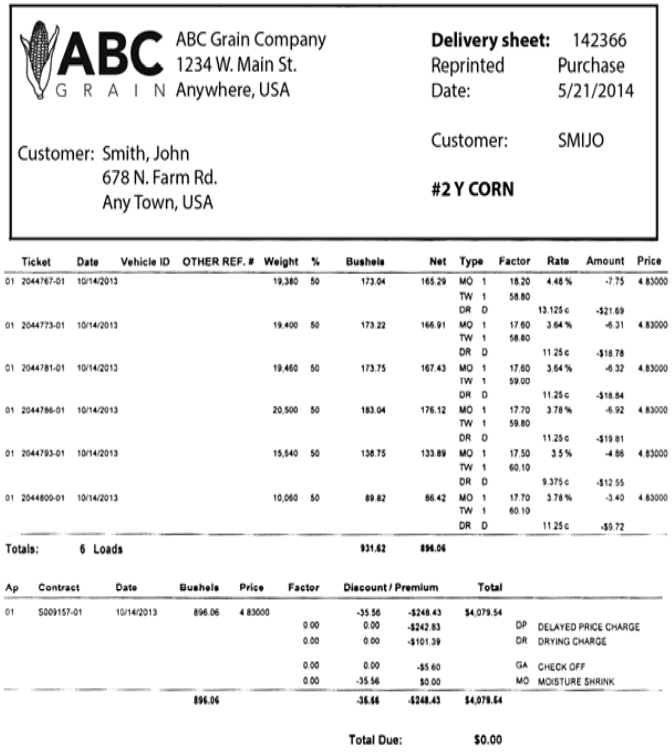
ABC Grain Company

DATE: 05/21/14 — PAGE: 1
TIME: 10:12 am
DAILY POSITION REPORT-COMBINED

Last Ticket In: 0933491 Out: 0000001 Control: C423631

CM LOC		IN TRANS INCREASE	OUT TRANS INCREASE	TERMINAL INCREASE	TOT STOCK ADJUSTMNT	TOT STOCK INCREASE	HOLD INCREASE	GRAIN BNK INCREASE	OPEN STOR INCREASE	WHS RCPT INCREASE	OWN UNPD INCREASE	OWN PAID INCREASE	DELAYED PRICE
UNIT OF MEASURE		IN TRANS DECREASE	OUT TRANS DECREASE	TERMINAL DECREASE		TOT STOCK DECREASE	HOLD DECREASE	GRAIN BNK DECREASE	OPEN STOR DECREASE	WHS RCPT DECREASE	OWN UNPD DECREASE	OWN PAID DECREASE	COMP OWN IN HOUSE
BN DEF	+	0	0	0	0	0	0	0	0	0	0	0	3847
BUSHELS	-	0	0	0		0	0	0	0	0	0	0	57391
05/21/14	=	0	0	0		60208	1061	0	1755	0	5334	52057	
BN GHI	+	0	0	0	0	0	0	0	0	0	1000	1000	3860
BUSHELS	-	0	0	0		0	0	0	0	0	2000	0	985
05/21/14	=	0	0	0		5179	0	0	2359	1834	28403	27418-	
BN JKL	+	0	0	0	0	0	0	0	0	0	0	0	0
BUSHELS	-	0	0	0		0	0	0	0	0	0	0	84060
05/21/14	=	0	0	0		84060	0	0	0	0	0	84060	
BN MNO	+	0	0	0	0-	168	168	0	0	0	0	0	15420
BUSHELS	-	0	0	0		0	0	0	0	0	0	0	168704
05/21/14	=	0	0	0		169606	168	0	735	0	15420	153284	
BN PQR	+	0	2732	0	0	0	2732	0	0	0	0	0	0
BUSHELS	-	0	2732	0		0	0	0	0	0	0	2732	6112-
05/21/14	=	0	0	0		0	6112	0	0	0	5682	11793-	
BN STU	+	0	914	0	0	0	0	0	0	0	100	100	14194
BUSHELS	-	0	0	0		914	0	0	100	0	100	914	112468
05/21/14	=	0	914	0		126455	0	0	13987	0	20241	92227	
BN VWX	+	0	0	0	0	0	0	0	0	0	0	0	10163
BUSHELS	-	0	0	0		0	0	0	0	0	0	0	19365-
05/21/14	=	0	0	0		25255	0	0	7914	36706	10962	30328-	

Delivery/Settlement Sheets



ABC GRAIN

ABC Grain Company
1234 W. Main St.
Anywhere, USA

Delivery sheet: 142366
Reprinted Purchase
Date: 5/21/2014

Customer: Smith, John
678 N. Farm Rd.
Any Town, USA

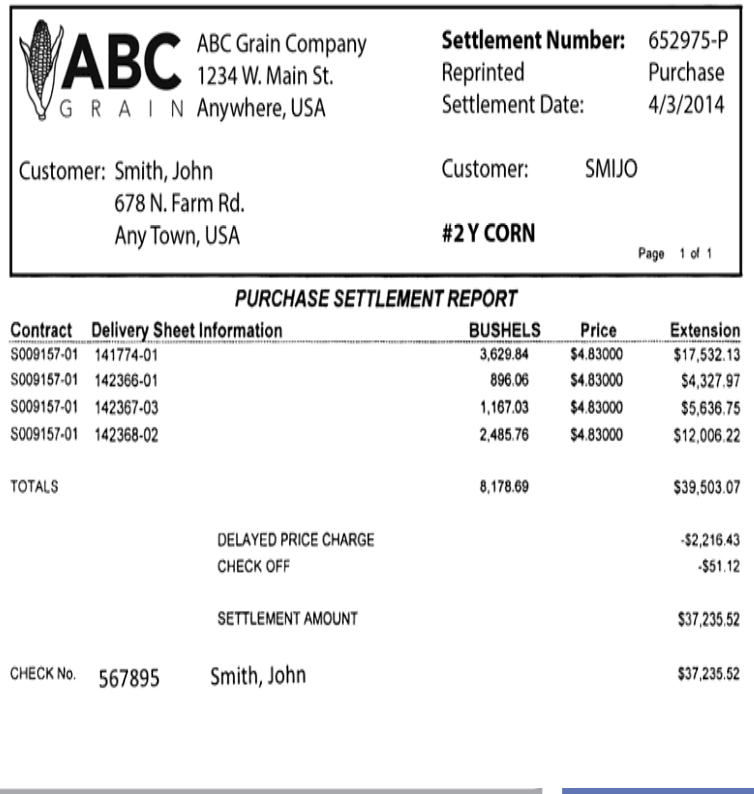
Customer: SMIJO

#2 Y CORN

	Ticket	Date	Vehicle ID	OTHER REF. #	Weight	%	Bushels	Net	Type		Factor	Rate	Amount	Price
01	2044767-01	10/14/2013			19,380	50	173.04	165.29	MO	1	18.20	4.48 %	-7.75	4.83000
									TW	1	58.80			
									DR	D		13.125 c	-$21.69	
01	2044773-01	10/14/2013			19,400	50	173.22	166.91	MO	1	17.60	3.64 %	-6.31	4.83000
									TW	1	58.80			
									DR	D		11.25 c	-$18.78	
01	2044781-01	10/14/2013			19,460	50	173.75	167.43	MO	1	17.60	3.64 %	-6.32	4.83000
									TW	1	59.00			
									DR	D		11.25 c	-$18.84	
01	2044786-01	10/14/2013			20,500	50	183.04	176.12	MO	1	17.70	3.78 %	-6.92	4.83000
									TW	1	59.80			
									DR	D		11.25 c	-$19.81	
01	2044793-01	10/14/2013			15,540	50	138.75	133.89	MO	1	17.50	3.5 %	-4.86	4.83000
									TW	1	60.10			
									DR	D		9.375 c	-$12.55	
01	2044800-01	10/14/2013			10,060	50	89.82	86.42	MO	1	17.70	3.78 %	-3.40	4.83000
									TW	1	60.10			
									DR	D		11.25 c	-$9.72	
Totals:		**6 Loads**					**931.62**	**896.06**						

Ap	Contract	Date	Bushels	Price	Factor	Discount / Premium		Total		
01	S009157-01	10/14/2013	896.06	4.83000		-35.56	-$248.43	$4,079.54		
					0.00	0.00	-$242.83		DP	DELAYED PRICE CHARGE
					0.00	0.00	-$101.39		DR	DRYING CHARGE
					0.00	0.00	-$5.60		GA	CHECK OFF
					0.00	-35.56	$0.00		MO	MOISTURE SHRINK
			896.06			**-35.56**	**-$248.43**	**$4,079.54**		

Total Due: **$0.00**



ABC GRAIN

ABC Grain Company
1234 W. Main St.
Anywhere, USA

Settlement Number: 652975-P
Reprinted Purchase
Settlement Date: 4/3/2014

Customer: Smith, John
678 N. Farm Rd.
Any Town, USA

Customer: SMIJO

#2 Y CORN

Page 1 of 1

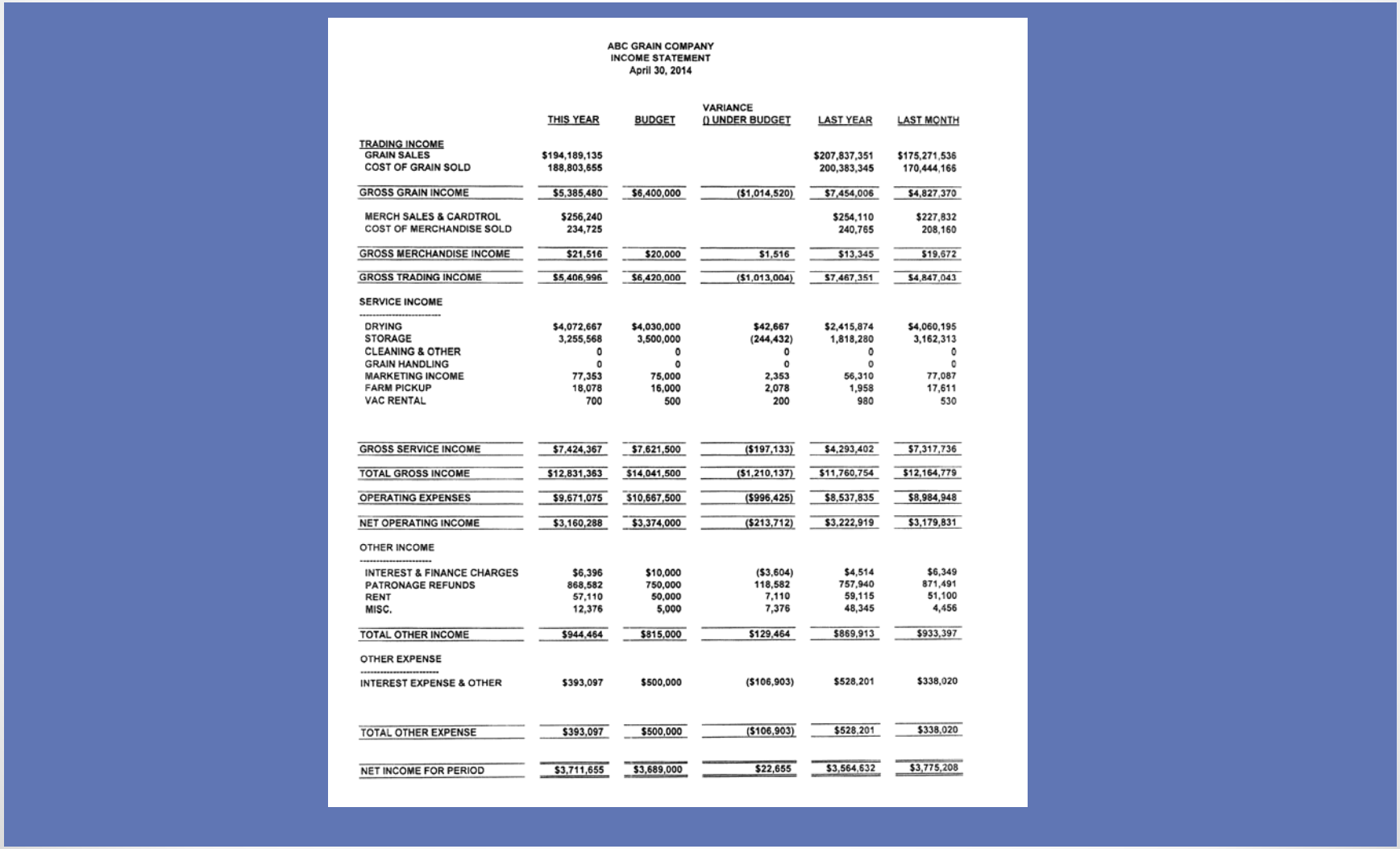
PURCHASE SETTLEMENT REPORT

Contract	Delivery Sheet Information	BUSHELS	Price	Extension
S009157-01	141774-01	3,629.84	$4.83000	$17,532.13
S009157-01	142366-01	896.06	$4.83000	$4,327.97
S009157-01	142367-03	1,167.03	$4.83000	$5,636.75
S009157-01	142368-02	2,485.76	$4.83000	$12,006.22
TOTALS		8,178.69		$39,503.07

