Data Driven Safety Process Improvement

Beyond the struggle with human nature

R. Cary Tuckfield, PhD

Process Improvement Consultant

Safety-Analytics LLC

Here's the Point

- If we view Workplace Safety as a *process*, we can use the principles of *statistical process control* to
  - Improve the process
  - Retain the improvements
  - Increase reliability for a safe workplace
  - Minimize OSHA citations and fines

The Focus

"In God we trust; all others bring data"

- W. Edwards Deming

Why ?

- "There's no substitute for knowledge"
- "It's not enough to do your best. You must KNOW what to do, and then do your best"
- Knowledge comes from data analysis

Otherwise:

If you always do what you always did, you'll always get what you always got!

“Without new knowledge, companies can make few strides forward. Tradition and rigid procedures will only preserve ignorance and loss.”

- R. Cary Tuckfield

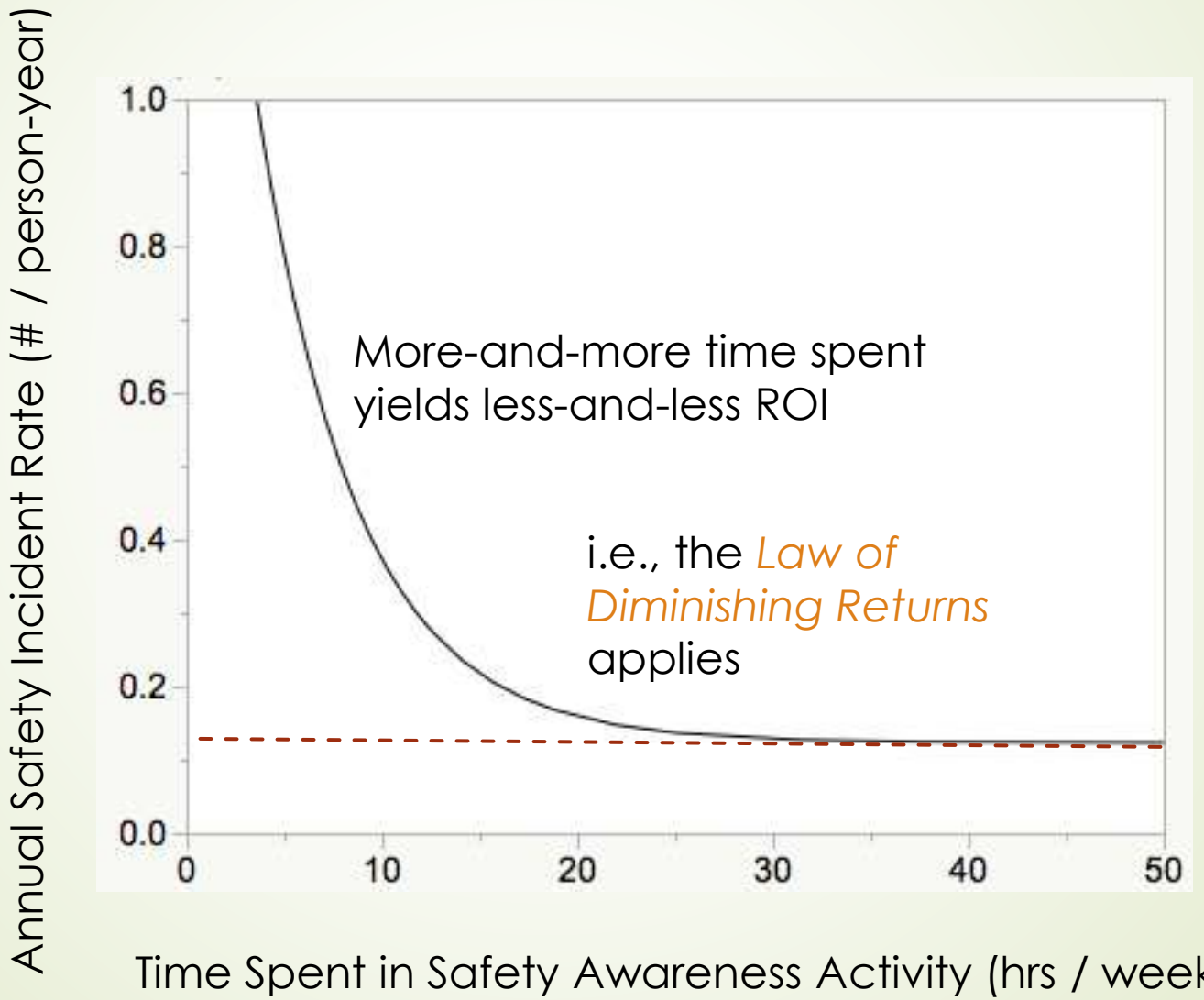
It’s **human nature**…

and our experience.

So, what does every company do?

- Practice the **Theory of Safety Awareness**
  - Annual safety training
  - Hazard assessments and safety inspections
  - Toolbox Talks
  - Regular Safety Meetings
  - Safety Committees
  - Posters, placards, slogans, jargon
- The **Aim**
  - Raise & sustain awareness
  - Stimulate all to think before they act
  - Build a safety culture

But, what should we expect?



It's just human nature, right?!

How can we change this?

- How do we get new knowledge?
- How do we overcome the Law of Diminishing Returns?
- How do we build on the bedrock of our current practice of Safety Awareness?
- How do we improve the Safety Process beyond the struggle with our own human nature?

