Solutions2.0
reliability & operations solutions supporting organizational performance

U.S. SUGAR-- CASE STUDY

ROBERT H. BUKER, JR
President and CEO

RELIABILITY EXCELLENCE IS NOT OUR MISSION

U.S. Sugar Case Study

Robert H. Buker, Jr.

President and CEO

CEO CONCERNS

1. Stock price
2. Stock price
3. Stock price

…

25. Reliability Excellence

BUT--

INTRODUCTION

- Virtually everything today is commoditized (i.e. very low brand loyalty to anything)
- What matters is
  - Quality
  - Price/cost Therefore--
- Stock price is tied to profits, which are ultimately tied to producing a low-cost, high-quality product or service
- Outsourcing—only a temporary answer because once one company does it successfully, so will the competitors

INTRODUCTION, CONTINUED

- Virtually all production
  a) Requires intensive capital
  b) Is fixed cost

  Therefore--

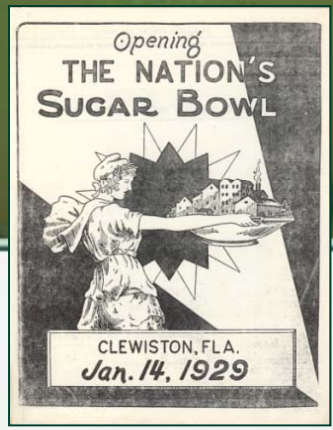
- No matter where or what you produce, the issue boils down to maximizing throughput while maintaining quality
- This depends on Reliability Excellence– steady state production at a high rate

CONCLUSION

- Reliability Excellence will maximize the potential profits – and
- Increase the stock price

UNITED STATES SUGAR CORPORATION SOUTHERN GARDENS CITRUS

U.S. SUGAR CASE STUDY: OUR PAST



- Raw sugar producer for 75+ years
- Two factories, 150,000 acres of farms and a railroad
- Our **new** technology was 1950s
- Majority of our technology was pre-World War I

- Our business model was based on cheap, plentiful, low-skilled labor
- Factories and farms ran in constant "crisis" mode

UNITED STATES SUGAR CORPORATION SOUTHERN GARDENS CITRUS

OUR PAST -- "YOU CAN'T MAKE THIS STUFF UP"

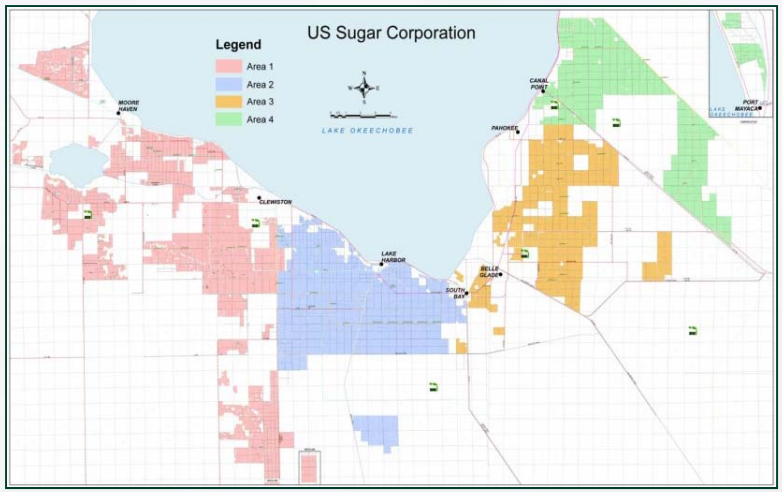
- No control of inventory –parts or product
- No scheduled replacement of equipment
- No known unit cost of production
- Measured the amount of raw material processed in the factory rather than the product produced
- Managed by huge redundancies in equipment
- Disassembled the factories & reassembled every year without any formal planning or control
- Union guaranteed 56 hrs/wk, 7 days/wk for 140 days. Then 4 days/wk for 225 days

OUR PAST: RESULTS

- Factories were unreliable
- Forced to process sugarcane at our competitor's facilities

THE PROCESS—SUMMARY

- Re-organized farms from 10 to 4 farms
- Went to 24-hr harvest
- Farmed for profit rather than production



THE PROCESS -- SUMMARY

- Scrapped newer factory
- Totally re-designed and re-built older factory
  - Standardized equipment
  - Fully automated
  - PLC controlled
  - Central control room