DELAYED PRICE CHARGE	-$2,216.43
CHECK OFF	-$51.12
SETTLEMENT AMOUNT	$37,235.52

CHECK No. 567895 Smith, John $37,235.52

Income Statement

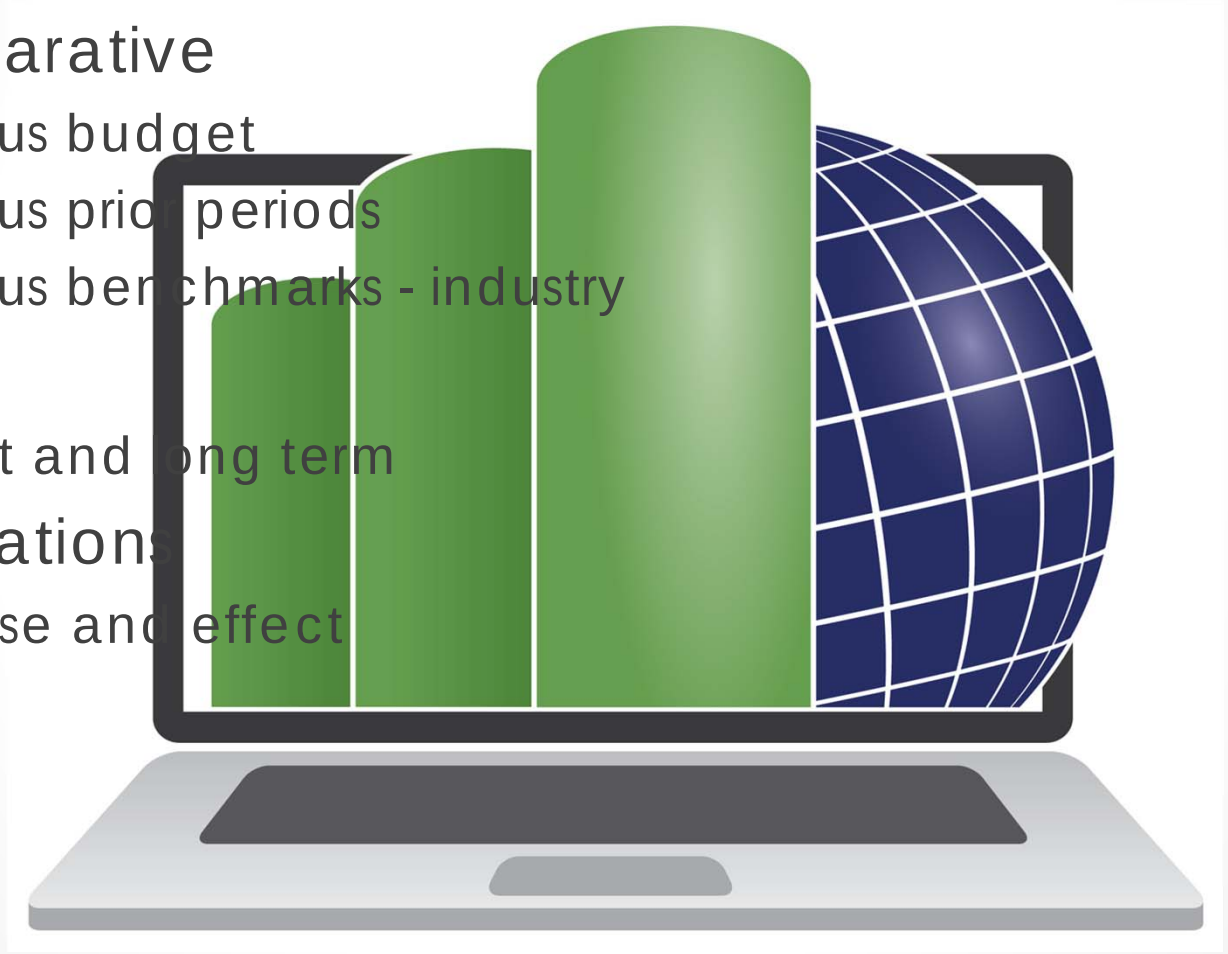


ABC GRAIN COMPANY
INCOME STATEMENT
April 30, 2014

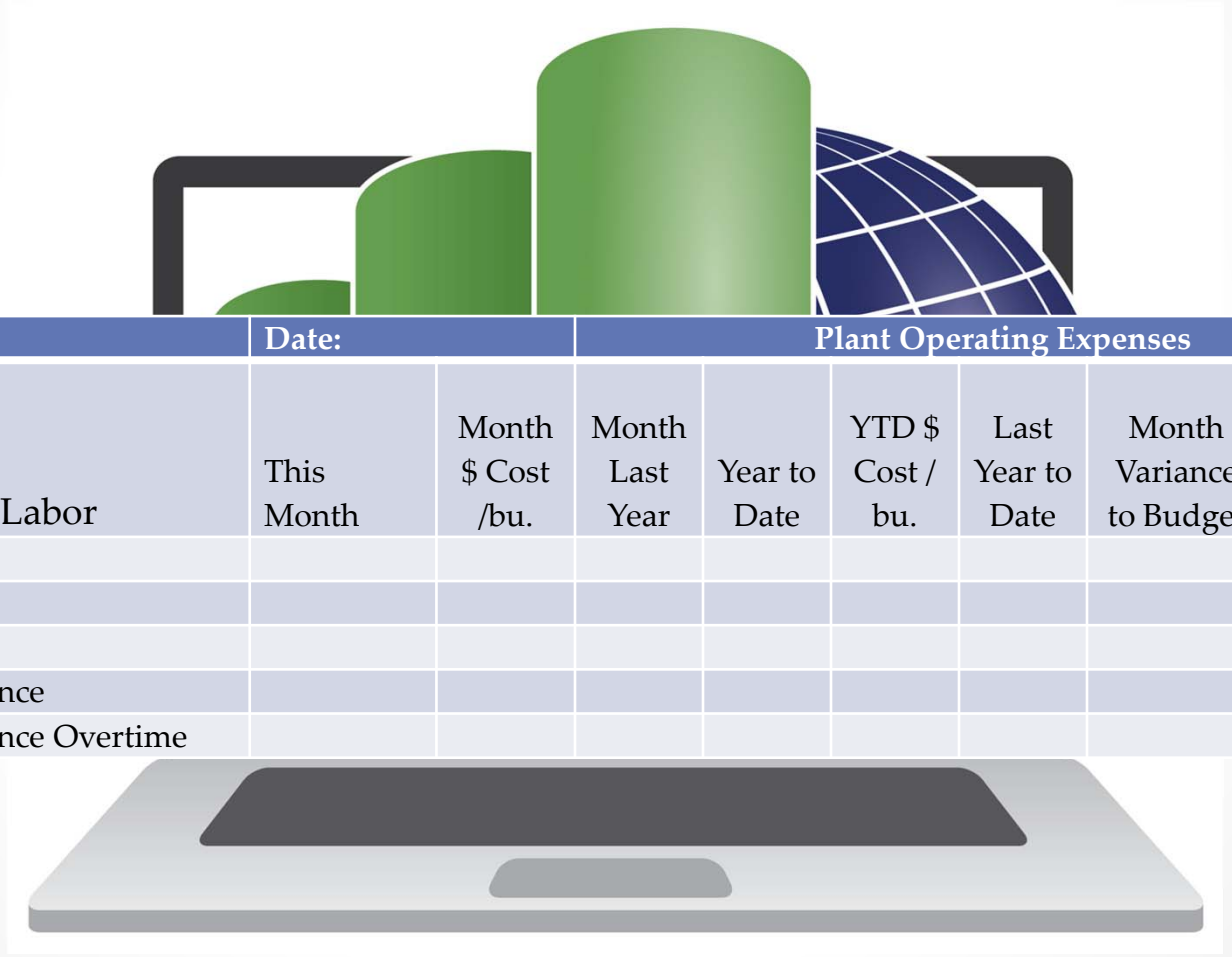
	THIS YEAR	BUDGET	VARIANCE () UNDER BUDGET	LAST YEAR	LAST MONTH
TRADING INCOME					
GRAIN SALES	$194,189,135			$207,837,351	$175,271,536
COST OF GRAIN SOLD	188,803,655			200,383,345	170,444,166
GROSS GRAIN INCOME	$5,385,480	$6,400,000	($1,014,520)	$7,454,006	$4,827,370
MERCH SALES & CARDTROL	$256,240			$254,110	$227,832
COST OF MERCHANDISE SOLD	234,725			240,765	208,160
GROSS MERCHANDISE INCOME	$21,516	$20,000	$1,516	$13,345	$19,672
GROSS TRADING INCOME	$5,406,996	$6,420,000	($1,013,004)	$7,467,351	$4,847,043
SERVICE INCOME					
DRYING	$4,072,667	$4,030,000	$42,667	$2,415,874	$4,060,195
STORAGE	3,255,568	3,500,000	(244,432)	1,818,280	3,162,313
CLEANING & OTHER	0	0	0	0	0
GRAIN HANDLING	0	0	0	0	0
MARKETING INCOME	77,353	75,000	2,353	56,310	77,087
FARM PICKUP	18,078	16,000	2,078	1,958	17,611
VAC RENTAL	700	500	200	980	530
GROSS SERVICE INCOME	$7,424,367	$7,621,500	($197,133)	$4,293,402	$7,317,736
TOTAL GROSS INCOME	$12,831,363	$14,041,500	($1,210,137)	$11,760,754	$12,164,779
OPERATING EXPENSES	$9,671,075	$10,667,500	($996,425)	$8,537,835	$8,984,948
NET OPERATING INCOME	$3,160,288	$3,374,000	($213,712)	$3,222,919	$3,179,831
OTHER INCOME					
INTEREST & FINANCE CHARGES	$6,396	$10,000	($3,604)	$4,514	$6,349
PATRONAGE REFUNDS	868,582	750,000	118,582	757,940	871,491
RENT	57,110	50,000	7,110	59,115	51,100
MISC.	12,376	5,000	7,376	48,345	4,456
TOTAL OTHER INCOME	$944,464	$815,000	$129,464	$869,913	$933,397
OTHER EXPENSE					
INTEREST EXPENSE & OTHER	$393,097	$500,000	($106,903)	$528,201	$338,020
TOTAL OTHER EXPENSE	$393,097	$500,000	($106,903)	$528,201	$338,020
NET INCOME FOR PERIOD	$3,711,655	$3,689,000	$22,655	$3,564,632	$3,775,208

Analysis

- Comparative
  - Versus budget
  - Versus prior periods
  - Versus benchmarks - industry
- Trends
  - Short and long term
- Correlations
  - Cause and effect



Operating Expenses



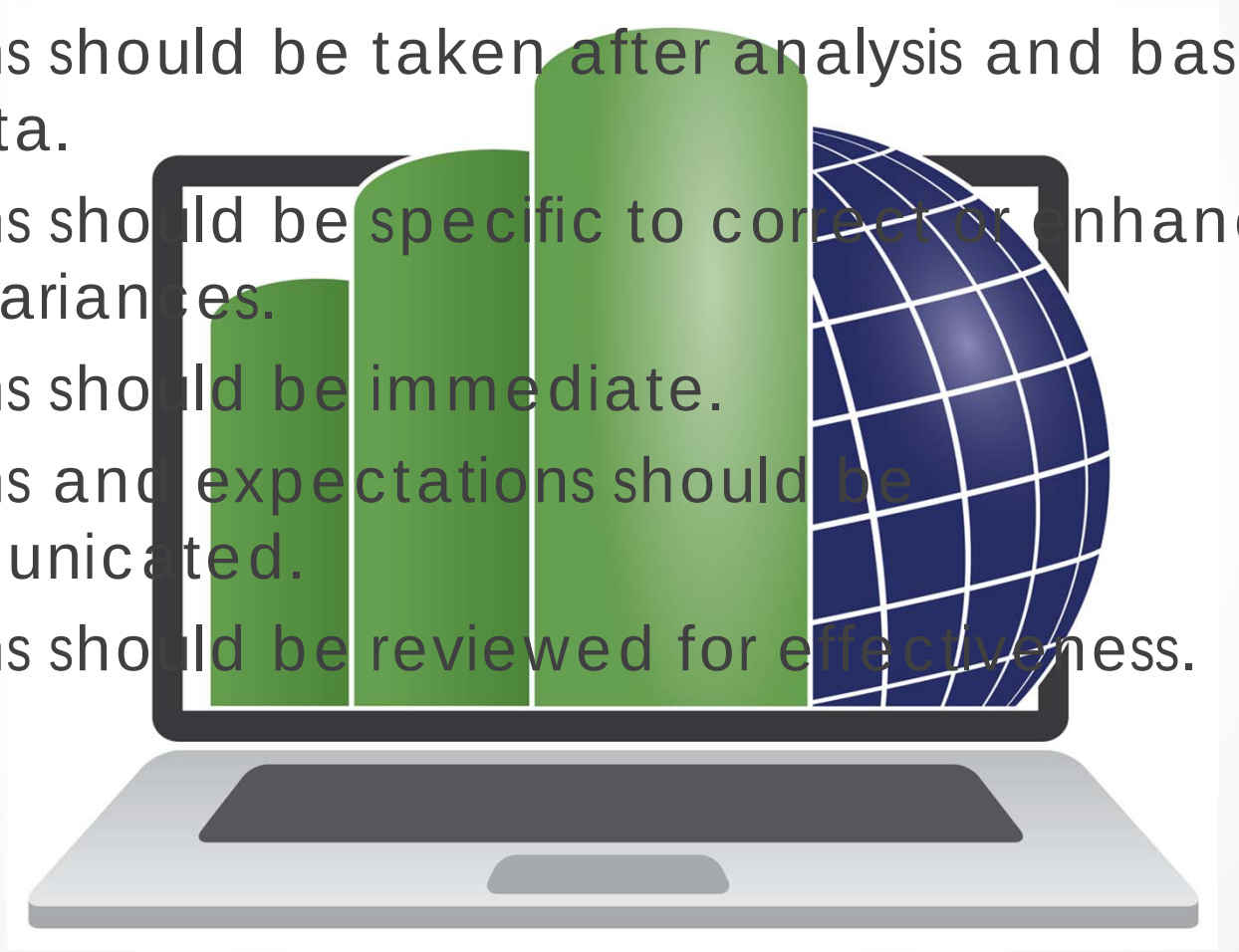
Location:		Date:		Plant Operating Expenses					
Acct #	Labor	This Month	Month $ Cost /bu.	Month Last Year	Year to Date	YTD $ Cost / bu.	Last Year to Date	Month Variance to Budget	YTD Variance to Budget
xxxx	Salaried								
	Hourly								
	Overtime								
	Maintenance								
	Maintenance Overtime								

Management Action

- Compare performance against business plan
  Accept and acknowledge performance **or**
- Take action on manageable items not meeting expectations **or**
- Establish new goals or acceptable performance
- Share expectations and delegate task to achieve desired results

Actions

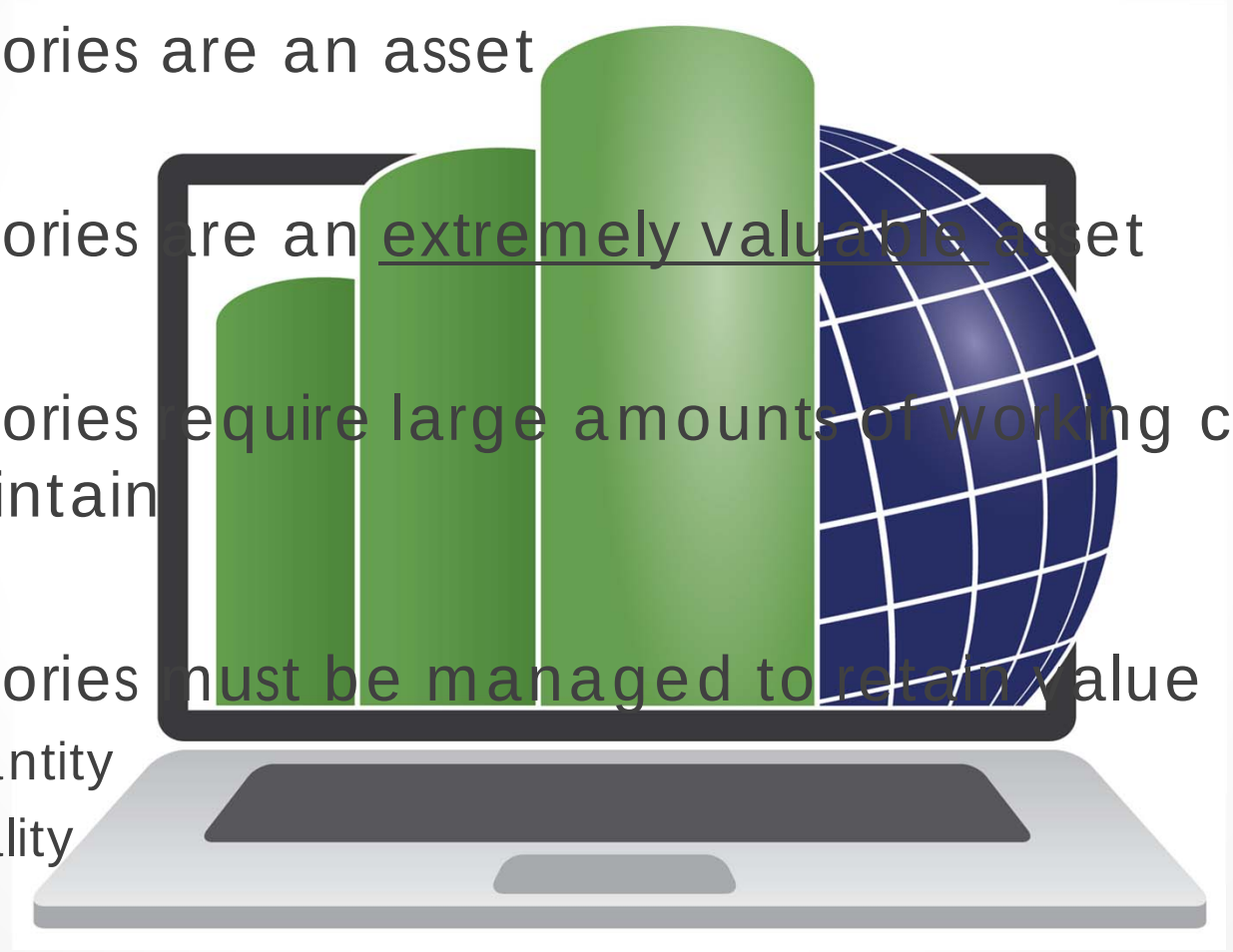
- Actions should be taken after analysis and based on data.
- Actions should be specific to correct or enhance plan variances.
- Actions should be immediate.
- Actions and expectations should be communicated.
- Actions should be reviewed for effectiveness.



Inventory Management

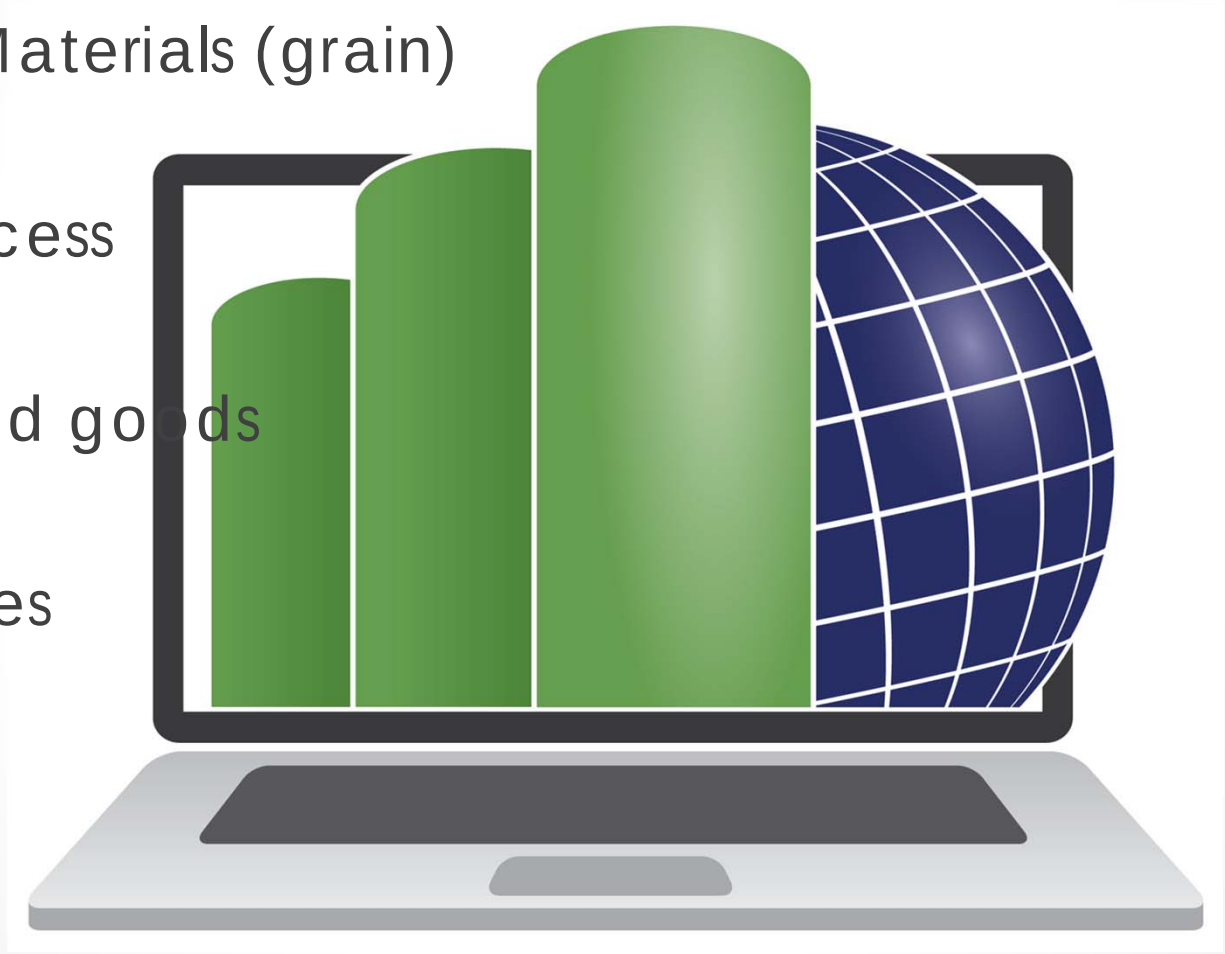
Asset Management

- Inventories are an asset
- Inventories are an extremely valuable asset
- Inventories require large amounts of working capital to maintain
- Inventories must be managed to retain value
  - Quantity
  - Quality