Answer: Let the Data Drive our Actions

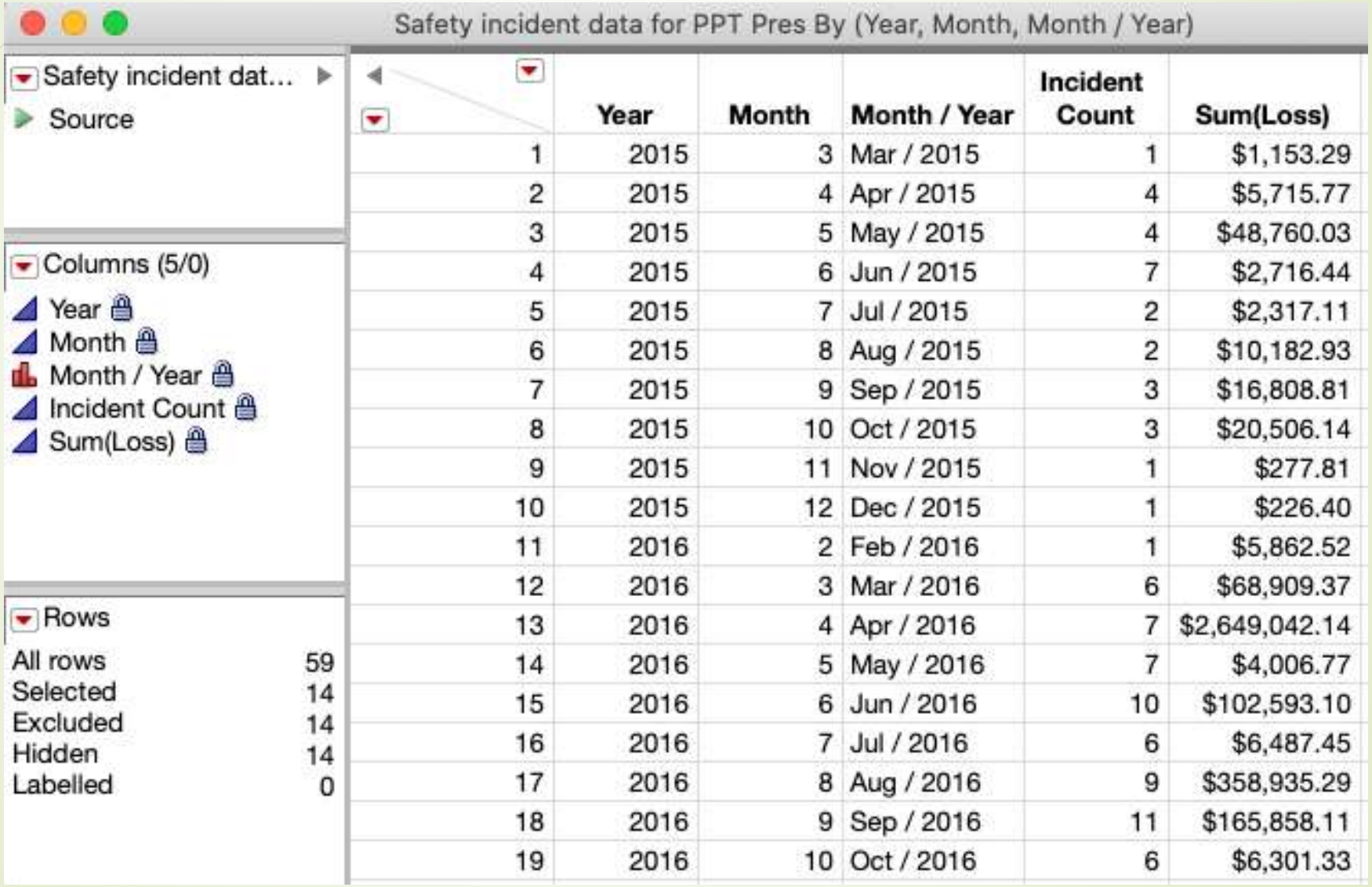
Employ the principles of Statistical Thinking

1. All work occurs as a system of connected processes
2. All processes have measurement (data) variation
3. Reducing variation in the *safety process* will lead to
    a. **Lower** incident frequency
    b. **Smaller** losses
    c. **Increased** reliability in a safe workplace environment

Data from a claims dataset in an Excel spreadsheet

	A	B	C	D	E
1	**Loss**	**Accident Date**	**Month / Year**	**Insurance Coverage**	**Bodily Injury Type**
2	$1,153.29	03/23/2015	Mar / 2015	WC	Contusion, bruise
3	$2,263.49	04/08/2015	Apr / 2015	WC	Contusion, bruise
4	$981.45	04/08/2015	Apr / 2015	AL	Vehicle Damage
5	$0.00	04/08/2015	Apr / 2015	WC	Strain
6	$25,425.66	05/22/2015	May / 2015	AL	Vehicle Damage
7	$7,067.82	05/22/2015	May / 2015	AL	Strain
8	$1,570.59	05/01/2015	May / 2015	WC	Laceration, open wound
9	$1,619.24	06/23/2015	Jun / 2015	WC	Not Otherwise Classified
10	$467.47	06/23/2015	Jun / 2015	WC	Strain
11	$304.39	06/17/2015	Jun / 2015	WC	Electric shock
12	$197.53	06/04/2015	Jun / 2015	WC	Strain
13	$127.81	06/12/2015	Jun / 2015	WC	Bite or sting
14	$1,300.17	07/06/2015	Jul / 2015	WC	Laceration, open wound
15	$1,016.94	07/09/2015	Jul / 2015	WC	Puncture
16	$232.94	08/18/2015	Aug / 2015	WC	Laceration, open wound
17	$13,390.77	09/11/2015	Sep / 2015	WC	Sprain

