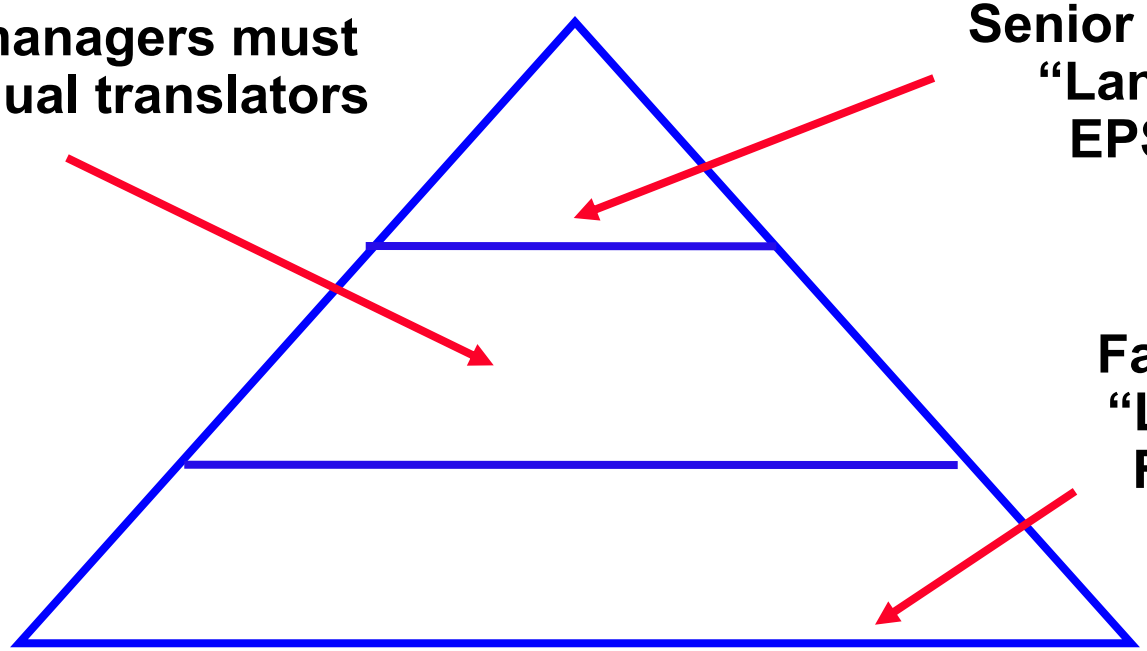
Measuring Operations Performance at Analog Devices

(Language of Money vs. Language of Physical Operations)

Middle managers must be bilingual translators

Senior managers speak the "Language of Money" EPS, ROI, NPV, etc.



Factory staff speak the "Language of Things" Flow rates, defects, downtime, etc.

Alternatives to middle management translation:

1. Teach language of money to the factory (Texas Eastman)
2. Teach language of things to executives (Analog Devices)
3. Teach both (Goldratt)

Cost Allocation Distortions

Consider Two Pen Manufacturing Plants

Same Capital Equipment, Different Product Mix

Plant A

1,000,000 Blue Pens

How much and what types of indirect and overhead costs will these plants have?

Plant B

500,000 Blue Pens
200,000 Black Pens
100,000 Green Pens
50,000 Red Pens

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100 Fuschia Pens

1,000,000 Pens

How Should Indirect/Overhead Costs Be Allocated?

Cost Allocation Distortions

Plant A	Plant B
1,000,000 Blue Pens	500,000 Blue Pens
	.
	100 Fuschia Pens
	1,000,000 Pens

Plant B Will Have Higher Costs Attributable to:
More Inventories, More Setup Labor, More Purchasing
More Manufacturing Engineering, More Information Processing
More Scheduling Effort, More Scrap and Waste

Under a Traditional (Direct-Labor-Based) Cost Allocation System in Plant B, Fuschia Pens Will Only Differ in Cost From Blue Pens by the Differences in Material Costs

Cost Allocation Distortions

Plant A

1,000,000 Blue Pens

Plant B

500,000 Blue Pens

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100 Fuschia Pens

1,000,000 Pens

Under a Traditional (Direct-Labor-Based) Cost Allocation System in Plant B, Fuschia Pens Will Differ in Cost From Blue Pens by the Differences in Material Costs

Volume-based overhead allocation schemes over cost the high volume products (Blue Pens) and under cost the low-volume products (Fuschia Pens)