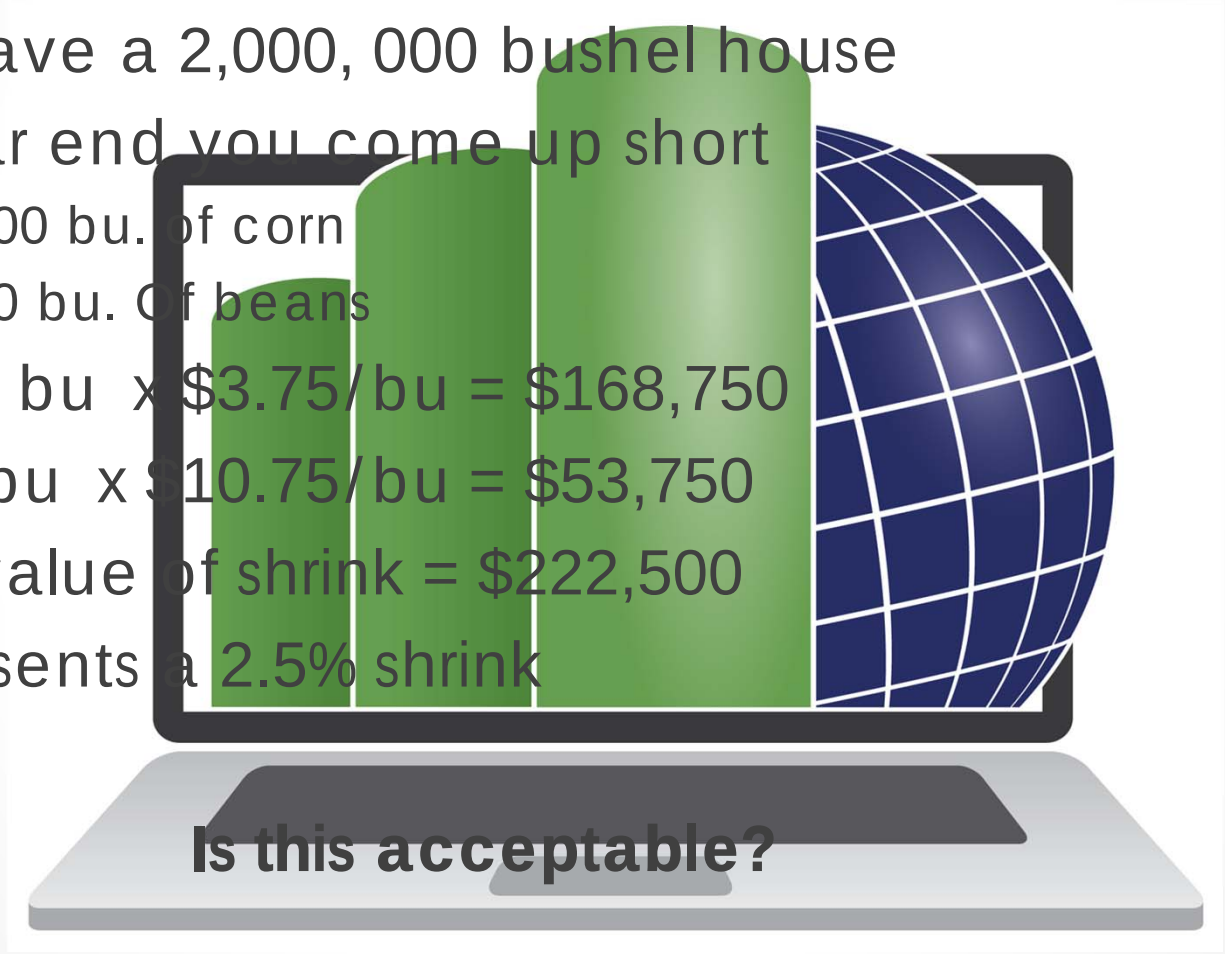
Types of Inventories

- Raw Materials (grain)
- In-process
- Finished goods
- Supplies
- Parts



Valuable Asset

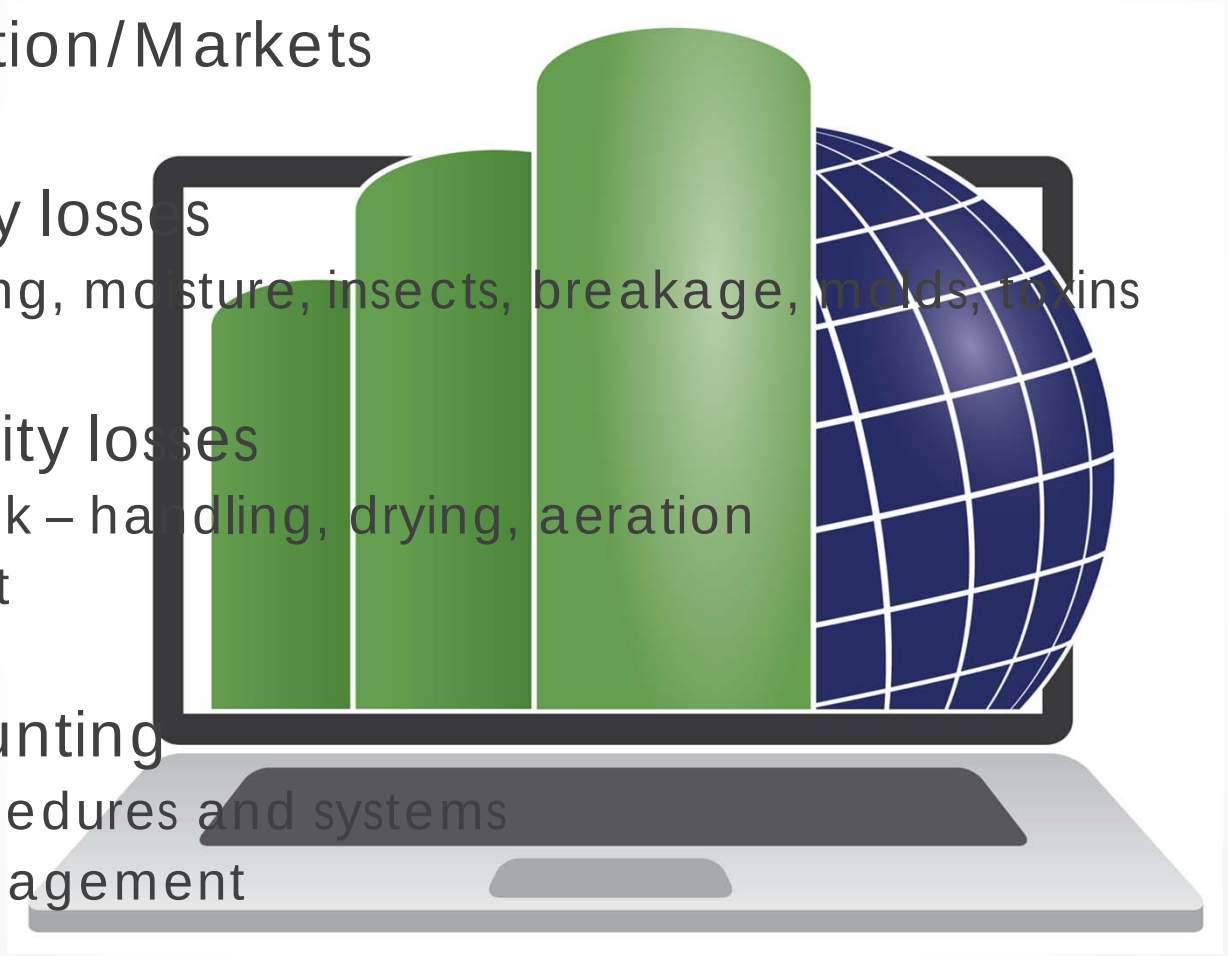
- You have a 2,000, 000 bushel house
- At year end you come up short
  - 45,000 bu. of corn
  - 5,000 bu. Of beans
- 45,000 bu x $3.75/bu = $168,750
- 5,000 bu x $10.75/bu = $53,750
- Total value of shrink = $222,500
- Represents a 2.5% shrink



Is this acceptable?

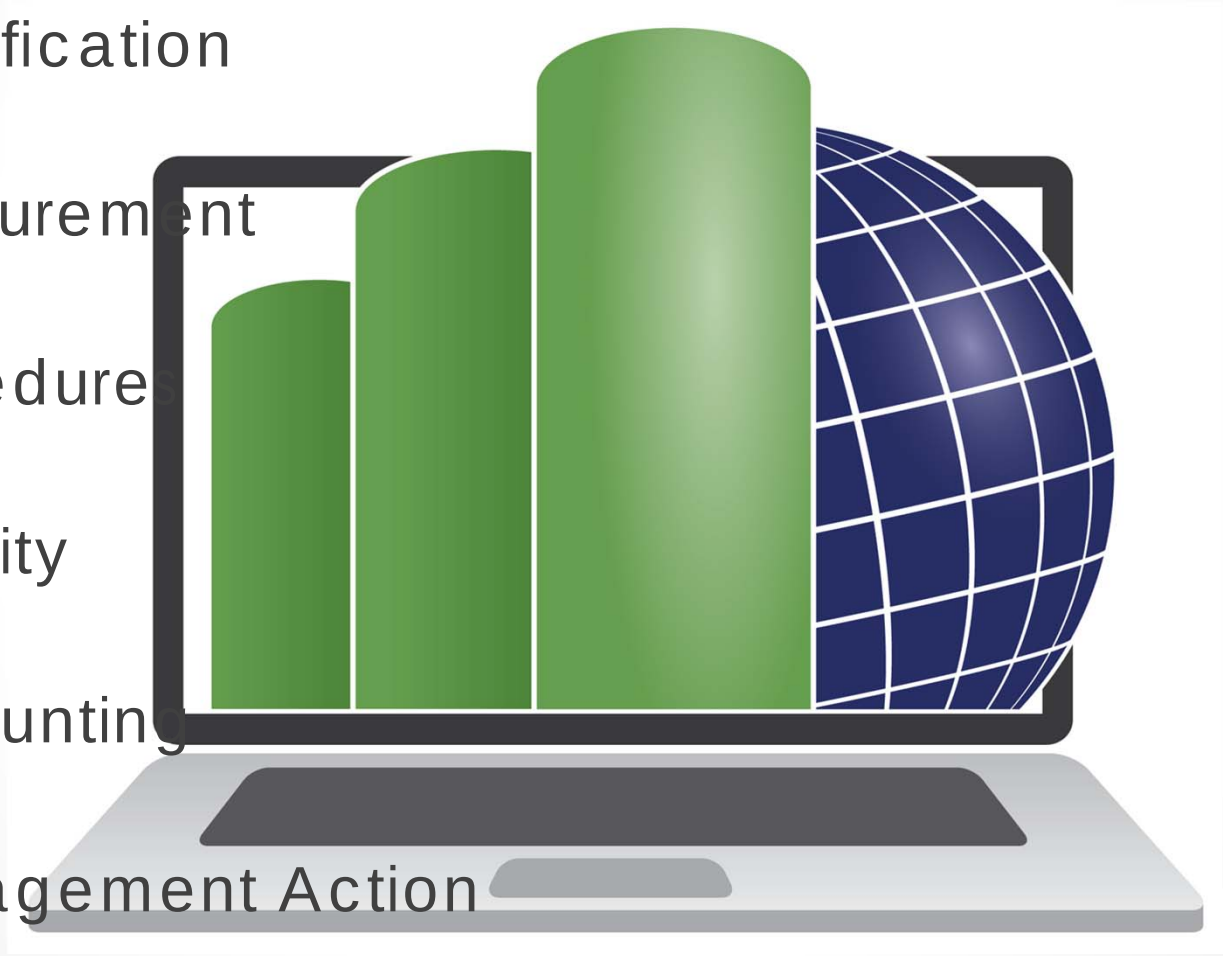
Risk Associated with Grain Inventories

- Valuation/Markets
- Quality losses
  - Mixing, moisture, insects, breakage, molds, toxins
- Quantity losses
  - Shrink – handling, drying, aeration
  - Theft
- Accounting
  - Procedures and systems
  - Management



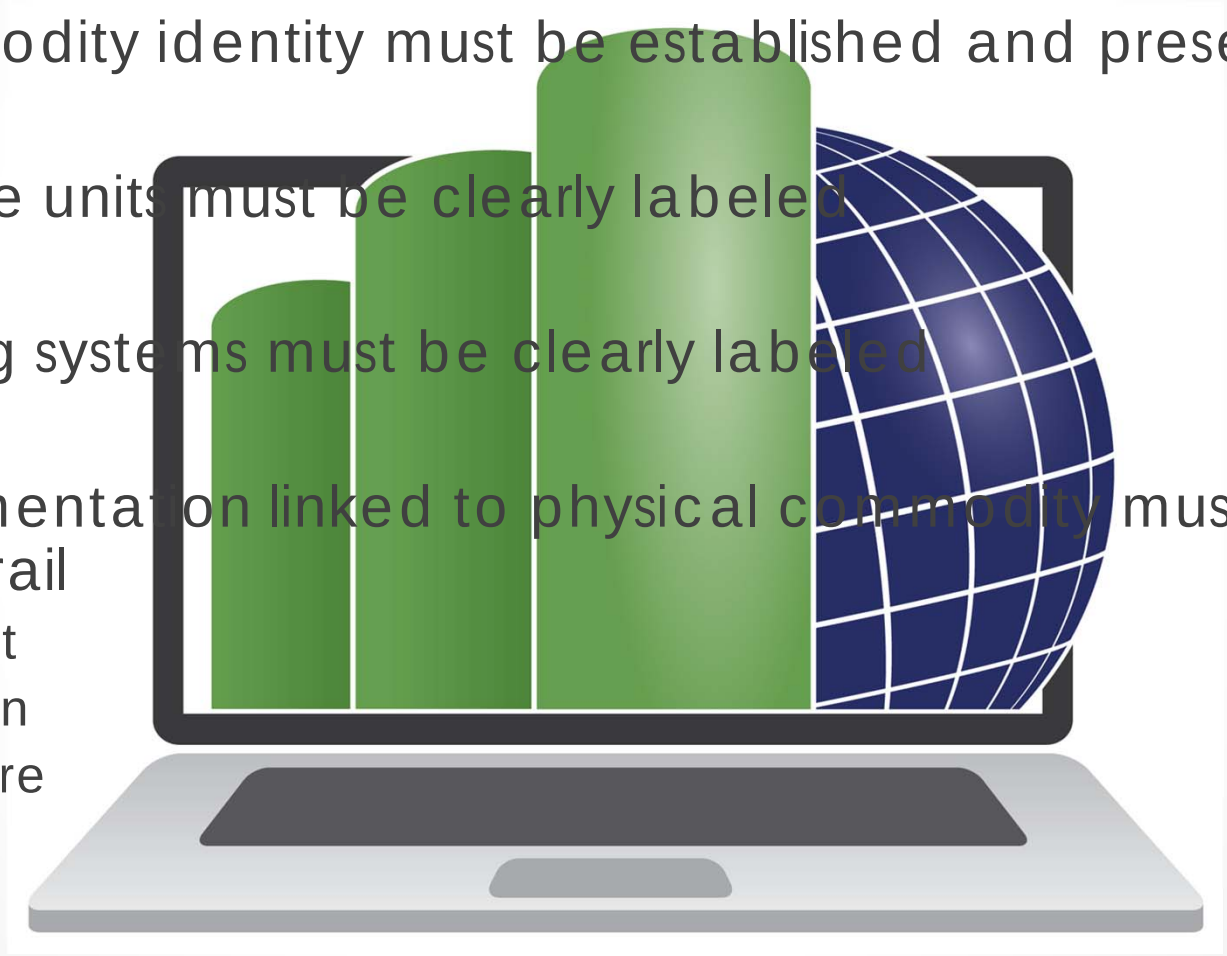
Managing Grain Inventories

1. Identification
2. Measurement
3. Procedures
4. Security
5. Accounting
6. Management Action



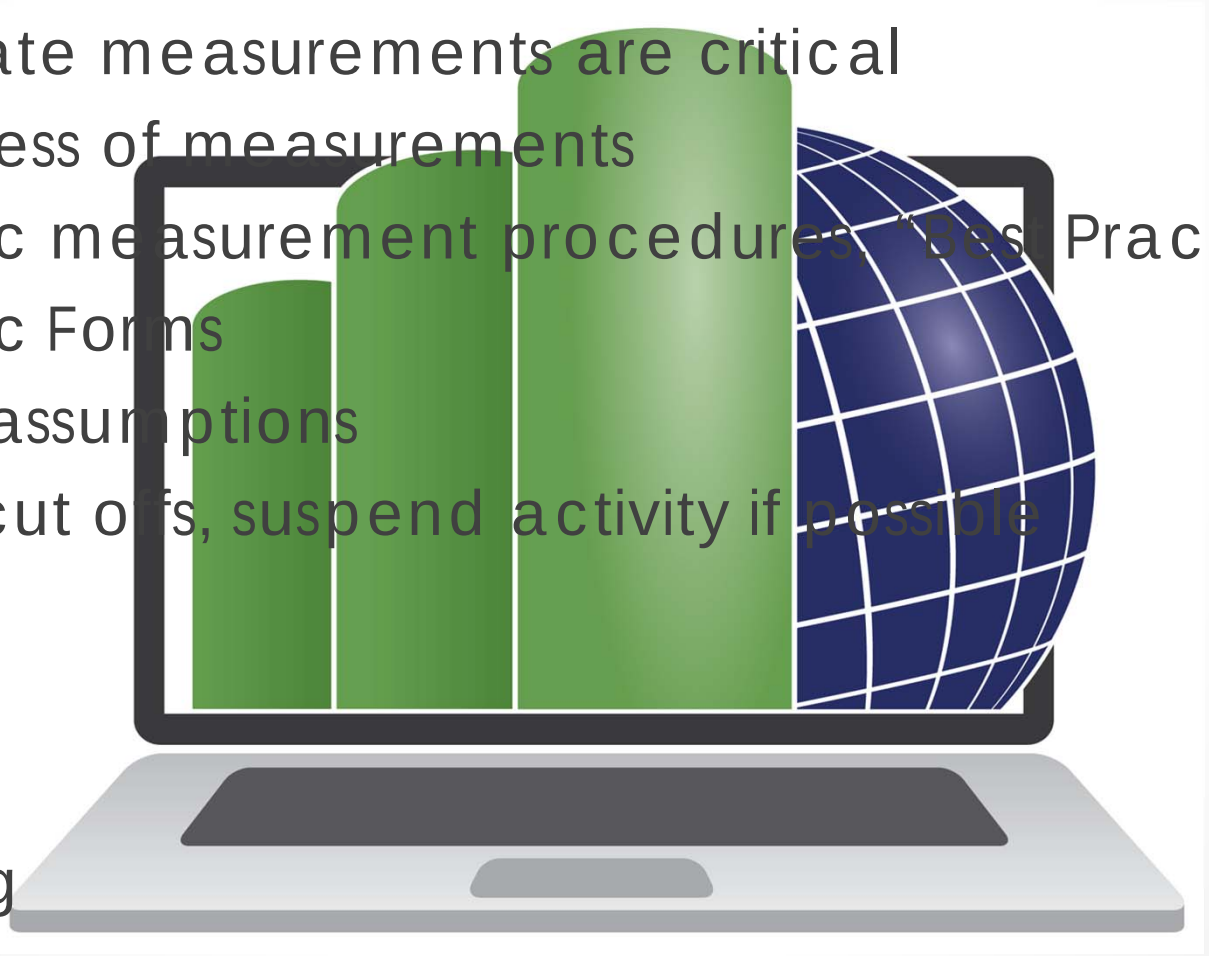
Identification

- Commodity identity must be established and preserved
- Storage units must be clearly labeled
- Routing systems must be clearly labeled
- Documentation linked to physical commodity must have audit trail
  - What
  - When
  - Where
  - Who



Measurement

- Accurate measurements are critical
- Timeliness of measurements
- Specific measurement procedures, "Best Practice"
- Specific Forms
- Avoid assumptions
- Clear cut offs, suspend activity if possible
- Charts
- Tools
- Safety
- Training



Measurement

How to Measure Your Grain

How do I find the bushels my round bin will hold?

(Diameter) x (Diameter)x (Depth)x (0.7854) = (cubic feet) x (0.80385)= Standard Bushels

How about the peak in my round bin?

(Diameter) x (Diameter) x (0.7854) x (0.80385) = bushels per foot

The height of the peak above the base divided by 3 and multiplied times the bushels per foot = Standard Bushels

If you can not determine the height of the peak. Divide the Diameter by 2 and multiply that times 0.4 for corn or 0.5 for soybeans. Divide that number by 3 and multiply that times the bushels per foot = Standard Bushels

How about my round bin which is pulled down into a cone in the center?

Find the bushels per foot the same as the peak above. Find the depth of the cone or use the rule of thumb given above and multiply two thirds of that number times the bushels per foot.

You can also take the depth at the side wall and add one third of the height of the cone up or subtract one third of the depth of the cone down. Then calculate the bushels as if the bin were level across.

The rule of thumb of 0.4 times the radius of a bin for corn or 0.5 times the radius of a bin for soybeans works for dry clean grain. If the grain is wet or has a lot of fines the peaks and valleys will be higher and deeper.

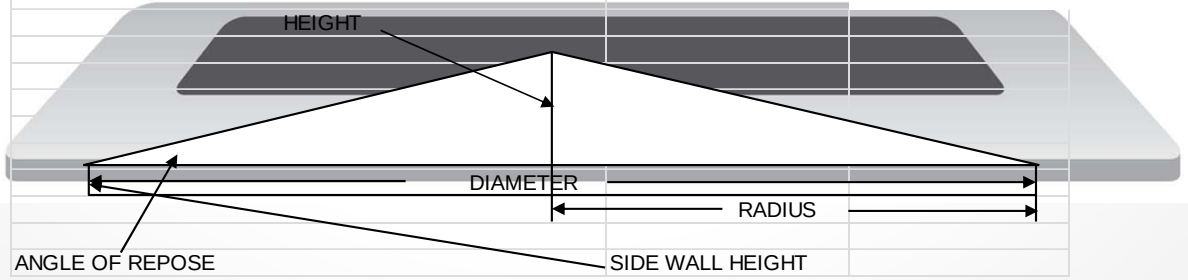
The test weight of the grain will affect the number of bushels. The directions given above result in Standard (Winchester) Bushels. Corn weighing more than 54 pounds and soybeans weighing more than 56 pounds per bushels will have more bushels than the standard and if they weigh less there will be less bushels. The Pack charts are too big to be placed here. If you need that degree of accuracy talk to your County Extension office.

My grain does not lay in nice regular figures. Try to break your bin down into several rectangles, triangles, or cones and calculate each and add up the totals. Good luck!