Summarize data by month using *JMP*™



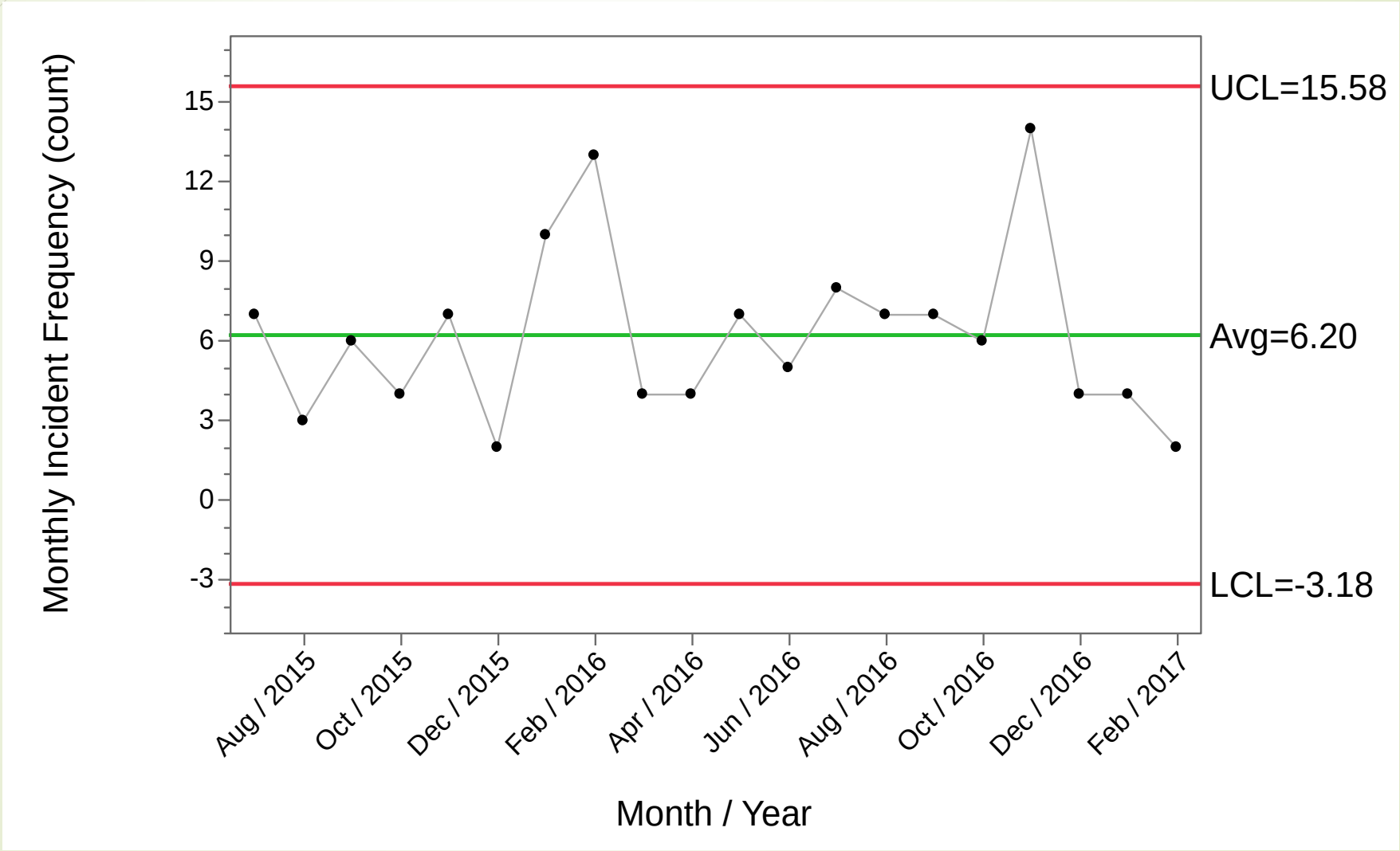
	Year	Month	Month / Year	Incident Count	Sum(Loss)
1	2015	3	Mar / 2015	1	$1,153.29
2	2015	4	Apr / 2015	4	$5,715.77
3	2015	5	May / 2015	4	$48,760.03
4	2015	6	Jun / 2015	7	$2,716.44
5	2015	7	Jul / 2015	2	$2,317.11
6	2015	8	Aug / 2015	2	$10,182.93
7	2015	9	Sep / 2015	3	$16,808.81
8	2015	10	Oct / 2015	3	$20,506.14
9	2015	11	Nov / 2015	1	$277.81
10	2015	12	Dec / 2015	1	$226.40
11	2016	2	Feb / 2016	1	$5,862.52
12	2016	3	Mar / 2016	6	$68,909.37
13	2016	4	Apr / 2016	7	$2,649,042.14
14	2016	5	May / 2016	7	$4,006.77
15	2016	6	Jun / 2016	10	$102,593.10
16	2016	7	Jul / 2016	6	$6,487.45
17	2016	8	Aug / 2016	9	$358,935.29
18	2016	9	Sep / 2016	11	$165,858.11
19	2016	10	Oct / 2016	6	$6,301.33