- Changed product to food-grade refined sugar
- Re-negotiated union contract --twice

UNITED STATES SUGAR CORPORATION

SOUTHERN GARDENS CITRUS

THE PROCESS--SUMMARY

- Measurement initiative
- Installed SAP
- Brought in LCE
- Hired maintenance planning teams
- Benchmarked internationally
- Re-designed overhead
- Started budgetary planning and forecasts

Rx PROCESS--THE RESULTS

- Lowered unit costs by 30%
- Stock price went up even during the financial meltdown

U.S. Sugar Share Price
Compound Annual Growth Rates

YEAR	U.S. SUGAR	S & P 500
2005	$ 199.10	$ 1,207.23
2006	$ 204.10	$ 1,310.46
2007	$ 180.00	$ 1,477.18
2008	$ 257.90	$ 1,220.04
2009	$ 237.90	$ 948.05
2010	$ 256.80	$ 1,186.69
CAGR	**6.35%**	**-0.34%**

REFINERY RESULTS

- **Refinery commissioned in 1998 w/capacity of 1,800 tons per day**
- **Refinery expanded in 2005 to capacity of 2,250 ton per day**
- **Refinery expanded in 2009-10 to capacity of 2500 tons per day**

Rx PROCESS RESULTS— THE DETAILS

- Details
  - Reduced headcount by 30% overall and 60% sugar manufacturing while maintaining production
  - Increased operating days from 140 to 180 in raw mill and to 350 in the refinery
  - Cut overhead by 25%
  - Cut overtime hours significantly
  - Reduced warehouse inventory by 25%
  - Reduced tractor and vehicle fleet by 23%
  - Increased reliability by nearly 30%
  - LEARNED WE ARE ONLY HALF FINISHED AT BEST

OUR AGRICULTURAL OPERATIONS—HORIZONTAL FACTORY

- Farming
- Harvesting
- Infrastructure--intensive
  - Road Maintenance (>1,000 mi)
  - Ditch/Canal Maintenance (>2,000 mi)
  - Irrigation and Stormwater Pumps
    - **435 pumps**
    - **250 million gal/hr for discharge**
    - **100 million gal/hr for irrigation**

UNITED STATES SUGAR CORPORATION SOUTHERN GARDENS CITRUS

HARVESTING -- CUTTING

- 100% mechanical harvest
- 24 hours a day, 7 days a week
- Typical crew:
  - 12 hour shift
  - 5 harvesters
  - 10 tractors
  - 30 wagons
  - 1 Supervisor
  - 22 operators
  - 1 mechanic

AG EQUIPMENT SUMMARY

Over 2,300 pieces of equipment

- **Farm Operations**
  - Tractors – 164
  - Implements – 303
- **Harvest**
  - Harvesters - 41
  - Loading Stations - 41
  - Tractors - 77
  - Cane Wagons – 213
- **Railroad**
  --11 locomotives
  --650 railcars
- **Water Control**
  - 435 pumps/structures
  - 250 power units
  - 185 electric motors
- **General**
  - Vehicles – 174
  - Construction – 50
  - Portable Fuel/Water - 108

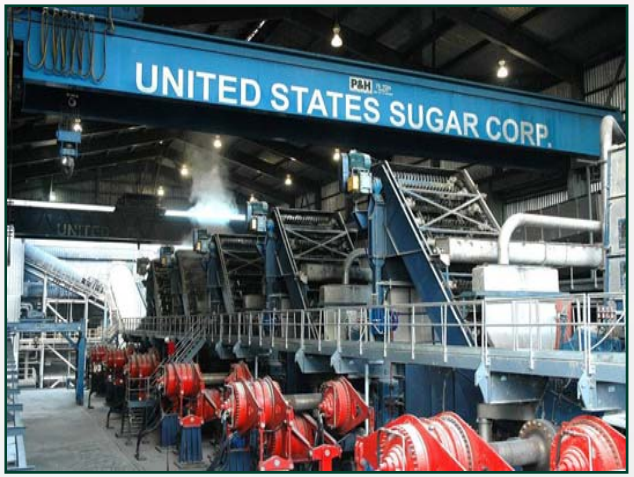
OUR MANUFACTURING OPERATIONS—VERTICAL FACTORY

- World's largest integrated cane sugar factory and refinery--consisting of three major unit operations:
  - Raw sugar factory, comprising Milling, Juice Processing and Crystallization
  - Power Plant
  - Refinery
- >720 individual pieces of operating equipment
- 110,000 feet of linear piping