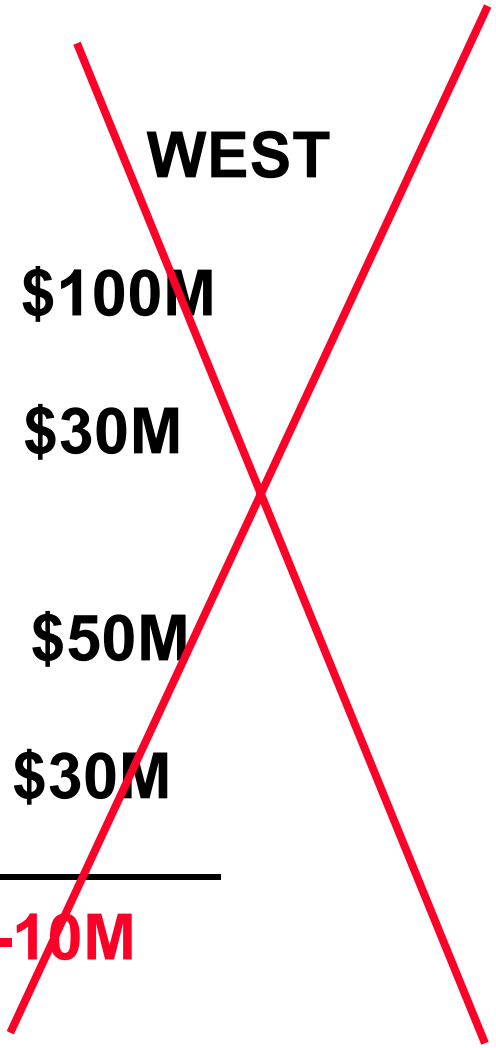
The Death Spiral

	TOTAL	EAST	CENTRAL	WEST
SALES	$300M	$100M	$100M	$100M
DIRECT COSTS	$9OM	$30M	$30M	$30M
TRANSP	$9OM	$10M	$30M	$50M
R&D	$9OM	$30M	$30M	$30M
NET	$30M	$30M	$10M	$-10M

Mandate: Close the West Division

The Death Spiral

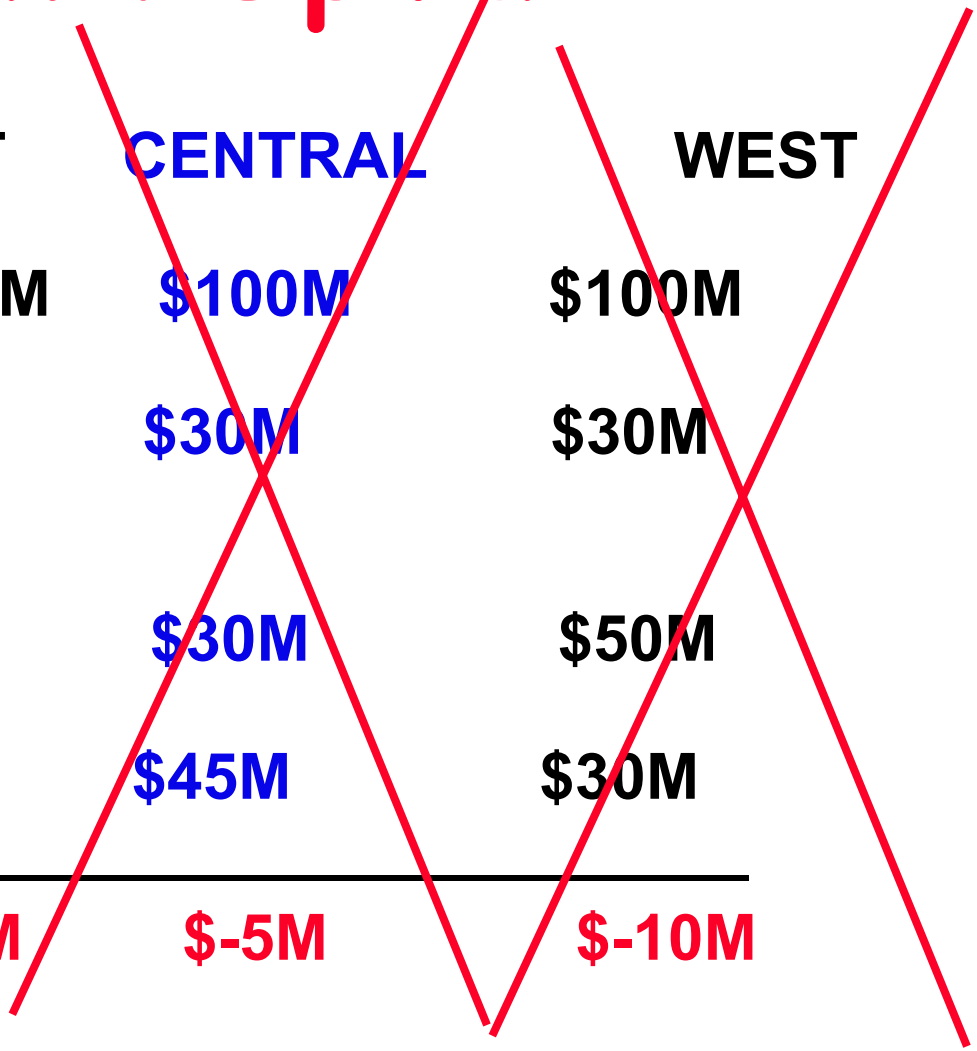
	TOTAL	EAST	CENTRAL	WEST
SALES	$200M	$100M	$100M	$100M
DIRECT COSTS	$6OM	$30M	$30M	$30M
TRANSP	$4OM	$10M	$30M	$50M
R&D	$9OM	$45M	$45M	$30M
NET	$10M	$15M	$-5M	$-10M