Display data via a Control Chart

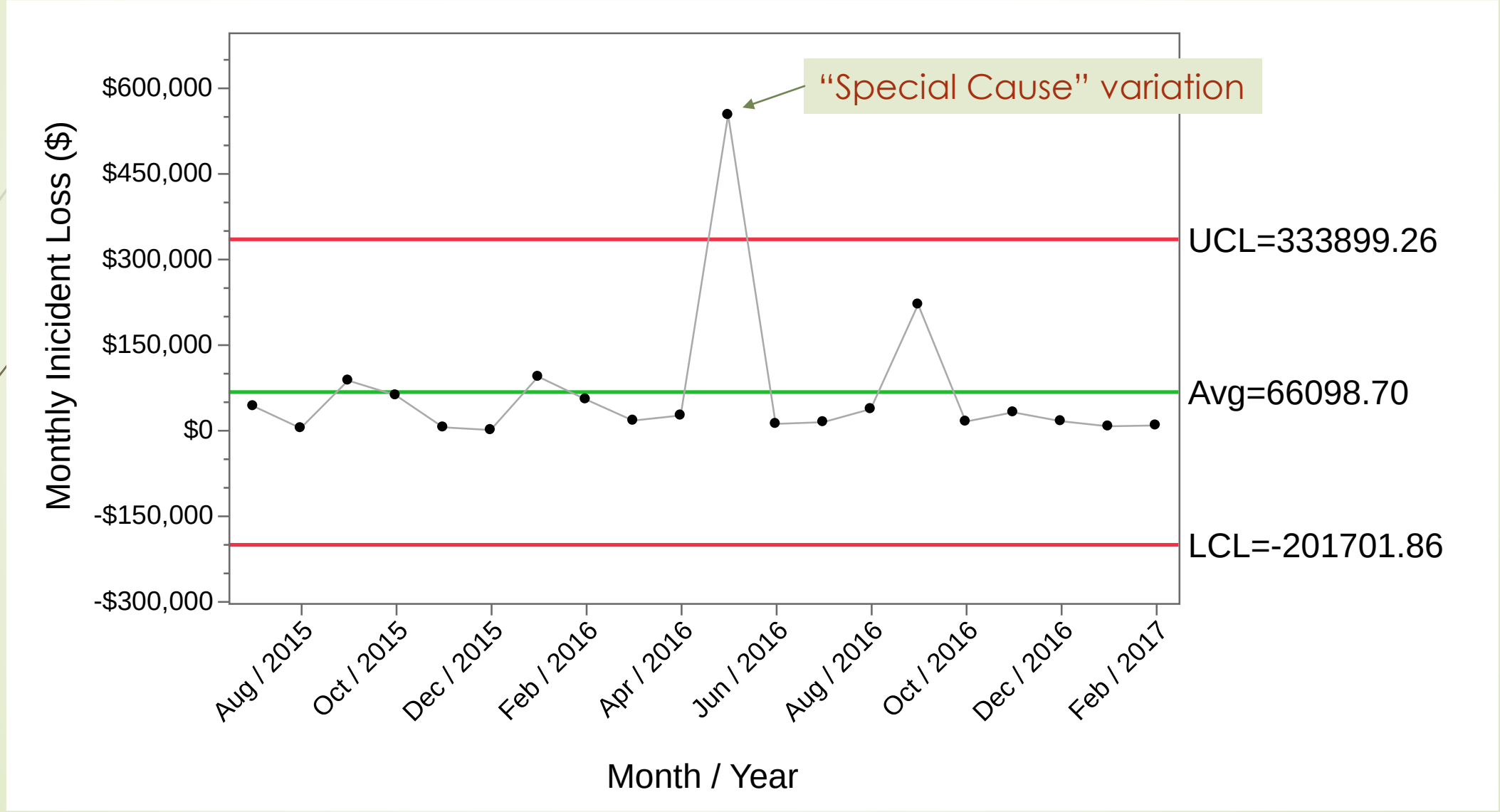
- Determine if safety process is ”stable”, i.e., in control
- Distinguish between “Common Cause” and ”Special Cause” variation
- If all common cause variation, take no action
- Examine and make “corrections” to special causes