UNITED STATES SUGAR CORPORATION SOUTHERN GARDENS CITRUS

SUGAR MANUFACTURING

- Processing
  - 2 milling tandems process 33,000 tons of cane per day for 200+ days
  - 400,000 gallons of juice processed every hour
- Refining
  - 14 million cwt annual capacity
  - Industrial and retail packaging
- Power Generation
  - 3 turbo-generators produce 52 MGW
  - Power the entire facility, with excess sold to grid
  - Exhaust steam is used as heating energy in raw mill & refinery



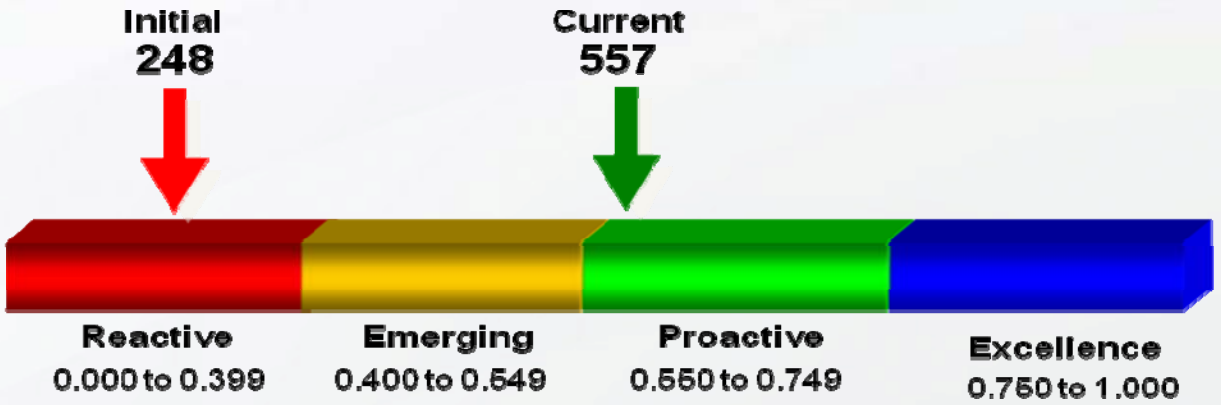
WHAT DID WE DO?

- **We approached Life Cycle Engineering (LCE), a premier provider of innovative and successfully executed reliability and maintenance solutions worldwide, to evaluate our maintenance practices**
- **Assessment in Oct 2006 showed our maintenance to be highly reactive**
- **We partnered with LCE to change our culture from reactive to proactive, and thereby improve the reliability and profitability of our facility**
- **Started on an initiative in Feb 2007, called Operational Excellence…powered by Rx**

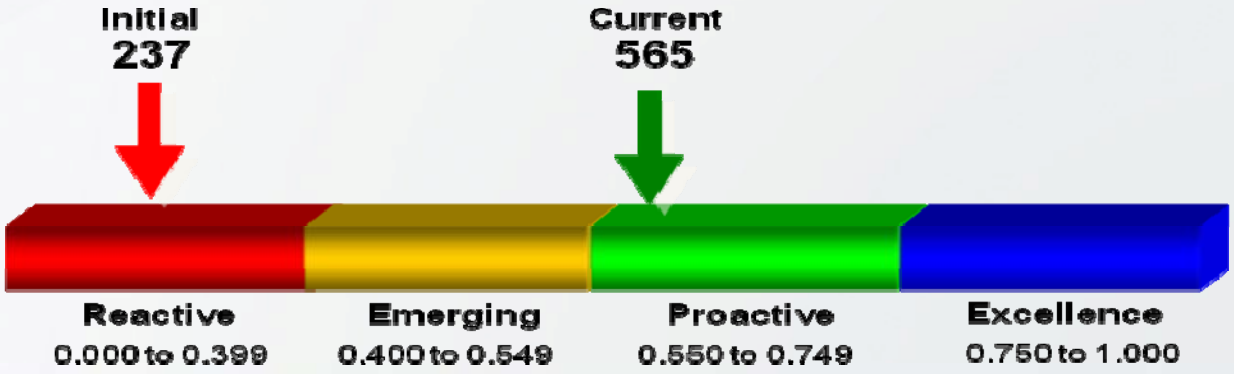
Ag

RELIABILITY (Rx) ASSESSMENT – APRIL '07 – April '10

Agriculture



Manufacturing



Rx – MAJOR AREAS OF OPPORTUNITY

- Reactive maintenance culture
- No understanding of Reliability Excellence
- No Reliability processes in place
- No Reliability performance metrics
- No structured focus on failure elimination
- No structured focus on loss elimination
- No resources in place to support Reliability