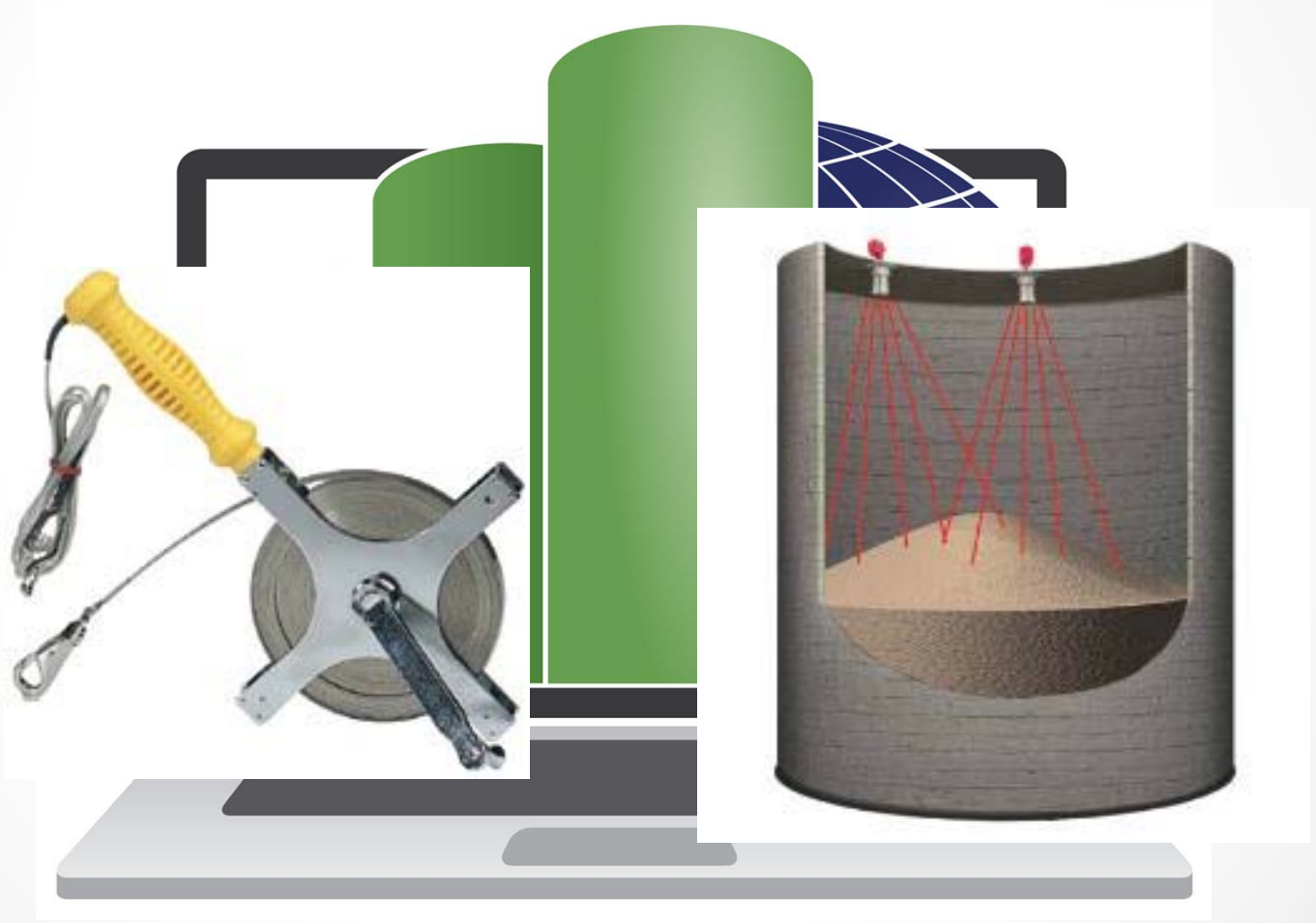
Return to Grain Warehouse Bureau

Measurement

GROUND PILE CALCULATOR		
ROUND PILE		
DIAMETER	**150**	**FEET**
RADIUS	75	FEET
ANGLE OF REPOSE	**22**	**DEGREES**
RADIANS	0.383972435	
TAN OF ANGLE	0.404026226	
COS OF ANGLE	0.927183855	
HEIGHT OF PILE	30.3	FEET
SIDEWALL HEIGHT	**4**	**FEET**
TOTAL HEIGHT OF PILE	34.3	FEET
DISTANCE FROM EDGE TO EDGE GOING OVER THE PEAK	162	FEET
VOLUME OF PILE(NO PACK)	**199,343**	**BUSHELS**

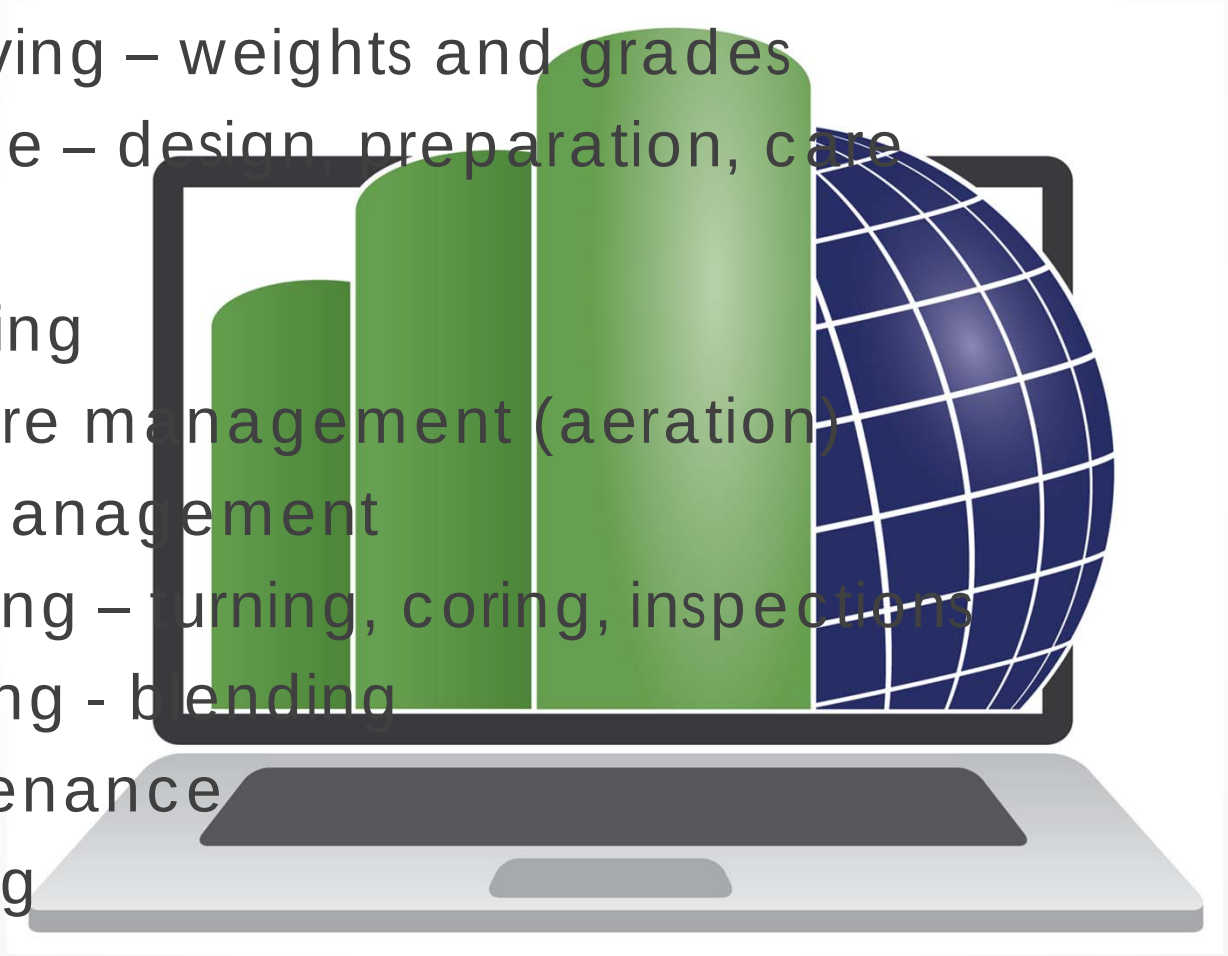


Measurement



Procedures

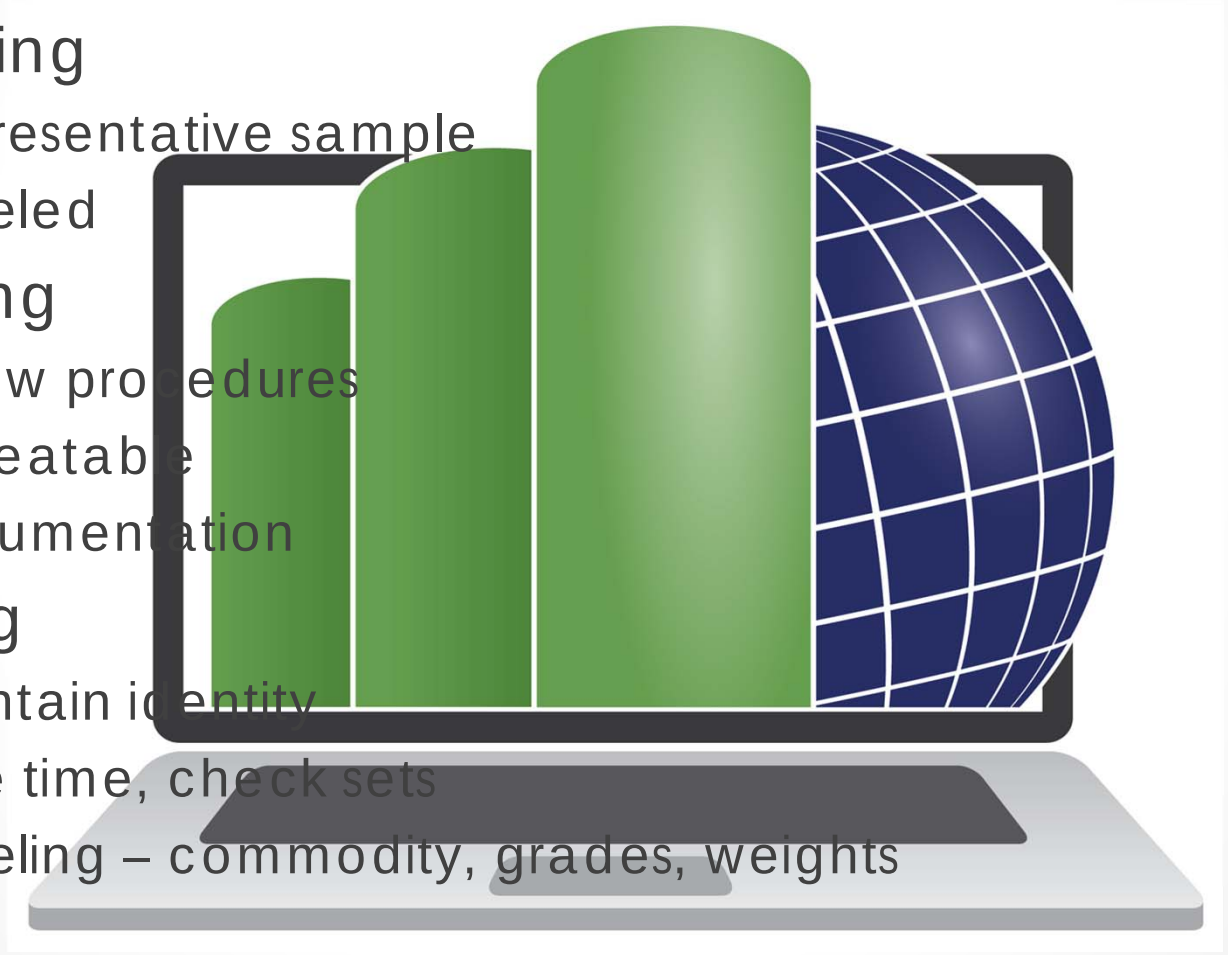
- Receiving – weights and grades
- Storage – design, preparation, care
- Drying
- Cleaning
- Moisture management (aeration)
- Pest management
- Handling – turning, coring, inspections
- Shipping - blending
- Maintenance
- Training



Procedures - Receiving

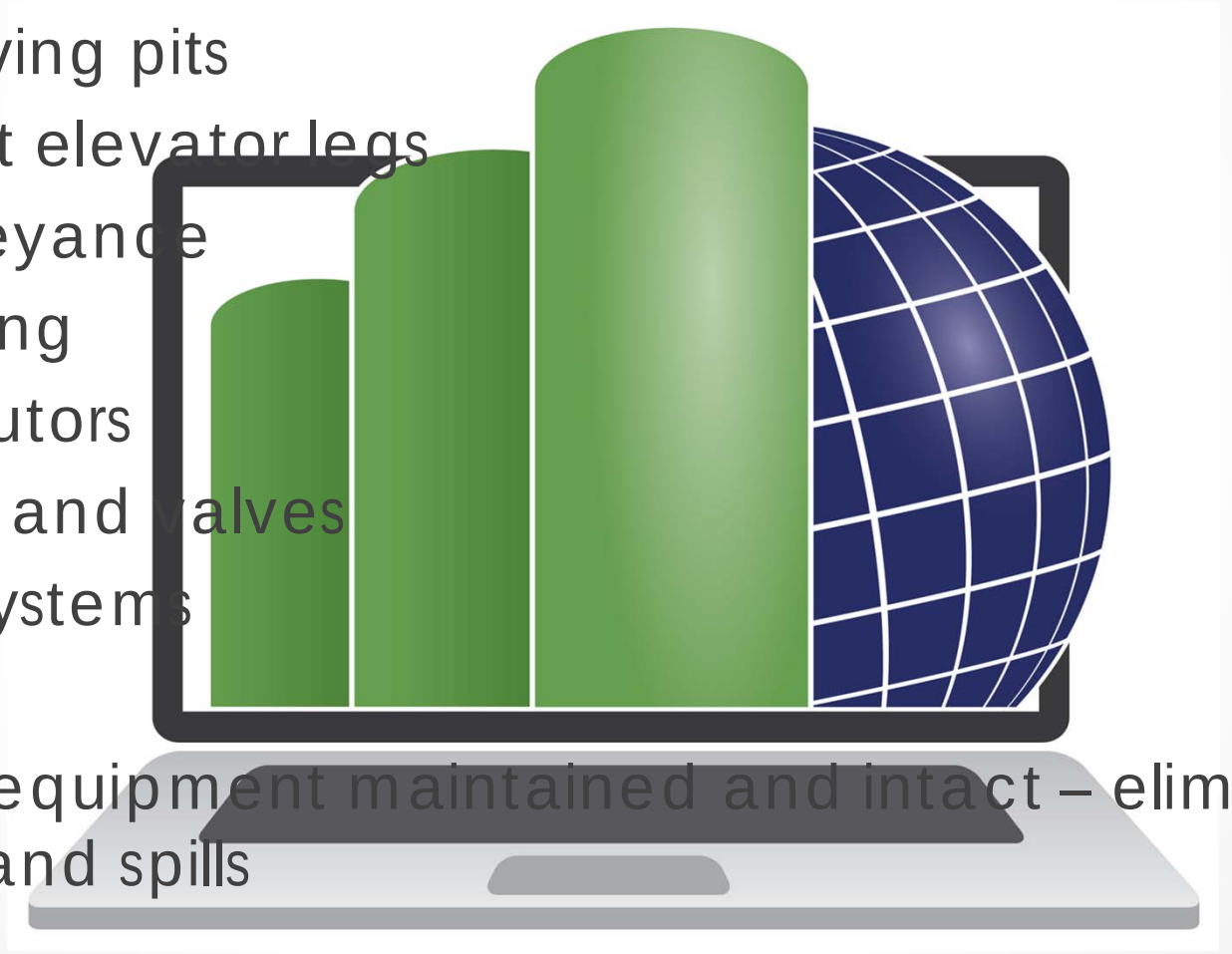
Procedures - Receiving

- Sampling
  - Representative sample
  - Labeled
- Grading
  - Follow procedures
  - Repeatable
  - Documentation
- Binning
  - Maintain identity
  - Take time, check sets
  - Labeling – commodity, grades, weights



Procedures - Routing

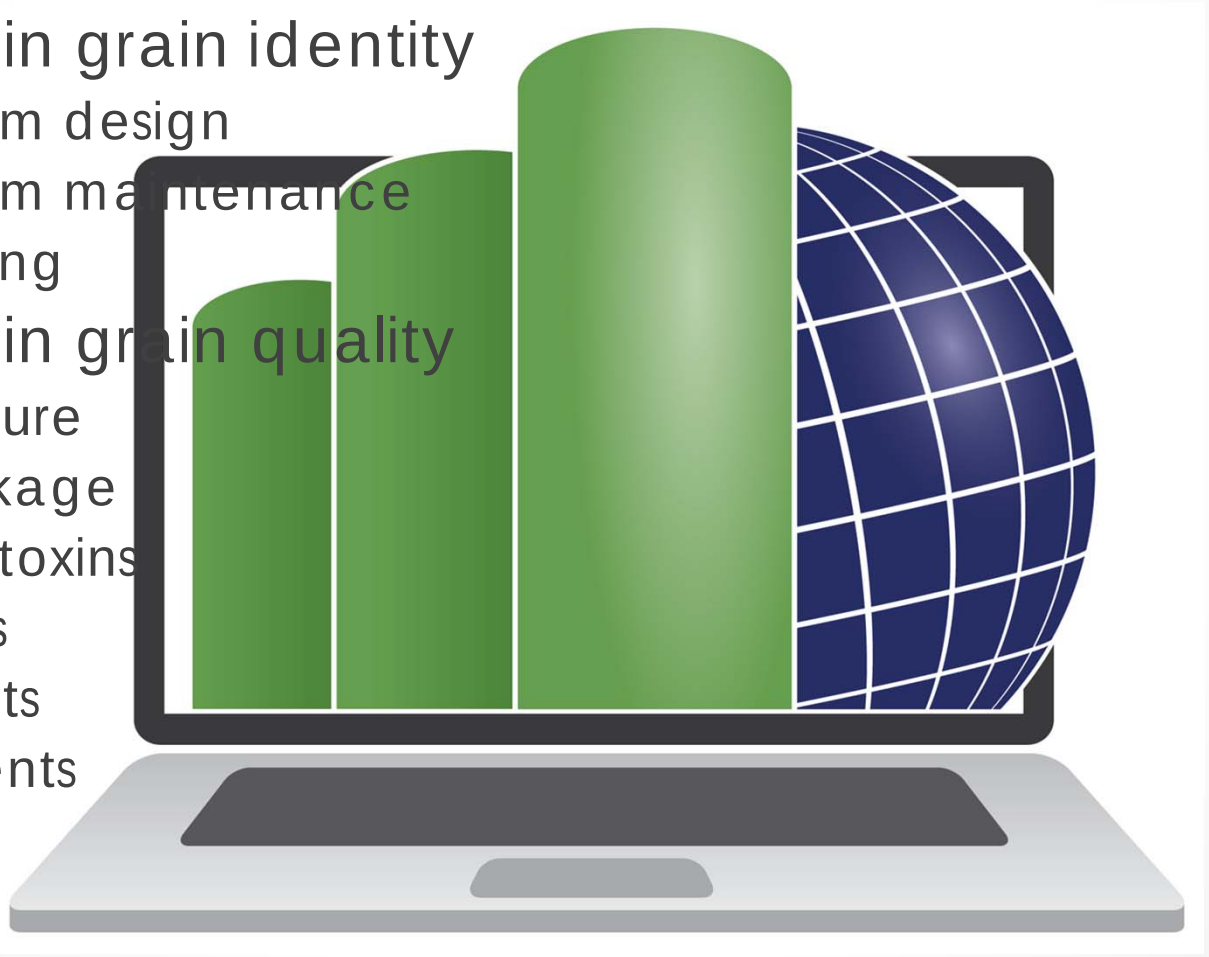
- Receiving pits
- Bucket elevator legs
- Conveyance
- Spouting
- Distributors
- Gates and valves
- Dust Systems