IR Control Chart: Monthly Incident Frequency

"Common Cause" variation



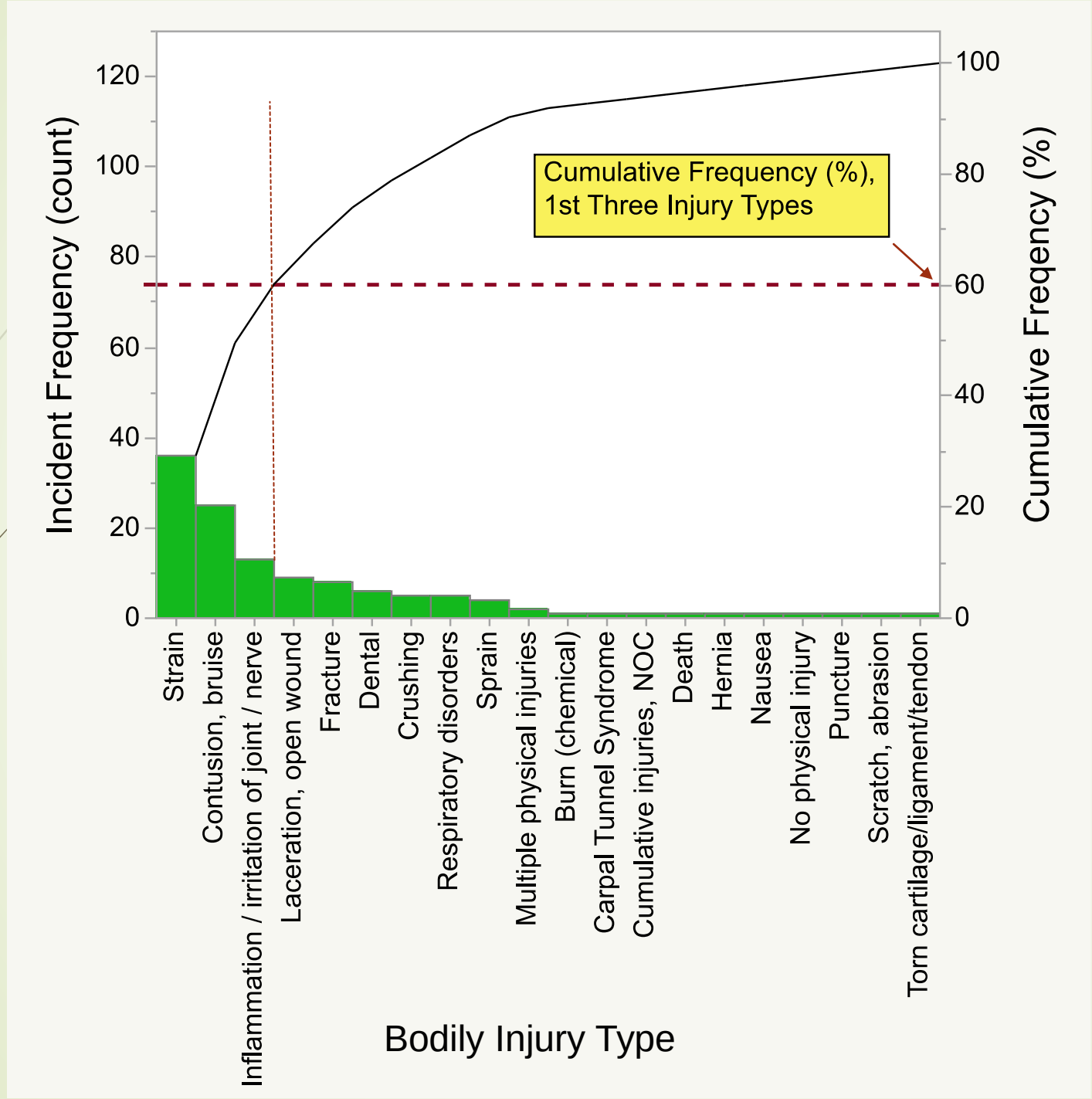
IR Control Chart: Monthly Loss

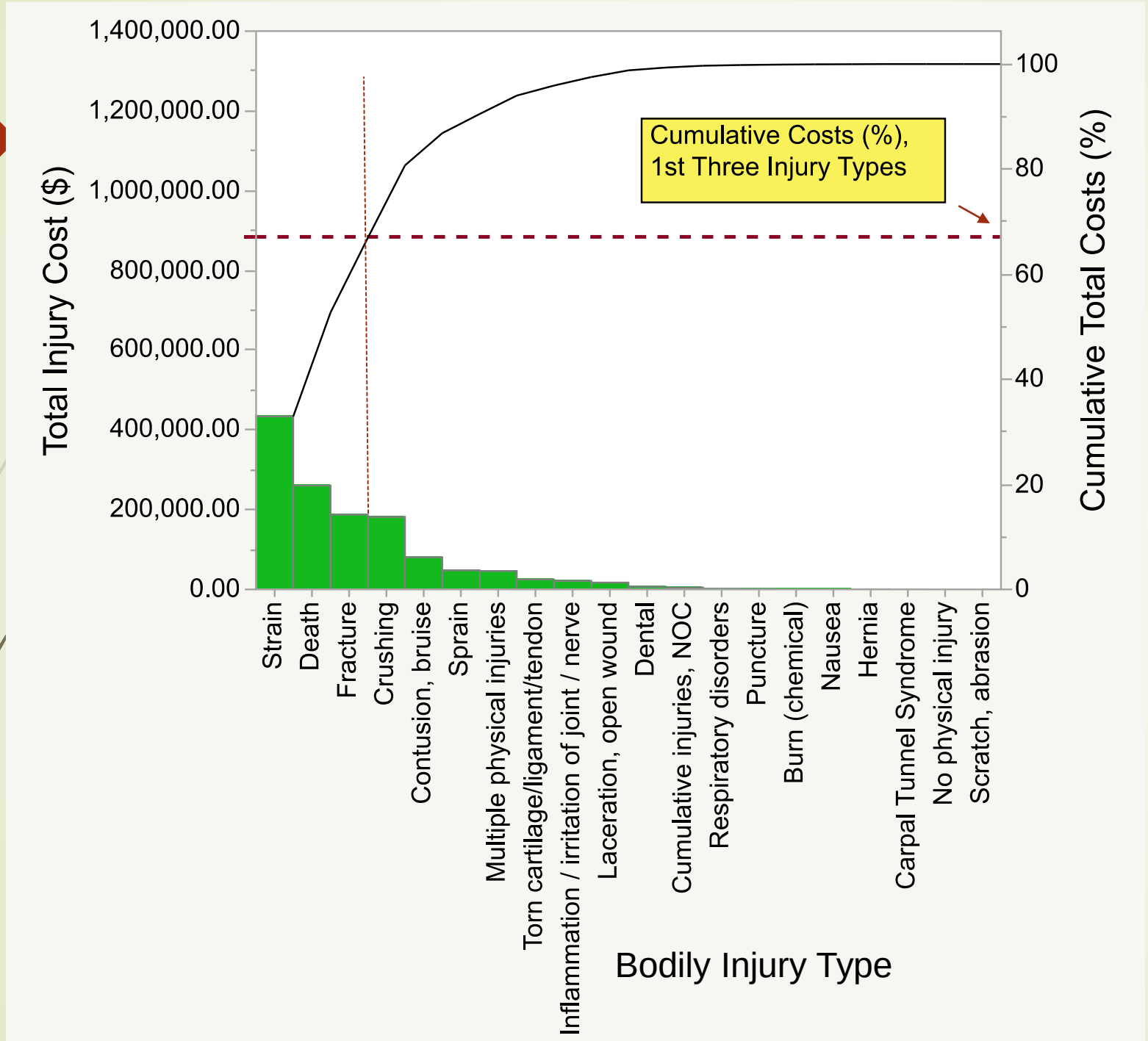


Safety Process Improvement

- Pareto Plot will identify the most frequent incident or injury type
- Process Map (flowchart) will identify the steps in the process with the highest risk
- OCSM for continual process improvement
  - Observe
  - Confirm
  - Strategize
  - Mitigate