IMPLEMENTATION CHALLENGES

We knew that culture change would be our biggest challenge…

- Competing priorities
- 50-year rule
- Operated on tribal knowledge
- Weak track record for successful initiatives
- Reactive Maintenance
- No understanding of Rx
- Union resistance
- Mid-level management resistance

PEOPLE

Effective Change Management is the key…

- Sponsorship
  - Engaged executive sponsorship is critical
  - Change management is a full-time responsibility
  - Don't back off of the new processes
- Communication
  - One-way communication is not effective
  - Need mechanisms for feedback
- Risk Management
  - Deal with resistors quickly & decisively
  - Tinkering does not deliver expected ROI
  - Big bang is attractive, but small pilots are more effective
  - Part-time resources deliver minimal value

HOW DID WE DO IT?
Reliability Excellence (Rx) Initiative

Four processes

- **Work Management and CMMS Optimization**
- **Materials Management**
- **Operational Excellence**
- **Reliability Engineering**

THE FOUR MAIN METRICS

- **Resource Utilization – Is all available work time being charged to WO's, targeting good data capture & productivity**
- **Schedule Compliance – Are we doing what we planned to do, targeting discipline towards our planned schedule. Use of flexible scheduling techniques**
- **PM/PdM Compliance – Are we doing our preventive maintenance work, focusing on being proactive, using non-invasive technology**
- **Emergency Work – Trend should be downwards, indicating move towards planned & scheduled work**

Rx IMPLEMENTATION PROCESS

- Step 1 – Early Education and Training
- Step 2 – Assessment / Gap Analysis
- Step 3 – Business Case
- Step 4 – Master Plan for Implementation
- Step 5 – “To Be” Process Development
- Step 6 – Pilot Implementation
- Step 7 – Full Implementation
- Step 8 – Continuous Measurement and Improvement

WORK MANAGEMENT ACCOMPLISHMENTS

- Added maintenance planners to plan jobs – no net headcount increase
- Utilize weekly, daily, and shutdown maintenance schedules
- Performance measurement (metrics)
- Parts kitting and delivery
- Focus on Preventive Maintenance compliance
- Designed SAP to fit the business process

BENEFITS OF PLANNED WORK

Crew
without Planning

2 Supervisors
20 Tradespersons
@ 35% Direct Work (wrench time)
7.0 Equivalents

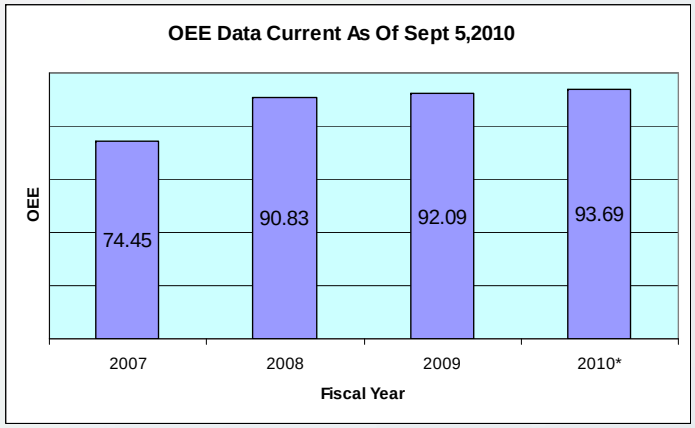
Crew
with Planning

2 Supervisors
19 Tradespersons
1 Planner
@ 65% Direct Work (wrench time)
12.4 Equivalents

Improved Output = 77%

RELIABILITY ENGINEERING ACCOMPLISHMENTS

- Reliability improvement initiative started in 2007
  - Results in increased uptime and reduced cost
  - Focus on preventive maintenance, work planning, scheduling, and failure elimination
- Equipment Maintenance Plans for most critical equipment
- Built detailed failure codes – building equipment history
- Use of Preventive Maintenance Inspections (PMI's)
- Replacement decisions based on total cost of ownership
  - 90% of equipment is owned
  - Lease and rental programs
  - where cost effective
- Utilized predictive maintenance technologies
- Increased equipment operating effectiveness ~30%