- Keep equipment maintained and intact – eliminate leaks and spills

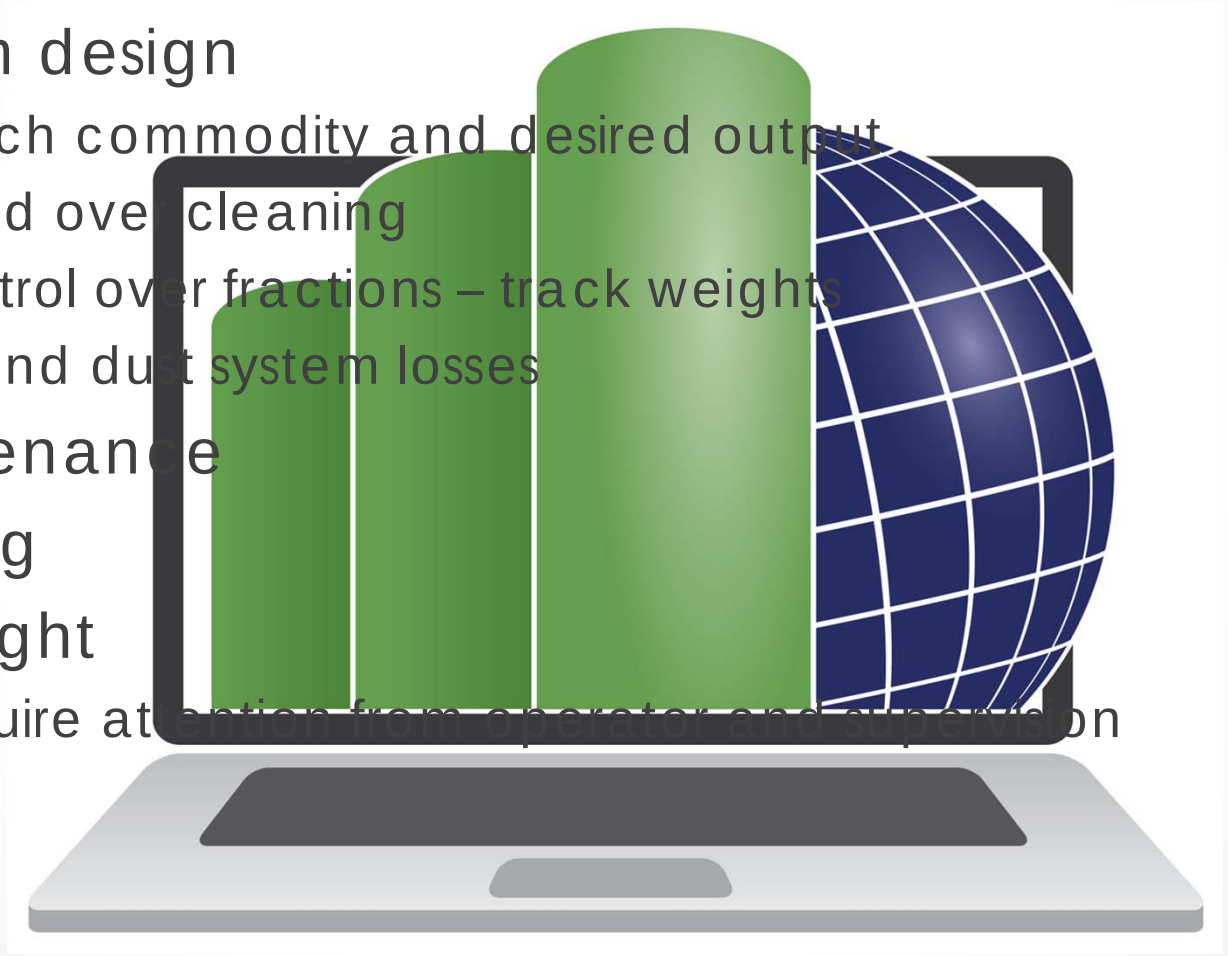
Procedures - Handling

- Maintain grain identity
  - System design
  - System maintenance
  - Training
- Maintain grain quality
  - Moisture
  - Breakage
  - Micotoxins
  - Mixes
  - Insects
  - Rodents
  - Birds



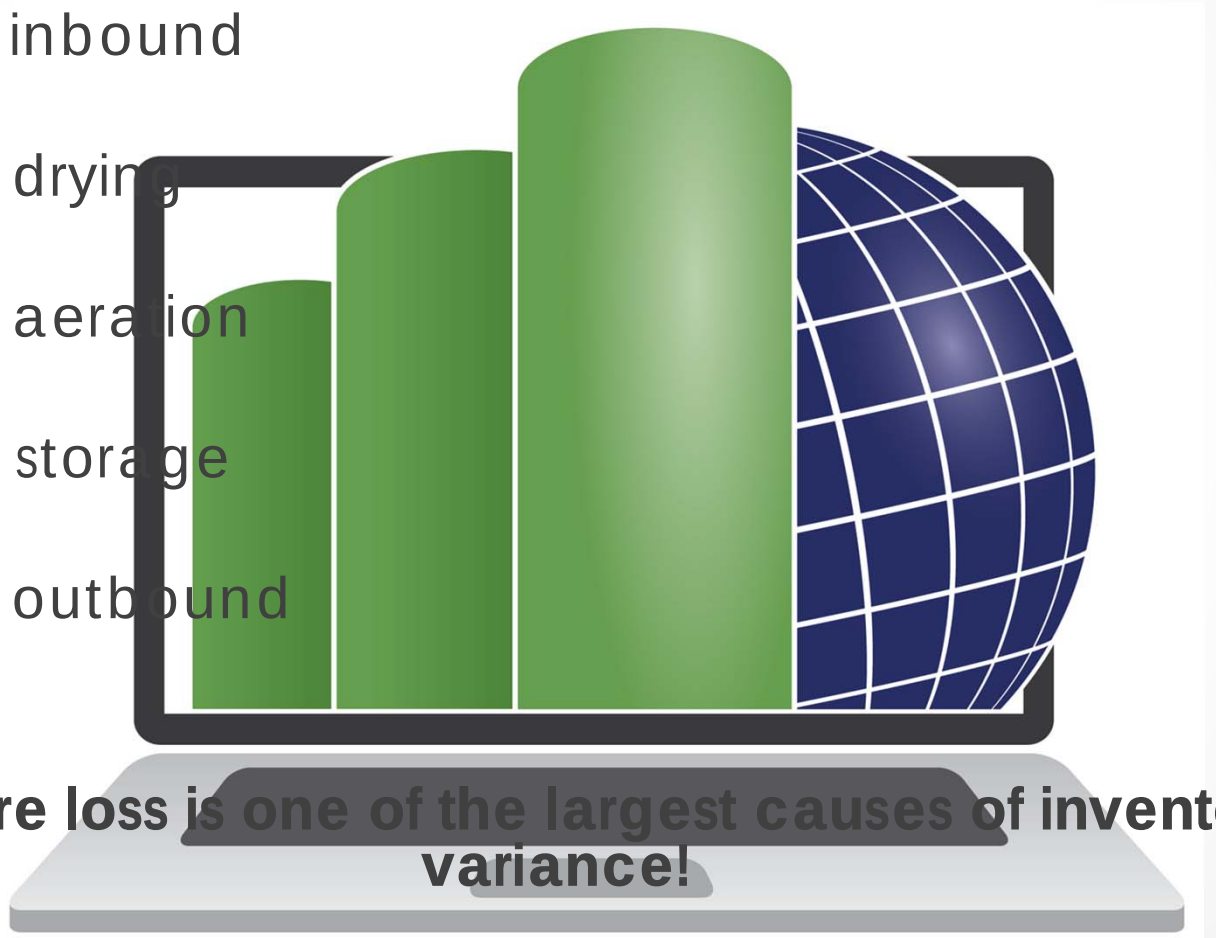
Procedures - Cleaning

- System design
  - Match commodity and desired output
  - Avoid over cleaning
  - Control over fractions – track weights
  - Air and dust system losses
- Maintenance
- Training
- Oversight
  - Require attention from operator and supervision



Procedures – Moisture Management

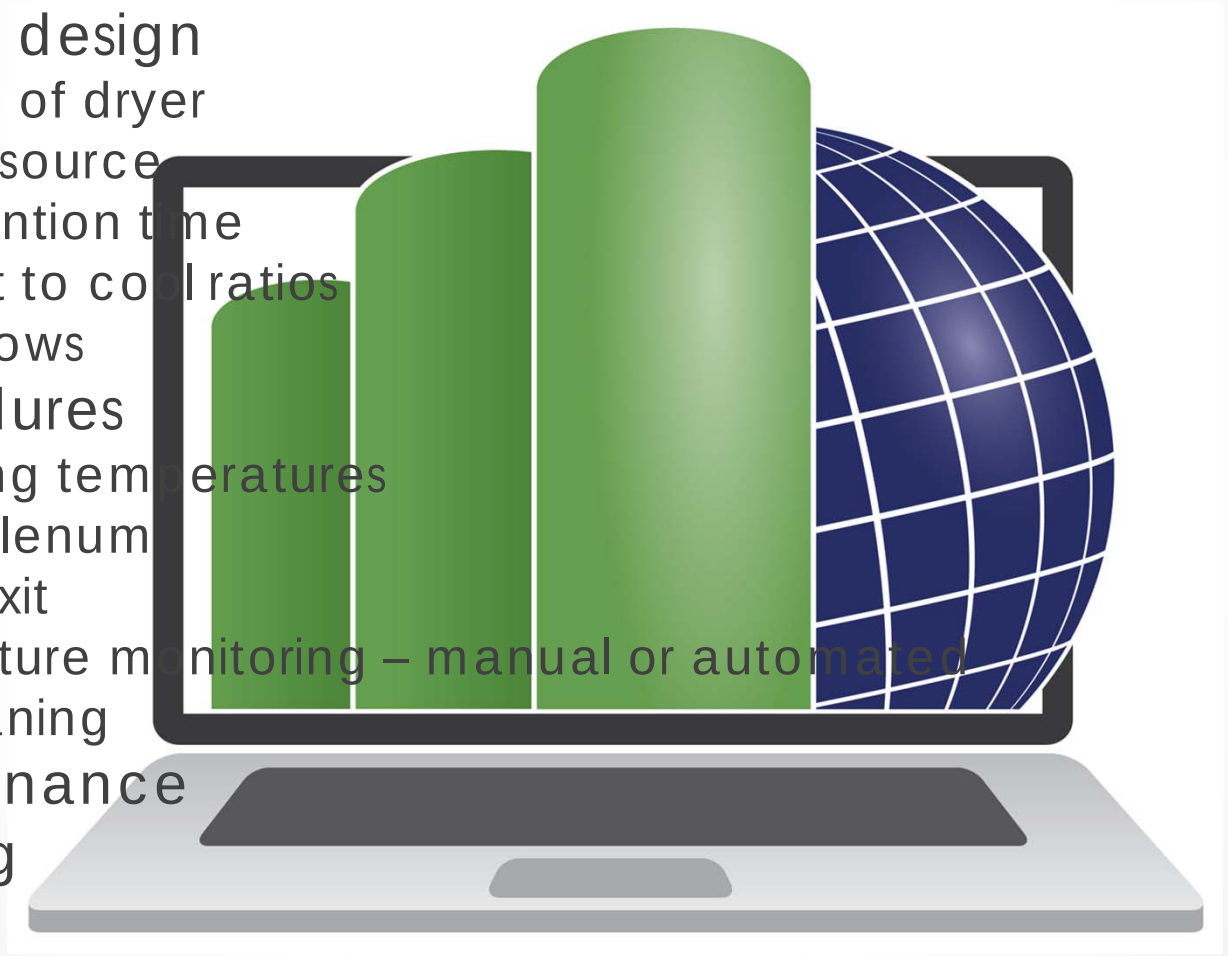
- Control inbound
- Control drying
- Control aeration
- Monitor storage
- Control outbound



Moisture loss is one of the largest causes of inventory variance!

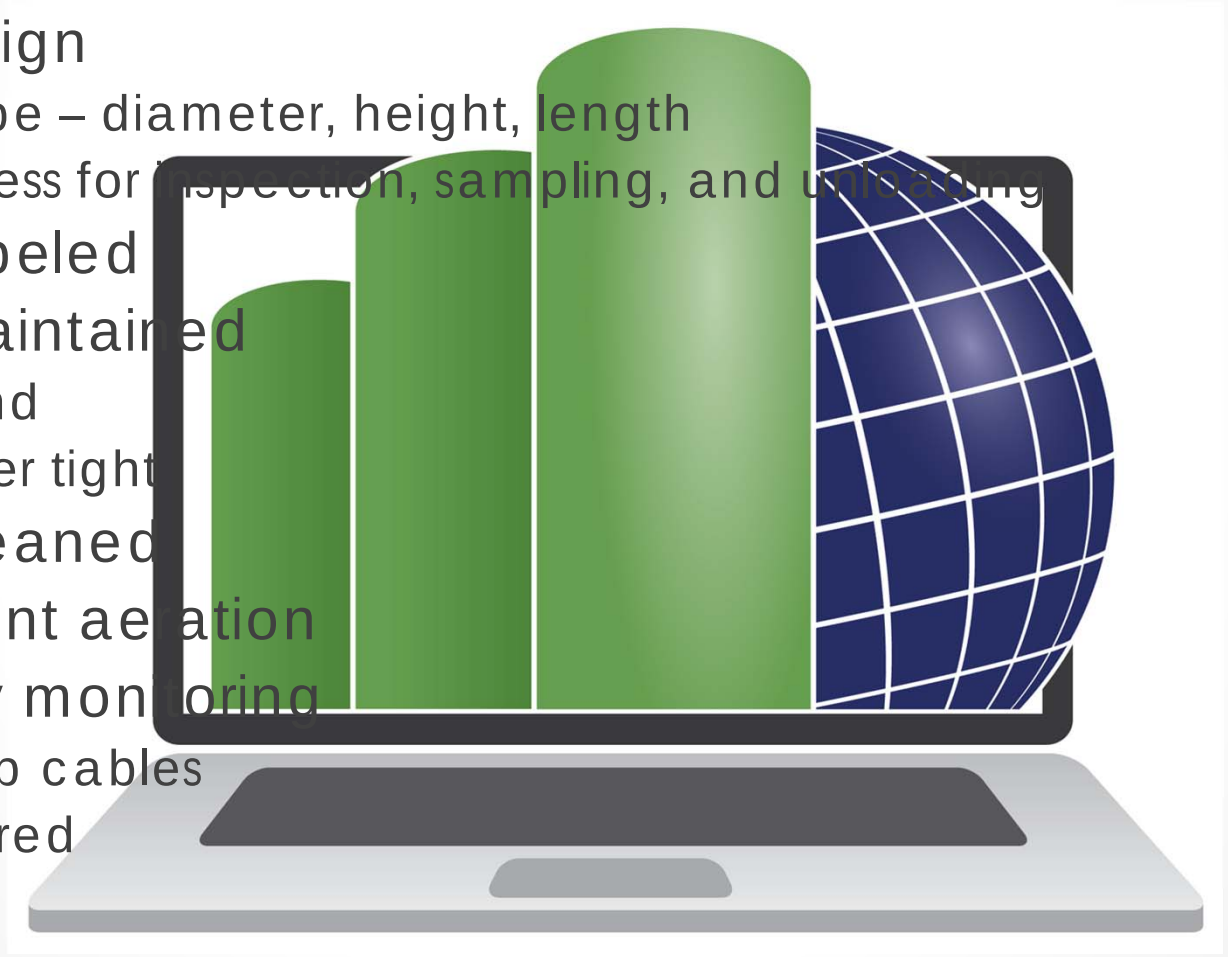
Procedures - Drying

- System design
  - Type of dryer
  - Fuel source
  - Retention time
  - Heat to coal ratios
  - Air flows
- Procedures
  - Drying temperatures
    - Plenum
    - Exit
  - Moisture monitoring – manual or automated
  - Cleaning
- Maintenance
- Training



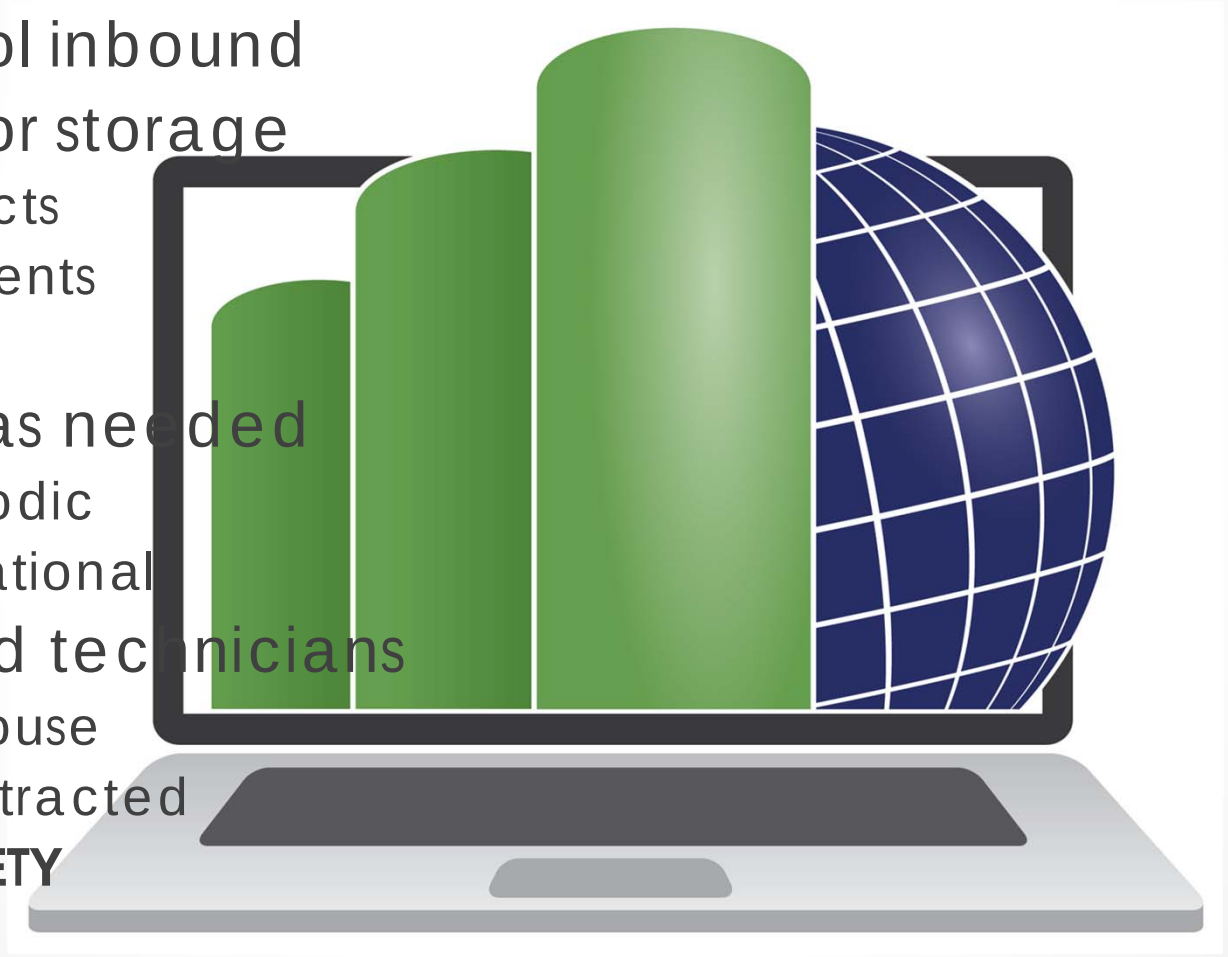
Procedures - Storage

- Bin design
  - Shape – diameter, height, length
  - Access for inspection, sampling, and unloading
- Bins labeled
- Bins maintained
  - Sound
  - Water tight
- Bins cleaned
- Sufficient aeration
- Quality monitoring
  - Temp cables
  - Infrared
  - CO_2