Pareto Chart: Bodily Injury Type





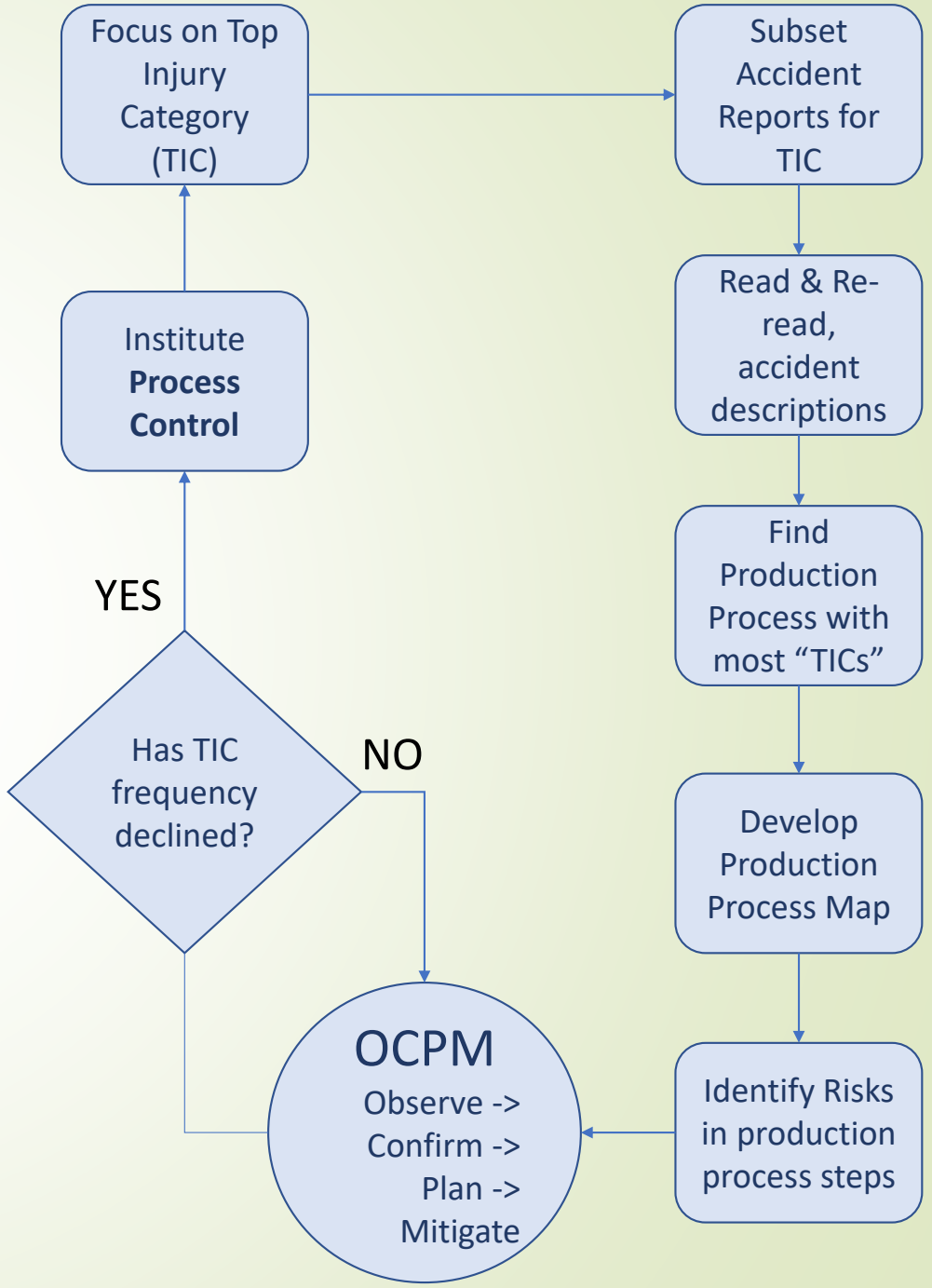
Pareto Chart: Total Loss by Bodily Injury Type

What we learned from the Pareto Charts

- STRAINs are the No. 1 bodily injury type
- Account for ~30% of all injuries
- Top three injury categories (Strain, Bruise, Inflammation/Nerve) account for ~60% of all injuries in the company

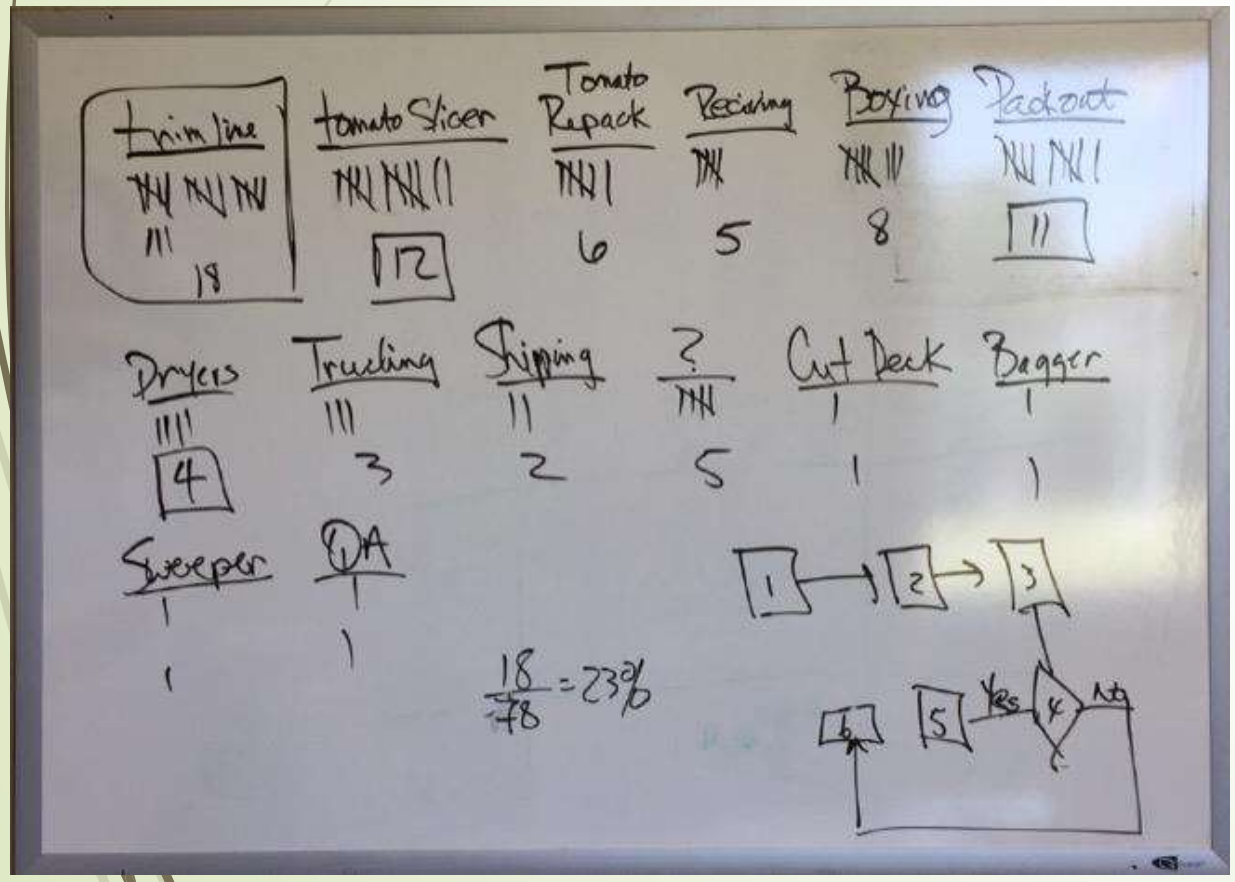
What to do next?