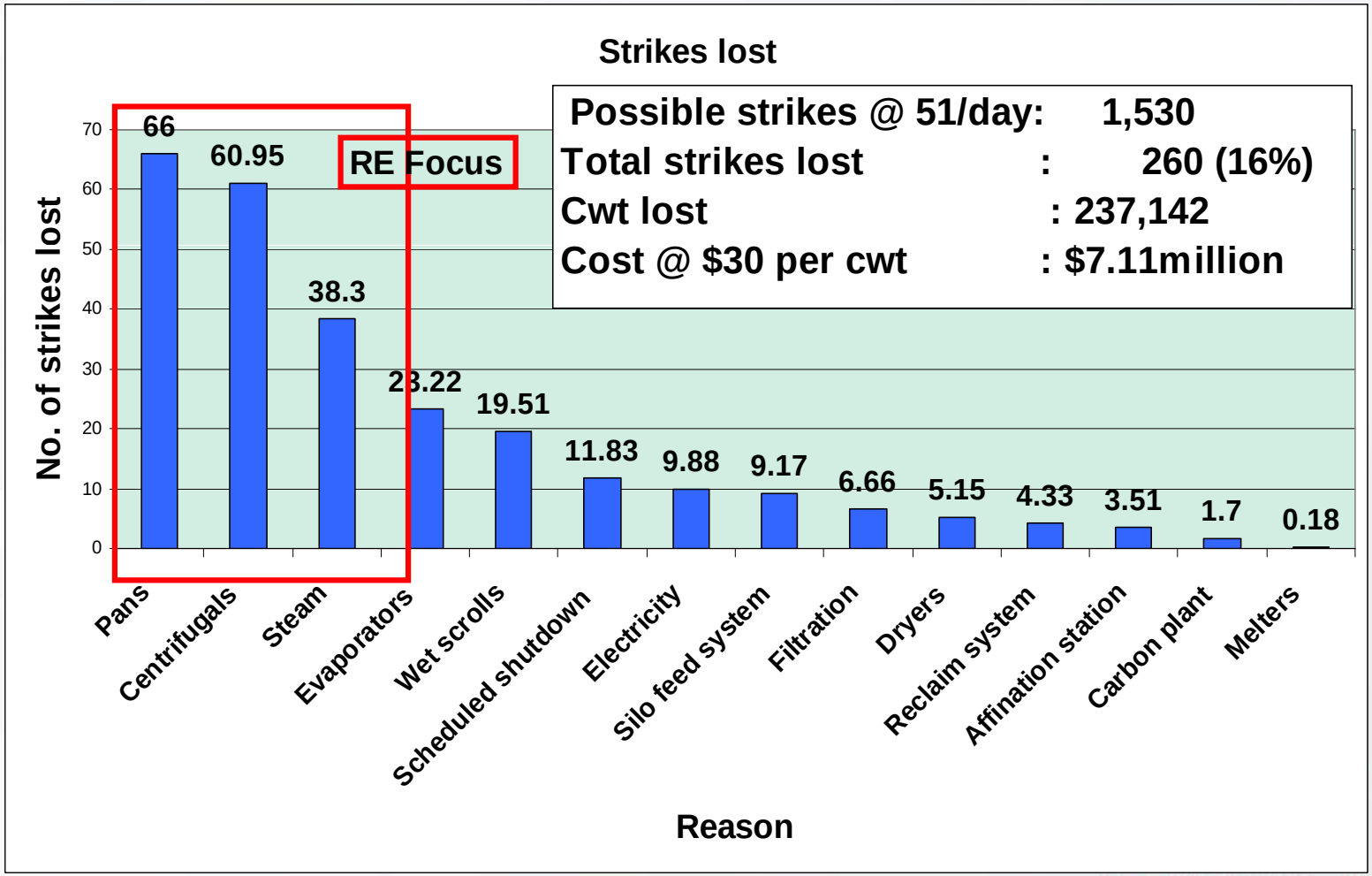
MATERIAL MANAGEMENT FOCUS

- **Centralize inventory to one central warehouse, with two satellite warehouses**
- **Implement best practices for materials management**
- **Elimination of obsolete items ($3.9MM to date)**
- **Aiming for inventory accuracy better than 95%**
- **Effective kitting and delivery process**
- **Reduction in inventory (VMI)**