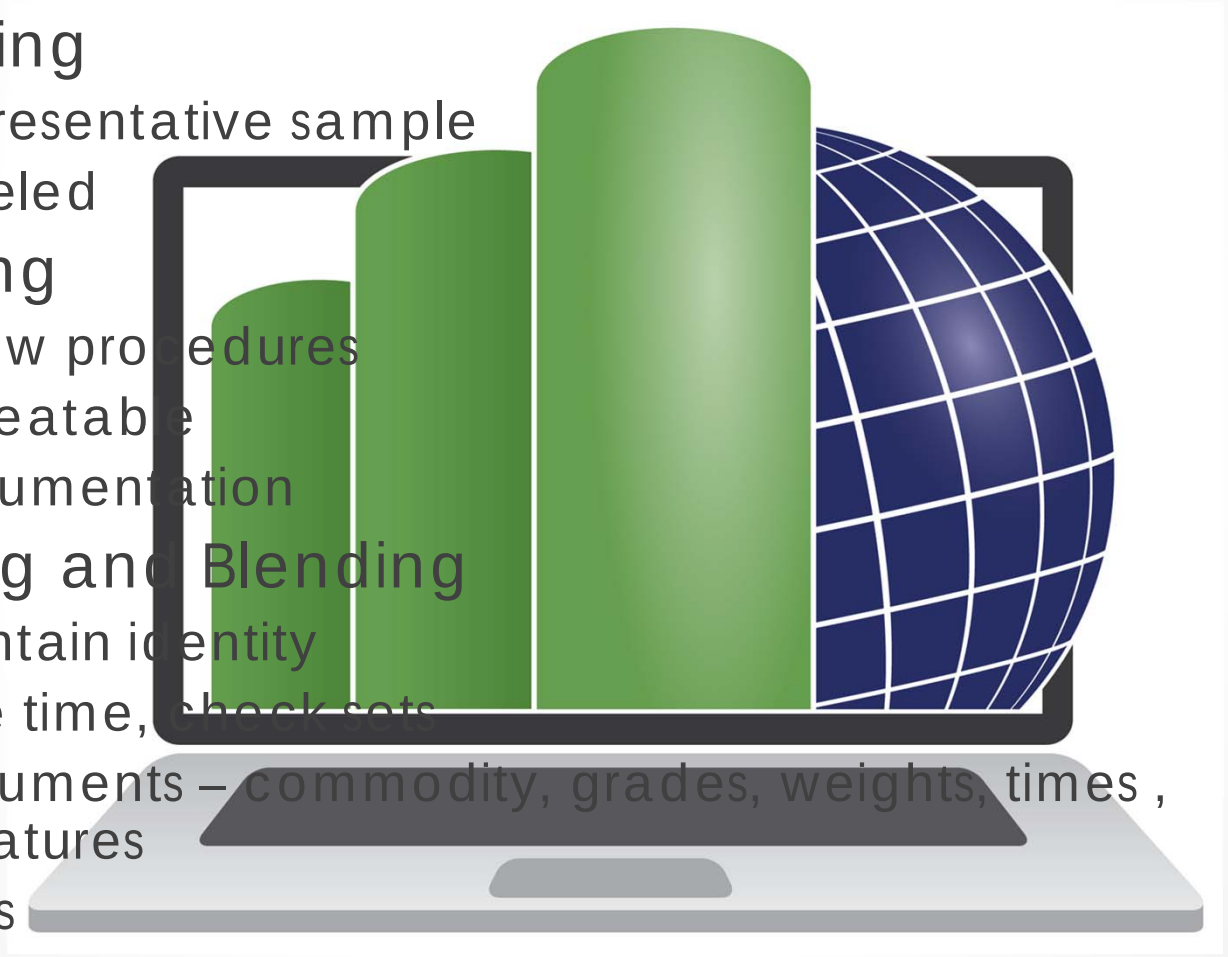
Procedures – Pest Management

- Control inbound
- Monitor storage
  - Insects
  - Rodents
  - Birds
- Treat as needed
  - Periodic
  - Situational
- Trained technicians
  - In house
  - Contracted
  - **SAFETY**



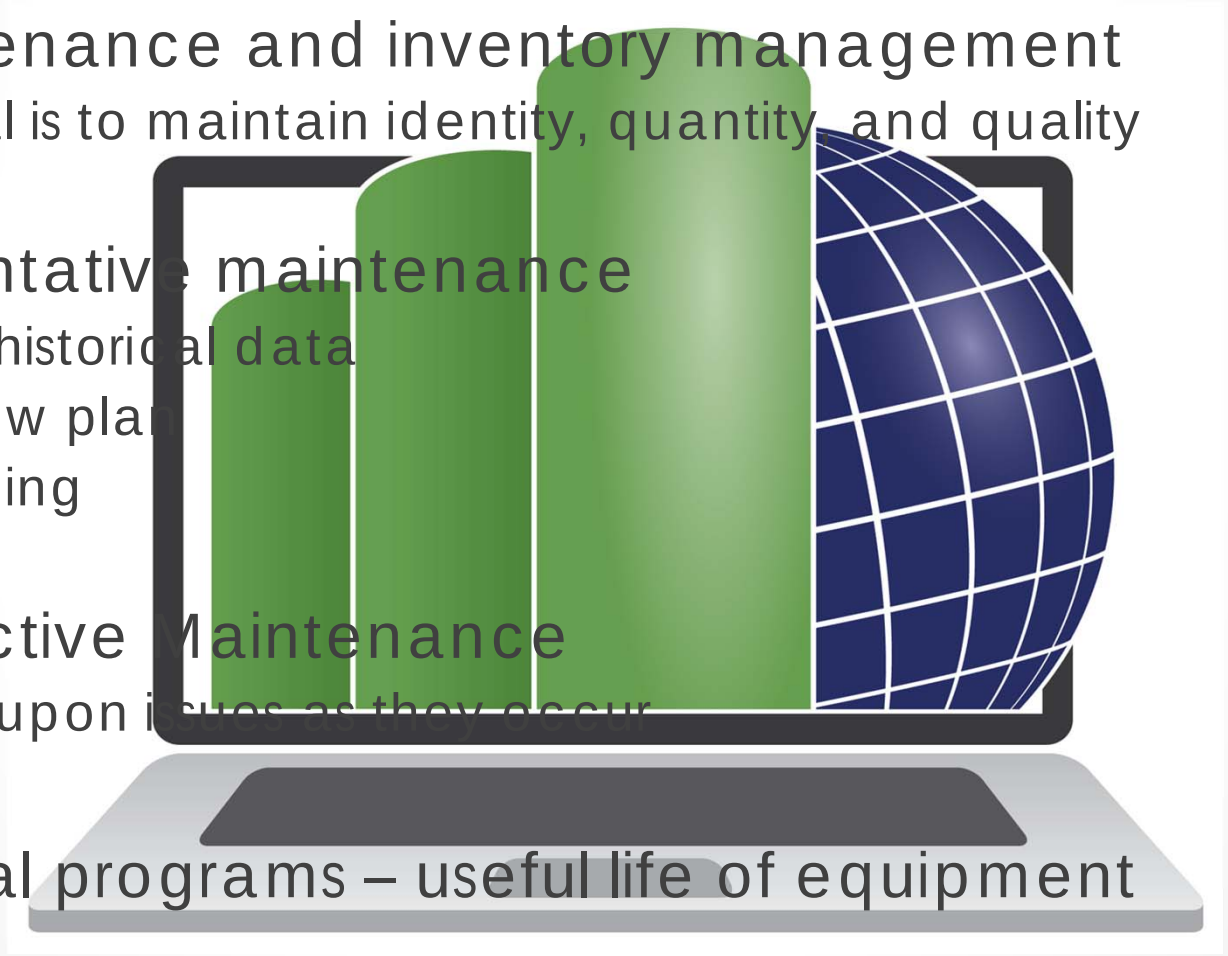
Procedures - Shipping

- Sampling
  - Representative sample
  - Labeled
- Grading
  - Follow procedures
  - Repeatable
  - Documentation
- Routing and Blending
  - Maintain identity
  - Take time, check sets
  - Documents – commodity, grades, weights, times , signatures
  - Seals



Procedures - Maintenance

- Maintenance and inventory management
  - Goal is to maintain identity, quantity, and quality
- Preventative maintenance
  - Use historical data
  - Follow plan
  - Training
- Corrective Maintenance
  - Act upon issues as they occur
- Capital programs – useful life of equipment

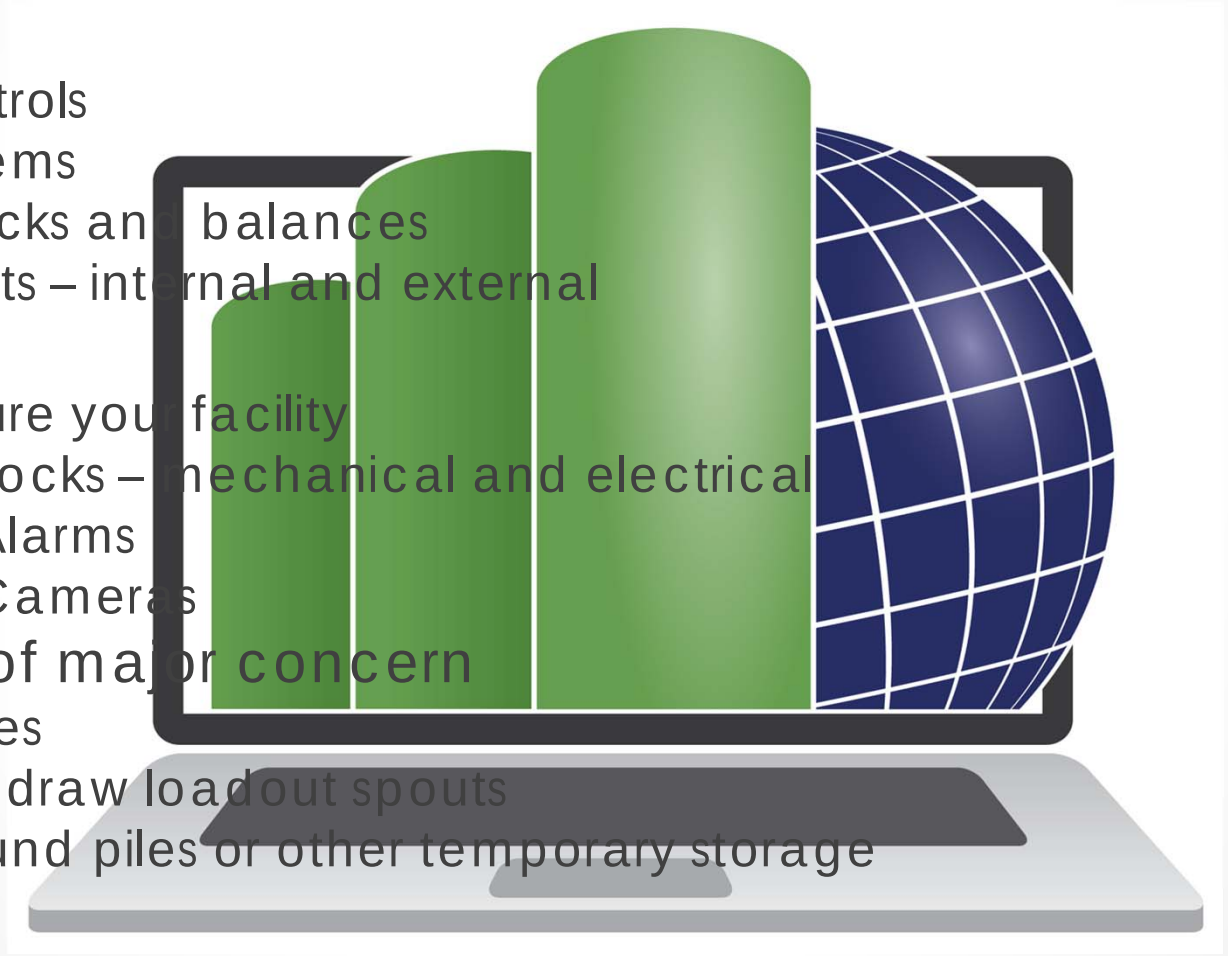


Procedures - Training

- Train
- Train
- Train
- Train
- Train
- Train
- **TRAIN!!!!!!!!!!!!**

Security

- Fraud
  - Controls
  - Systems
  - Checks and balances
  - Audits – internal and external
- Theft
  - Secure your facility
    - Locks – mechanical and electrical
    - Alarms
    - Cameras
- Areas of major concern
  - Scales
  - Side draw loadout spouts
  - Ground piles or other temporary storage



Accounting

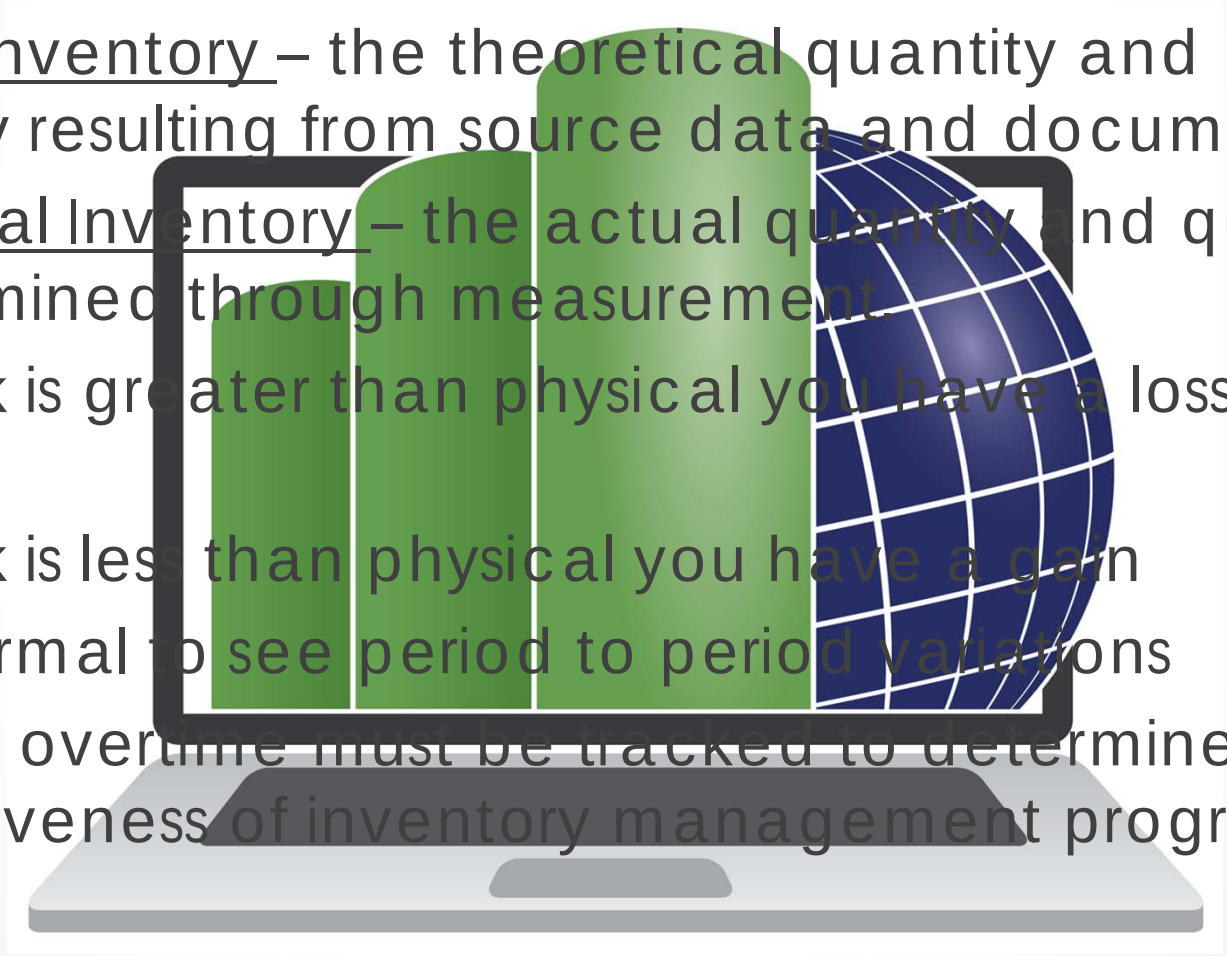
- Data and documents
- Frequency
- Book inventories
- Physical inventories
- Taking physical inventories
- Shrink calculation and management
- Report analysis
- Warehousing and grain dealers licenses
- Reconciliation

Source Data Documents

- Receipts
  - Weights , grades , logistical, and contractual
- In-process
  - Handling, cleaning, aeration, drying shrinks
- Inventories
  - Quantity and quality
  - Book vs. actual
  - **DPR's – Daily Position Report**
- Shipping
  - Weights , grades , logistical, and contractual

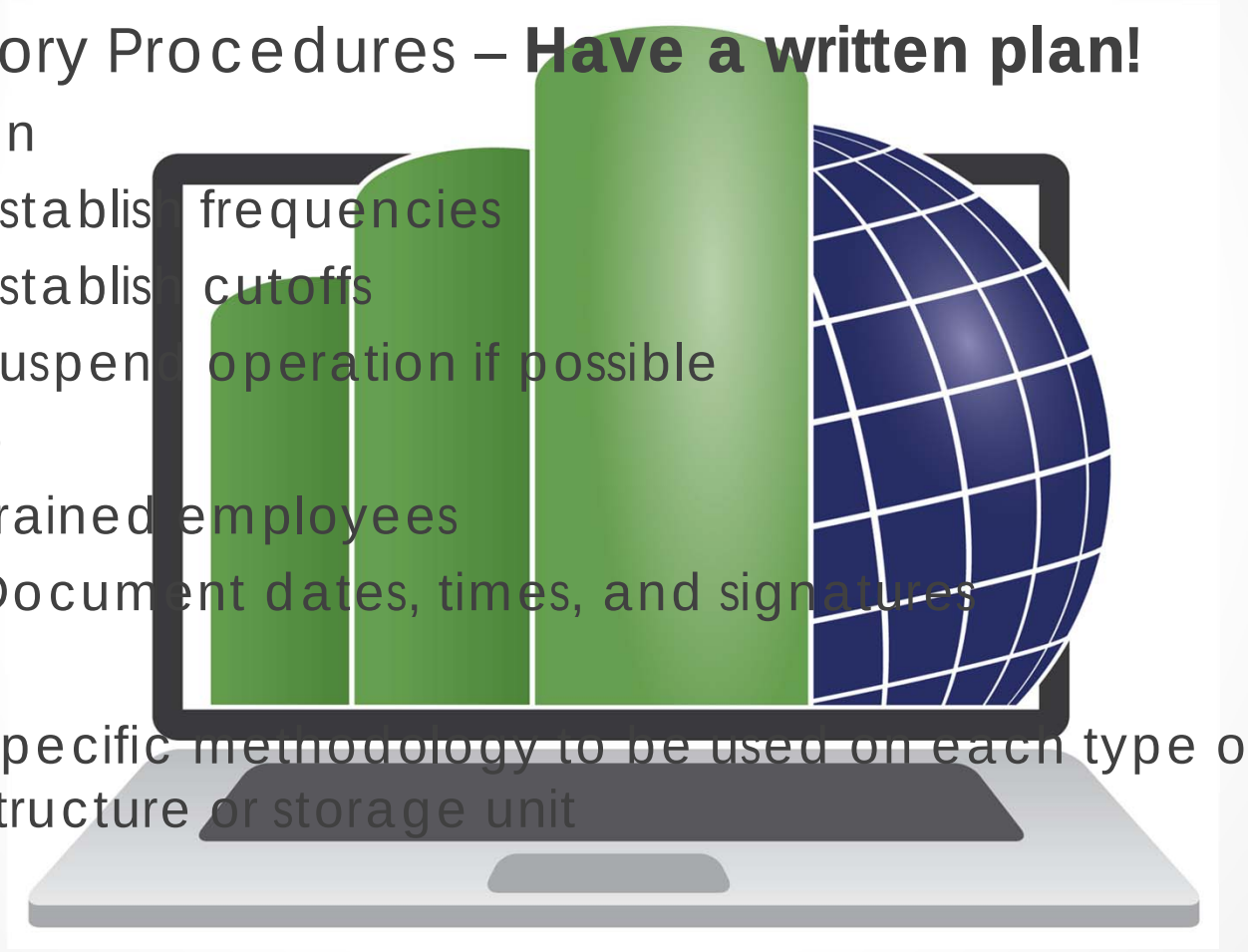
Accounting – Book vs Physical Inventories