Mandate: Close the Central Division

The Death Spiral

	TOTAL	EAST	CENTRAL	WEST
SALES	$100M	$100M	$100M	$100M
DIRECT COSTS	$3OM	$30M	$30M	$30M
TRANSP	$1OM	$10M	$30M	$50M
R&D	$9OM	$90M	$45M	$30M
NET	$-30M	$-30M	$-5M	$-10M



Mandate: EXIT THIS LOUSY BUSINESS

Analog Devices (Team assignments)

1. Describe of the half-life system and its rationale.
2. What are the strengths and weaknesses of the half-life system? Important underlying assumptions?
   How to get started?
2. Examples from the case that illustrate conflicts between operational and financial measures?
3. Describe of the scorecard system and its rationale.
4. What are the strengths and weaknesses of the scorecard system?

Analog Devices

(1. Describe of the half-life system and its rationale.)

1. Measures improvement progress in some metric (e.g., defects, cycle time, accidents, time-to-market)
2. Tracks length of time to 50% improvement (= "half-life")
3. Focuses measurement on dynamics of improvement

Analog Devices

(2.Strengths and weaknesses of the half-life system)

Strengths

1. Quantitative Improvement Measurement System
2. System to measure progress in any metric
3. Consonant with continuous improvement themes & PDCA
4. Enables comparisons across organizations on *rates* of improvement.
5. Focuses on results
6. Understandable, data-driven

Weaknesses

1. Assumes constant learning rates
2. No guidance on process
3. Logarithms not intuitive
4. No packaged programs
5. No benchmarks
6. Not process oriented

Analog Devices

(3. Examples from the case that illustrate conflicts between operational and financial measures)

1. As wafer yields improved, fewer wafer starts were increasing cost/wafer.
2. End-of-Quarter revenue needs lead to focusing on large (rather than late) orders, so OTD suffers.
3. Expediting engineering lots in the factory can degrade factory production performance.
4. Overall yield improvement can mask degradation on some categories
5. When operations are efficient, the are tradeoffs across Service, Inventory, and Cost.
6. Exhibits 10 & 11 versus 12 & 13

Analog Devices

(Describe of the scorecard system and its rationale)

1. Part of an executive information system that captures multiple domains of metrics.
2. Recognizes the need for *balance* across metrics for
   a. Financial Reports
   b. Customer Satisfaction
   c. Internal Business Processes
   d. Innovation, Learning, and Growth
3. Explicitly addresses existence of category tradeoffs

Analog Devices

(5. Strengths & weaknesses of the scorecard system)

Strengths

1. Recognizes need for balance across metric domains
- Recognizes the existence of tradeoffs
3. Recognizes that no single metric captures it all
4. Can provide cross-functional basis for discussions

Weaknesses

1. Doesn't tell how to make tradeoffs
- No simple objectives

Design your own Scorecard

Financial	
Goals	Objectives
1. xx	1. aa
2. yy	2. bb
3. zz	3. cc

Customer	
Goals	Objectives
1. xx	1. aa
2. yy	2. bb
3. zz	3. cc

Internal Processes	
Goals	Objectives
1. xx	1. aa
2. yy	2. bb
3. zz	3. cc

Innovation, Learning, Growth	
Goals	Objectives
1. xx	1. aa
2. yy	2. bb
3. zz	3. cc

Design your own Half-Life system

What metrics would you like to track continuous improvement on?

FUNCTIONS OF ACCOUNTING AND MEASUREMENT SYSTEMS

1. EXTERNAL REPORTING/
   INVENTORY VALUATION
2. PRODUCT COSTING FOR
   PRODUCT LINE DECISIONS
3. PROJECT EVALUATION/
   CAPITAL BUDGETING
4. OPERATIONS CONTROL
   AND IMPROVEMENT
5. PERFORMANCE MEASUREMENT
   AND ASSESSMENT
6. COMMUNICATION AND TRANSLATION
7. INFLUENCE BEHAVIOR
8. INFLUENCE WORLDVIEW