UNITED STATES SUGAR CORPORATION

SOUTHERN GARDENS CITRUS

INEFFICIENCY HITS BOTTOM LINE
Example -One Month – Lost Refinery Strikes



REFINERY: ANNUAL PRODUCTION

Year	Production	Operating Days	% Increase from previous year	Revenue Increase from previous year @ $25/cwt [$]	Avg/Day	Production % Increase from previous year
04-'05	10,847,955	311			34,881	
'05-'06	11,723,619	344	8%	21,891,600	34,080	-2%
'06-'07	11,055,978	352	-6%	(16,691,025)	31,409	-8%
'07-'08	13,488,099	360	22%	60,803,025	37,467	19%
'08-'09	13,856,334	357	3%	9,205,875	38,813	4%
'09-'10 PROJ.	14,100,000	351	2%	6,091,650	40,171	4%

****While increasing production, customer complaints decreased 54%**

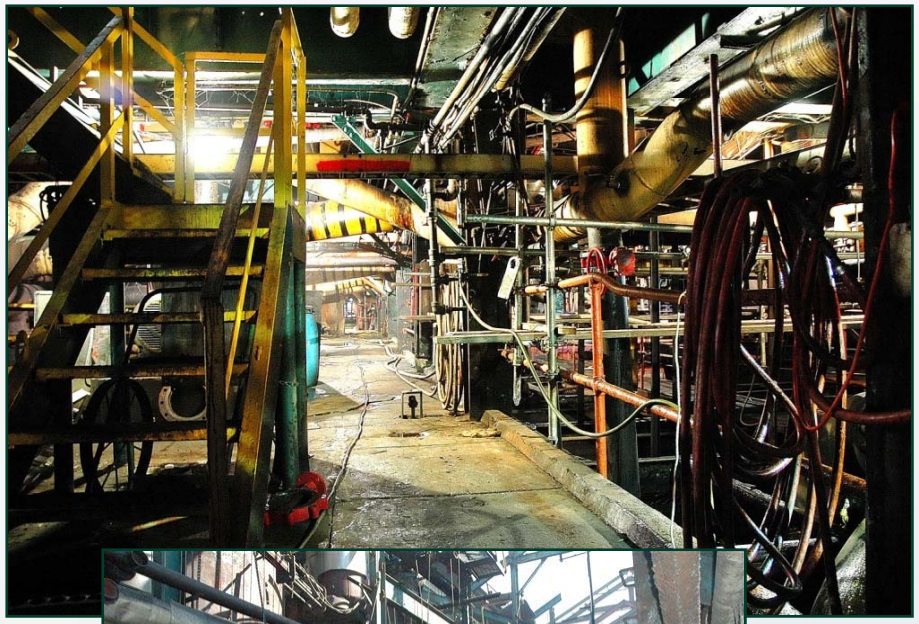
UNITED STATES SUGAR CORPORATION

SOUTHERN GARDENS CITRUS

OLD MAINTENANCE SYSTEM (pre-2007)

Old Culture

- Firefighters
- Reactive maintenance
- Run to failure
- Large stock of spare parts
- Large maintenance workforce
- High need for duplicate equipment
- High overtime



NEW MAINTENANCE SYSTEM

New Culture

- Planning & scheduling maintenance
- Proactive maintenance
- Utilize latest applicable technologies
- Ensuring capacity through regular equipment checks
- Economic stock of spare parts
- Smaller, more efficient maintenance workforce
- Reduced need for duplicate equipment
- Normal overtime

LESSSONS LEARNED

- Reliability Excellence is a cultural change—the biggest challenge is the headspace adjustment of the people
- It is a multi-year capital project
  - Money
  - People
  - Time
- Like the principles of war, the big payback is delayed but fundamental
- It does pay off, but not on a quarterly basis

LESSONS LEARNED

- Long-term commitment of upper management is key
- Identify leaders and resisters
- Don’t box, use judo wherever possible

- If you can’t change the people, change the people (>20% of management won’t be able to transition)
- Be prepared to walk around naked
- Don’t skimp on heart surgeons, skimp on podiatrists
- Persistence is more valuable than brilliance
- When you are going through hell, keep on going…

CLOSING

"As a military helicopter pilot, equipment failure can result in immediate and often fatal consequences.

As a business, equipment failure can result in a slower and less dramatic fatality, but dead is still dead and your competitors will dance on your grave."

Robert H. Buker, Jr.