- Book Inventory – the theoretical quantity and quality resulting from source data and documents.
- Physical Inventory – the actual quantity and quality determined through measurement.
- If Book is greater than physical you have a loss or shrink.
- If Book is less than physical you have a gain
- It is normal to see period to period variations
- Trends overtime must be tracked to determine effectiveness of inventory management programs



Accounting – Taking a Physical Inventory

- Inventory Procedures – **Have a written plan!**
  - When
    - Establish frequencies
    - Establish cutoffs
    - Suspend operation if possible
  - Who
    - Trained employees
    - Document dates, times, and signatures
  - How
    - Specific methodology to be used on each type of structure or storage unit

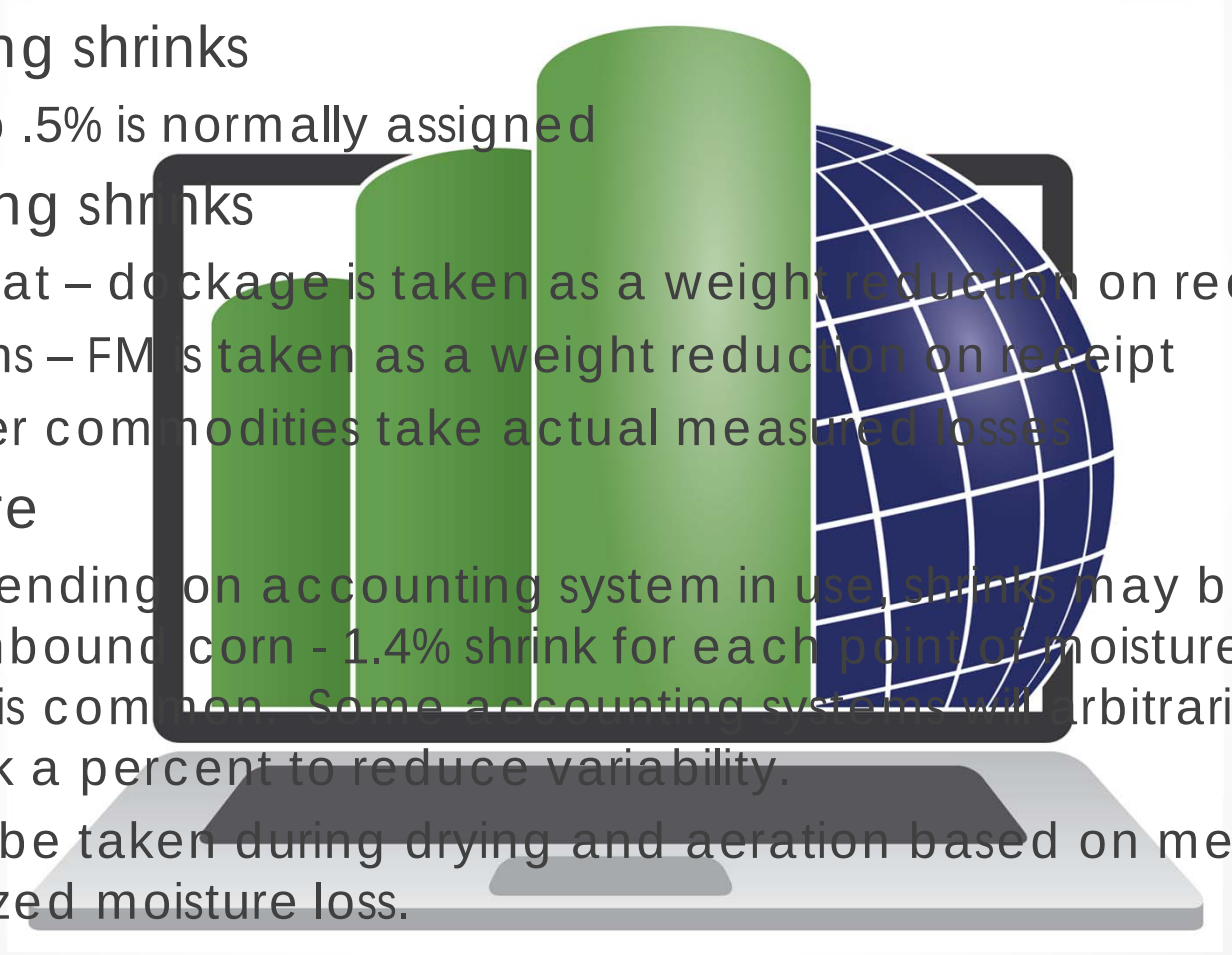


Common Types of Shrinks

- Handling
- Cleaning
- Moisture
  - Drying
  - Aeration

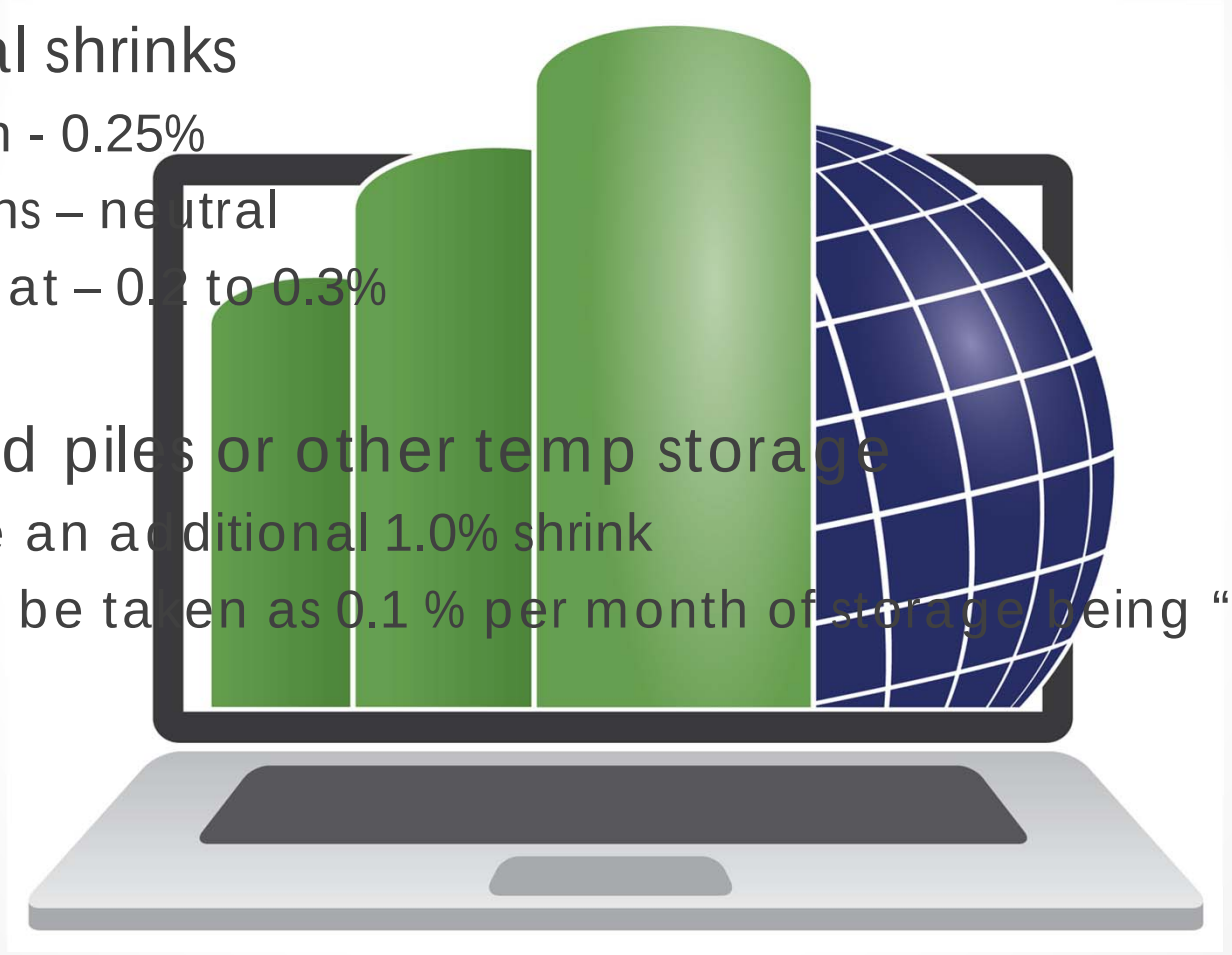
Accounting – Shrink Calculation and Management

- Handling shrinks
  - .2 to .5% is normally assigned
- Cleaning shrinks
  - Wheat – dockage is taken as a weight reduction on receipt
  - Beans – FM is taken as a weight reduction on receipt
  - Other commodities take actual measured losses
- Moisture
  - Depending on accounting system in use, shrinks may be taken on inbound corn - 1.4% shrink for each point of moisture over 15% is common. Some accounting systems will arbitrarily add back a percent to reduce variability.
  - Maybe taken during drying and aeration based on measured realized moisture loss.



Accounting – Shrink Calculation and Management

- Normal shrinks
  - Corn - 0.25%
  - Beans – neutral
  - Wheat – 0.2 to 0.3%
- Ground piles or other temp storage
  - Take an additional 1.0% shrink
  - May be taken as 0.1 % per month of storage being “out”

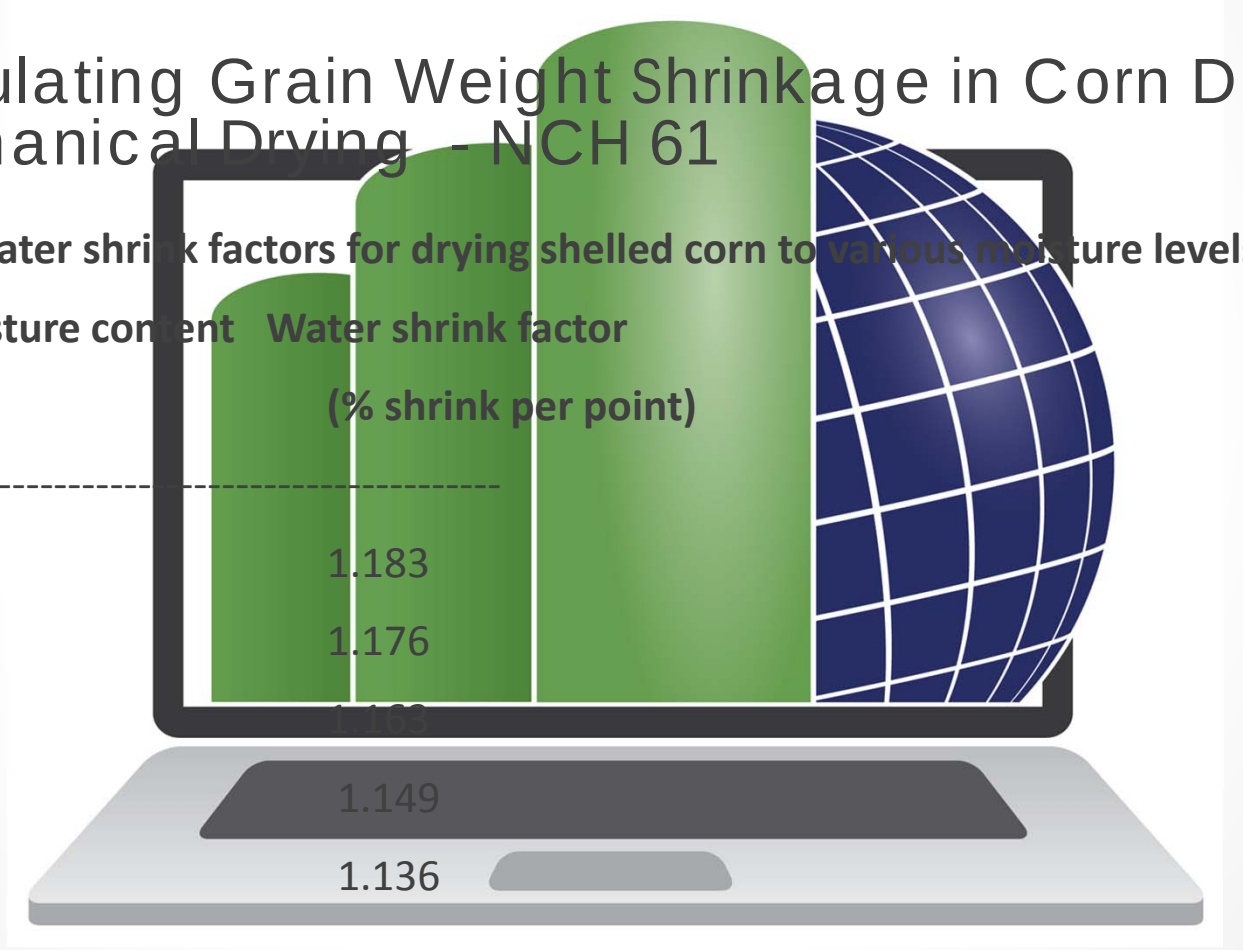


Accounting – Shrink Calculation and Management

Calculating Grain Weight Shrinkage in Corn Due to Mechanical Drying - NCH 61

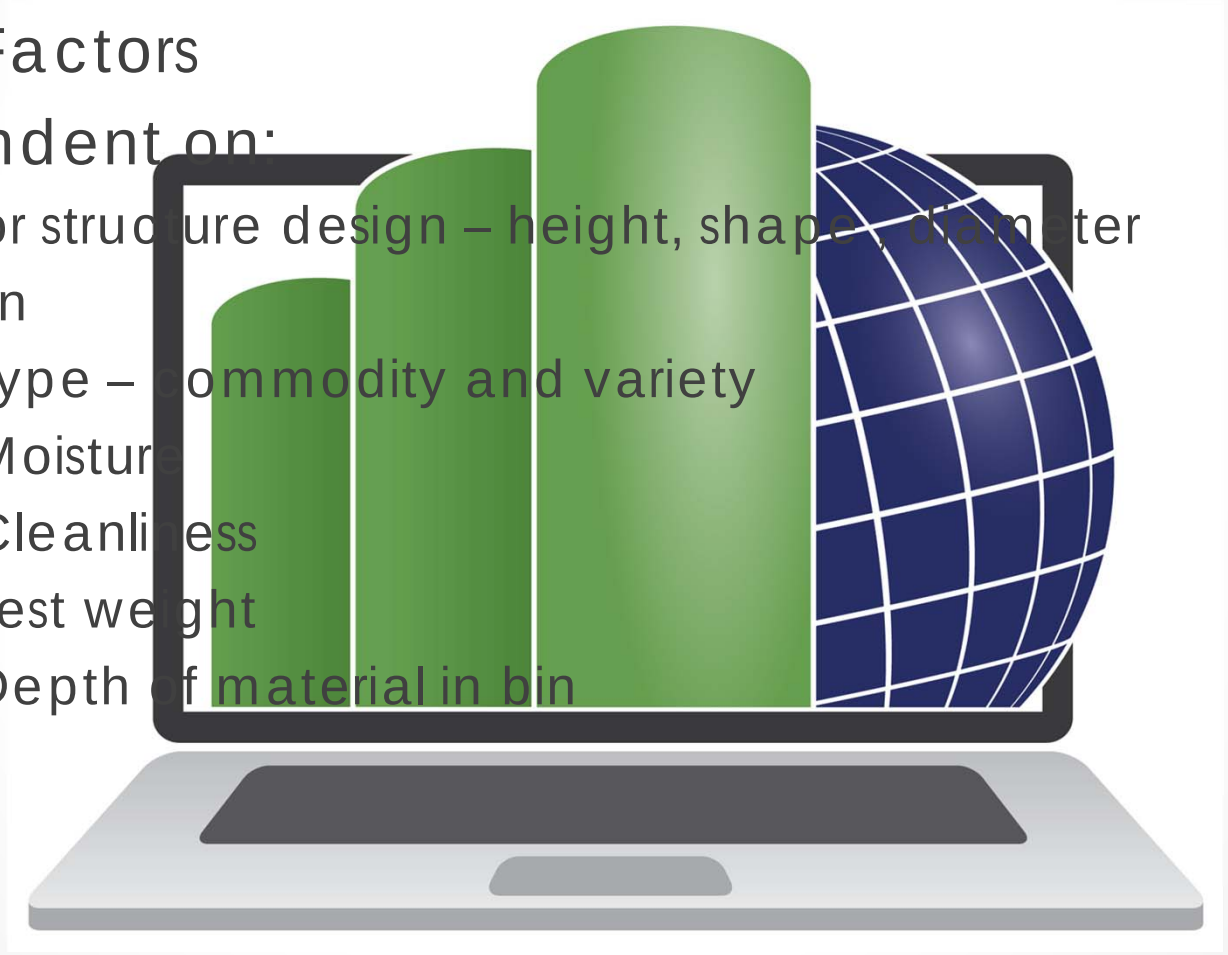
- **Table 1. Water shrink factors for drying shelled corn to various moisture levels.**

Final moisture content (%)	Water shrink factor (% shrink per point)
15.5	1.183
15	1.176
14	1.163
13	1.149
12	1.136



Calculation and Management

- Pack Factors
- Dependent on:
  - Bin or structure design – height, shape, diameter
  - Grain
    - Type – commodity and variety
    - Moisture
    - Cleanliness
    - Test weight
    - Depth of material in bin