- Subset the accident reports that have to do with STRAIN injuries
- Read, re-read and read again the accident descriptions
- Develop a Process Map for the *production process* with the most STRAINs
- Identify the process steps with the highest risk
- Then OCSM (Observe, Confirm, Strategize, and Mitigate)

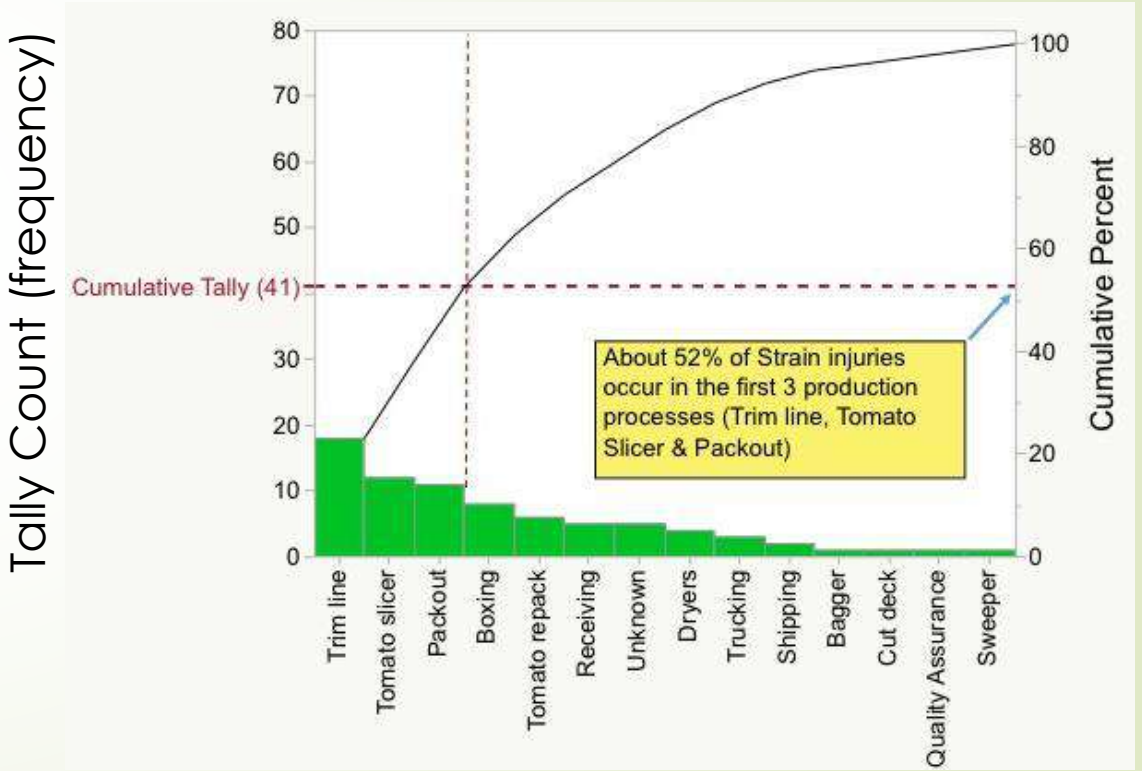


Tally up

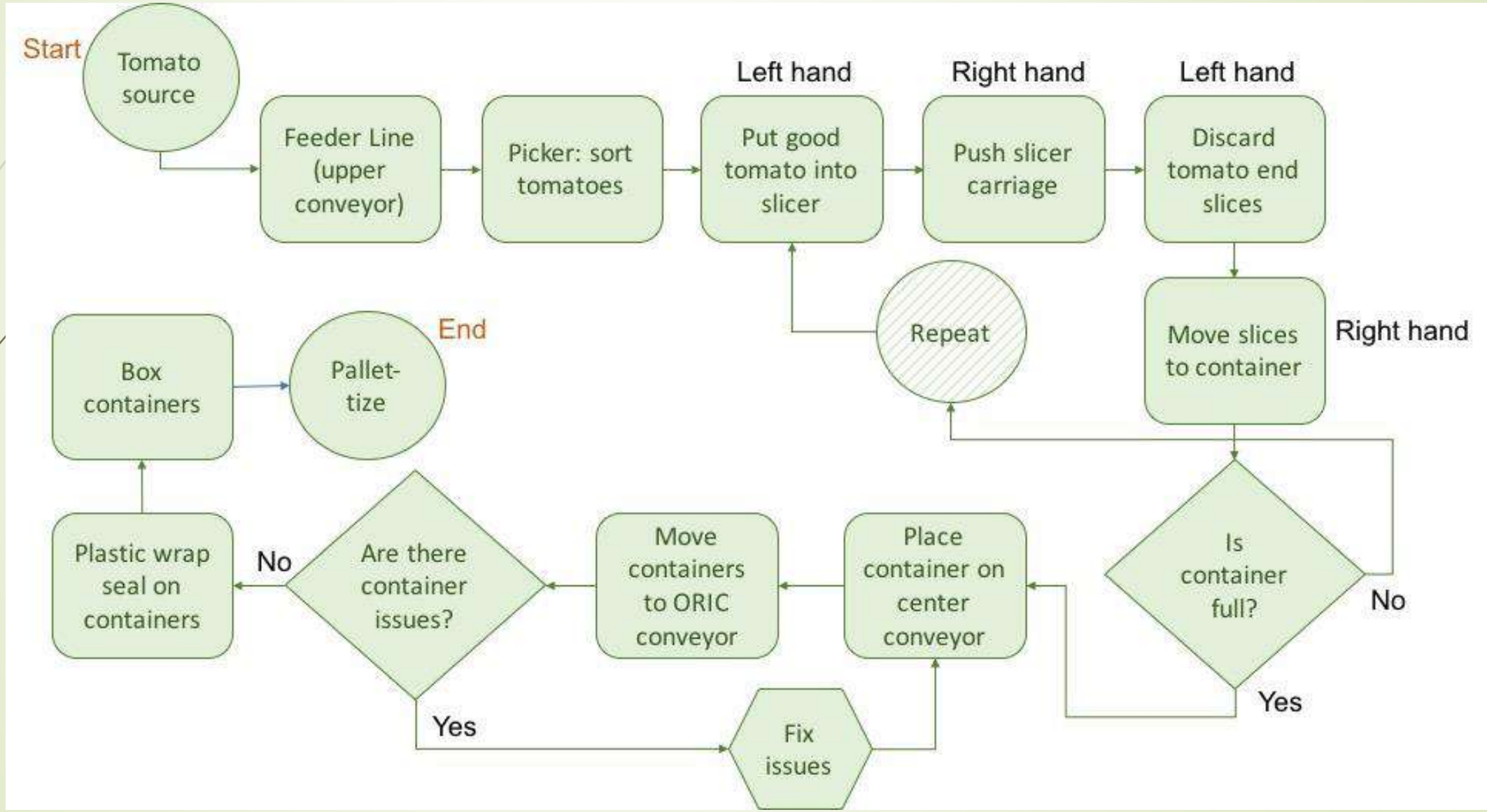
"Whiteboard" Production Process tally



Pareto Chart Summary



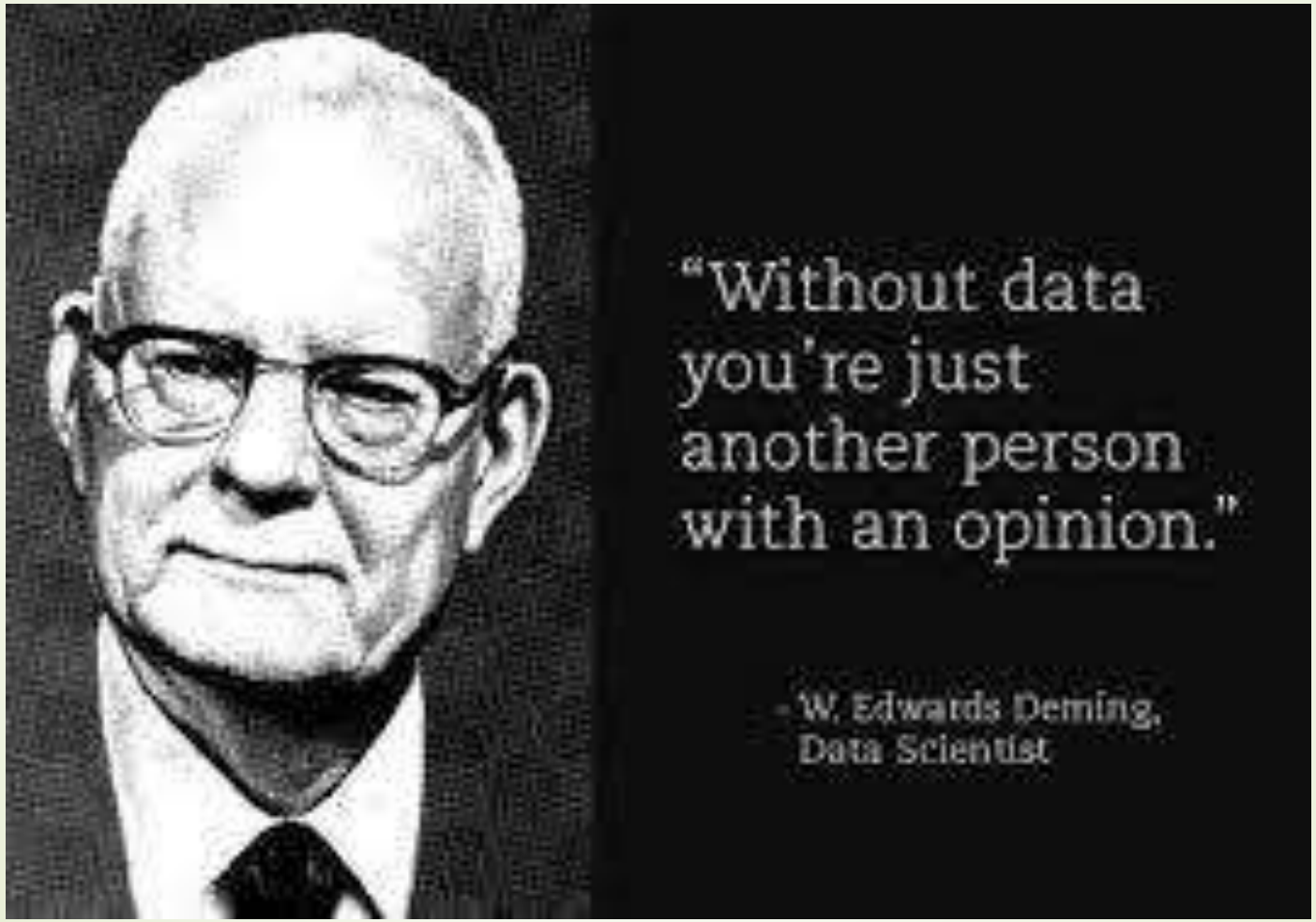
Production Process Map



Control the Safety Process

- When your mitigation strategy (i.e., OCSM) works, make it part of the new production process
- Create a new data metric that verifies the incorporation of your "new knowledge"
- This new data metric will be a leading indicator that will allow you to control the Safety Risk

Remember


"Without data you're just another person with an opinion."
- W. Edwards Deming, Data Scientist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