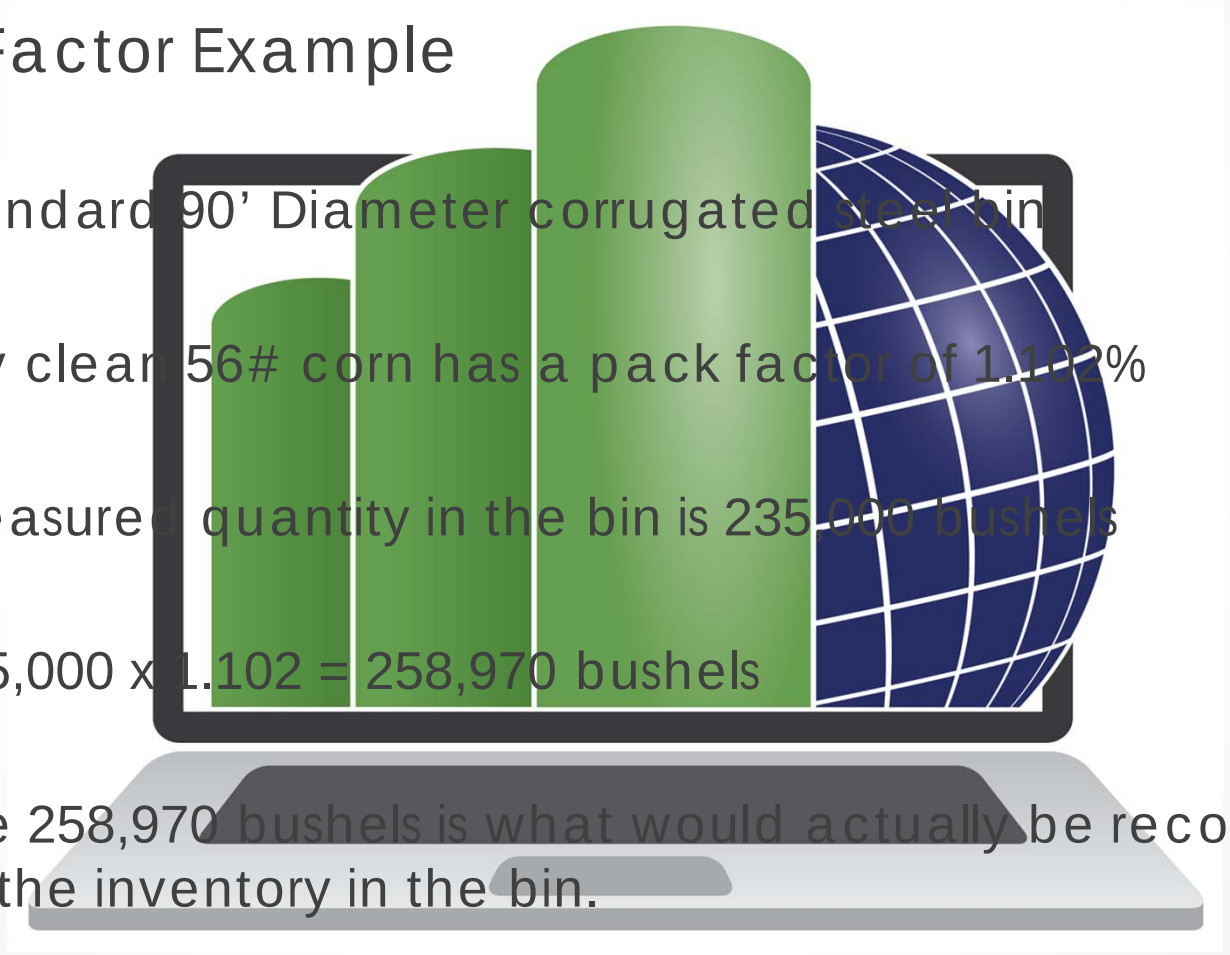


Calculation and Management

Test Weight	PACK FACTOR		
	Corn	Beans	Wheat
51	1.017	0.0951	0.994
52	1.034	0.966	1.01
53	1.051	0.981	1.026
54	1.069	0.997	1.043
55	1.085	1.013	1.06
56	1.102	1.029	1.077
57	1.118	1.044	1.093
58	1.134	1.06	1.108
59	1.151	1.074	1.126
2290 or over sq ft bins			
FCIC/USDA - 25010 (LAM)			

Calculation and Management

- Pack Factor Example



Standard 90’ Diameter corrugated steel bin

Dry clean 56# corn has a pack factor of 1.102%

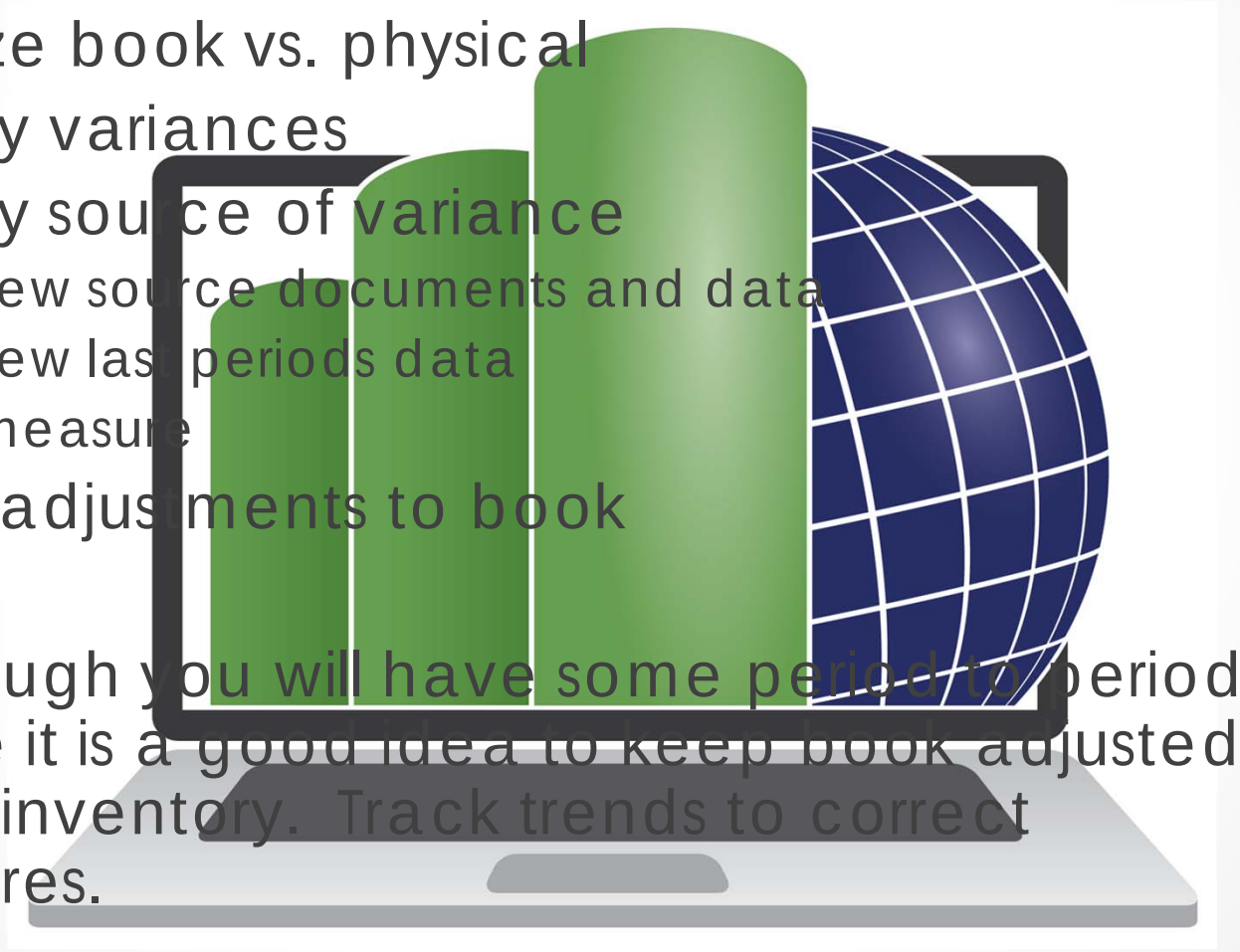
Measured quantity in the bin is 235,000 bushels

235,000 x 1.102 = 258,970 bushels

The 258,970 bushels is what would actually be recorded as the inventory in the bin.

Accounting –Analysis and Reconciliation

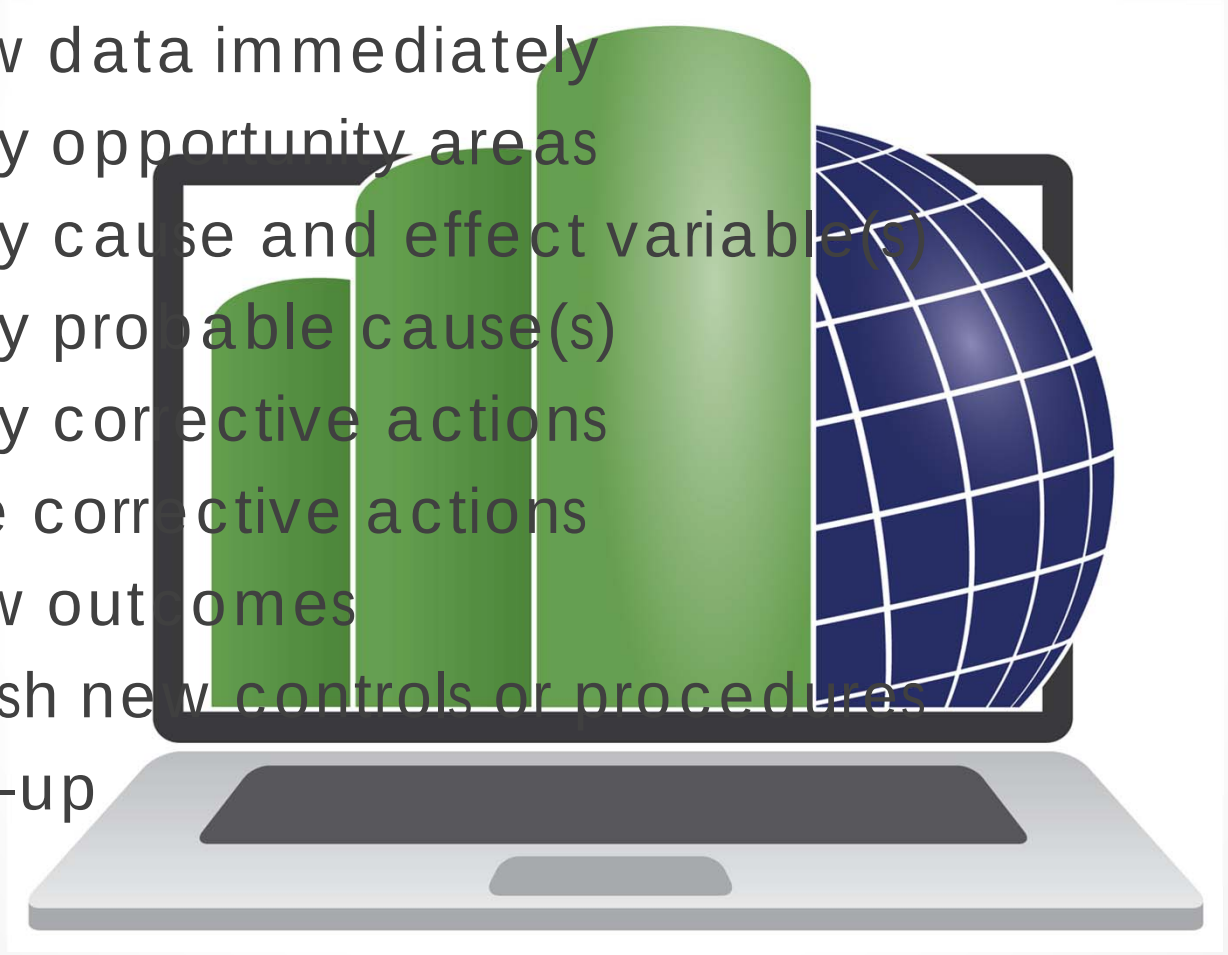
- Analyze book vs. physical
- Identify variances
- Identify source of variance
  - Review source documents and data
  - Review last periods data
  - Re-measure
- Make adjustments to book



Even though you will have some period to period variance it is a good idea to keep book adjusted to physical inventory. Track trends to correct procedures.

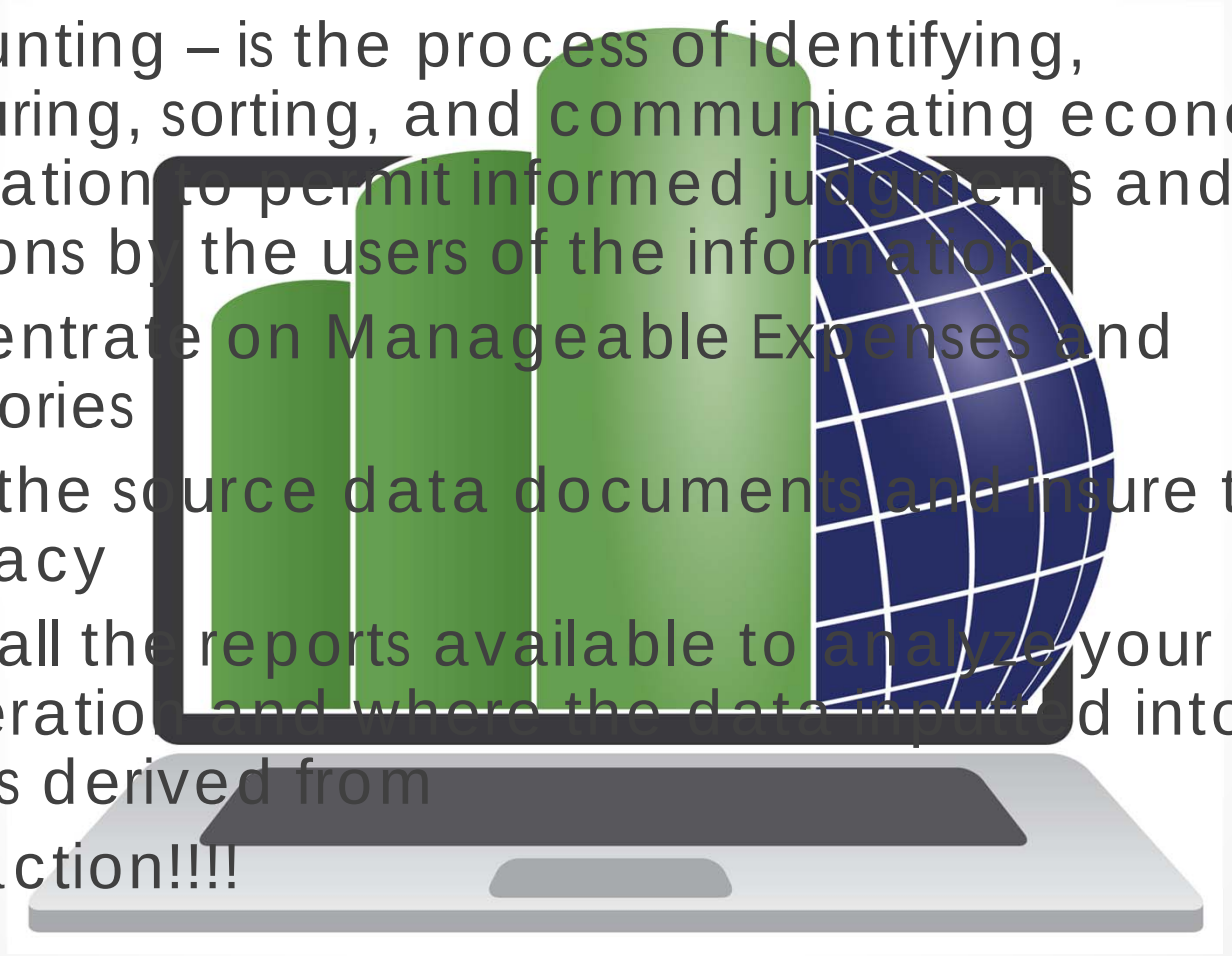
Management Action

- Review data immediately
- Identify opportunity areas
- Identify cause and effect variable(s)
- Identify probable cause(s)
- Identify corrective actions
- Initiate corrective actions
- Review outcomes
- Establish new controls or procedures
- Follow-up



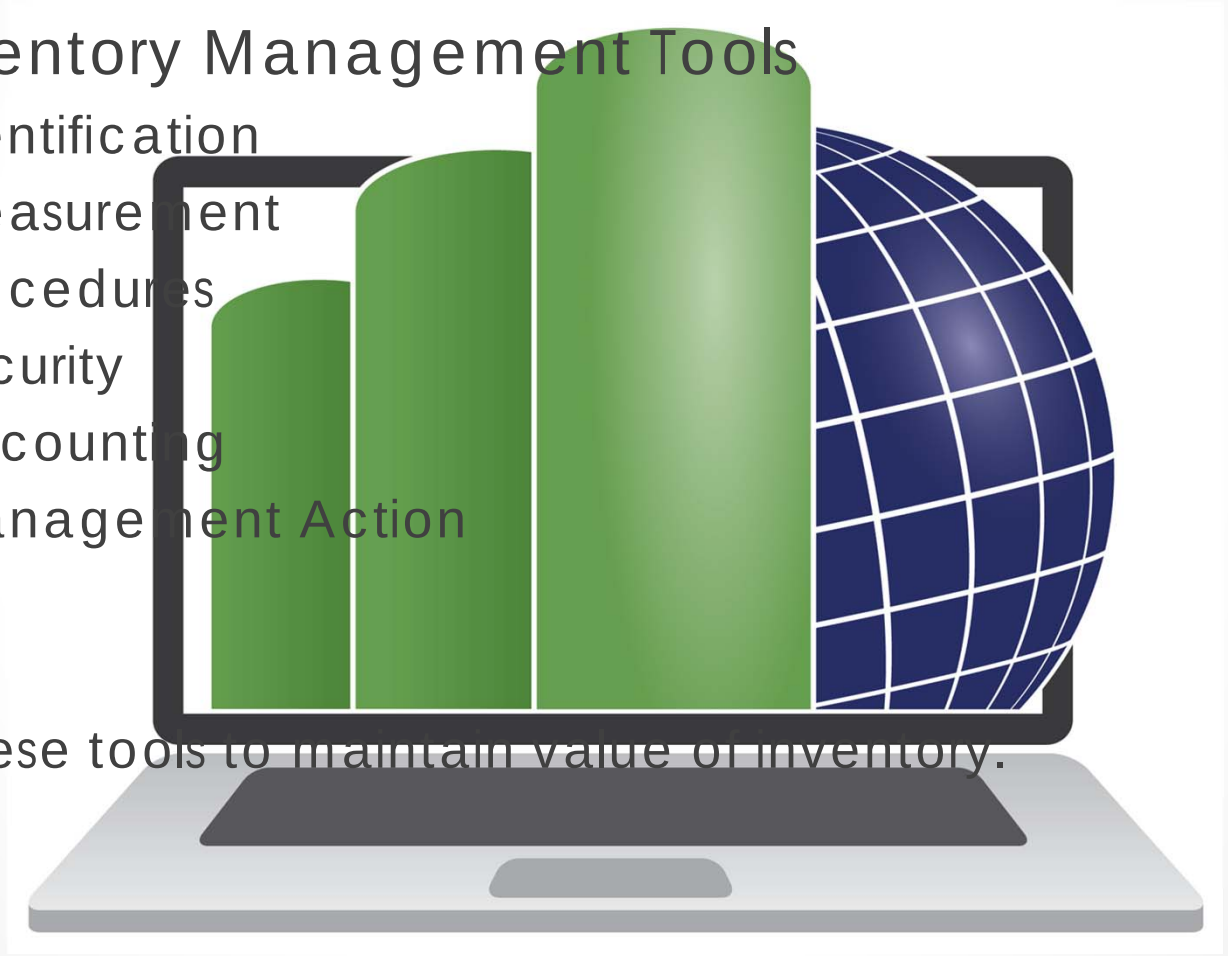
Summary

- Accounting – is the process of identifying, measuring, sorting, and communicating economic information to permit informed judgments and decisions by the users of the information.
- Concentrate on Manageable Expenses and Inventories
- Know the source data documents and insure their accuracy
- Know all the reports available to analyze your area of operation and where the data inputted into them is derived from
- Take action!!!!



Summary

- Six Inventory Management Tools
  1. Identification
  2. Measurement
  3. Procedures
  4. Security
  5. Accounting
  6. Management Action



Use these tools to maintain value of inventory.

Summary

- Trained employees
- **Accurate source documents**
- Understand operating activities impact on inventories, both quantity and quality
- Have a written physical inventory procedure and plan
- Safe unrestricted access to measurement points
- Proper tools
- **Take immediate action on variances**

Questions?

E-mail us at:

jfvsolutions@hotmail.com

Disclaimer

- This lesson is intended for a global audience that works in a variety of different styles of facilities as well as economic and governmental conditions. The content of this lesson is for informational purposes and to be used as it applies to your specific situation.
- The content of this lesson is not to take precedent over your current plant and /or company policies and programs, nor any governmental regulations.
- The photos used in this lesson were for illustration of the topic and are not to be taken as a recommendation for any design or equipment depicted in them.