BIOCRAFT

Panel Discussion

Leading Indicators – How Can They Help Us Act?

Keene STATE COLLEGE

DuPont Sustainable Solutions

DSS Talking Points

- Fatal and Life-Altering Events do occur in laboratories
  - A brief history
- Leading Indicators are available to signal SIF vulnerability
  - Position on the DSS Bradley Curve
  - SIF Leading Metrics
    - % SIF
    - % Protected
- Reliable source documents on leading indicators
  - Campbell Institute
  - CCPS

DuPont Sustainable Solutions

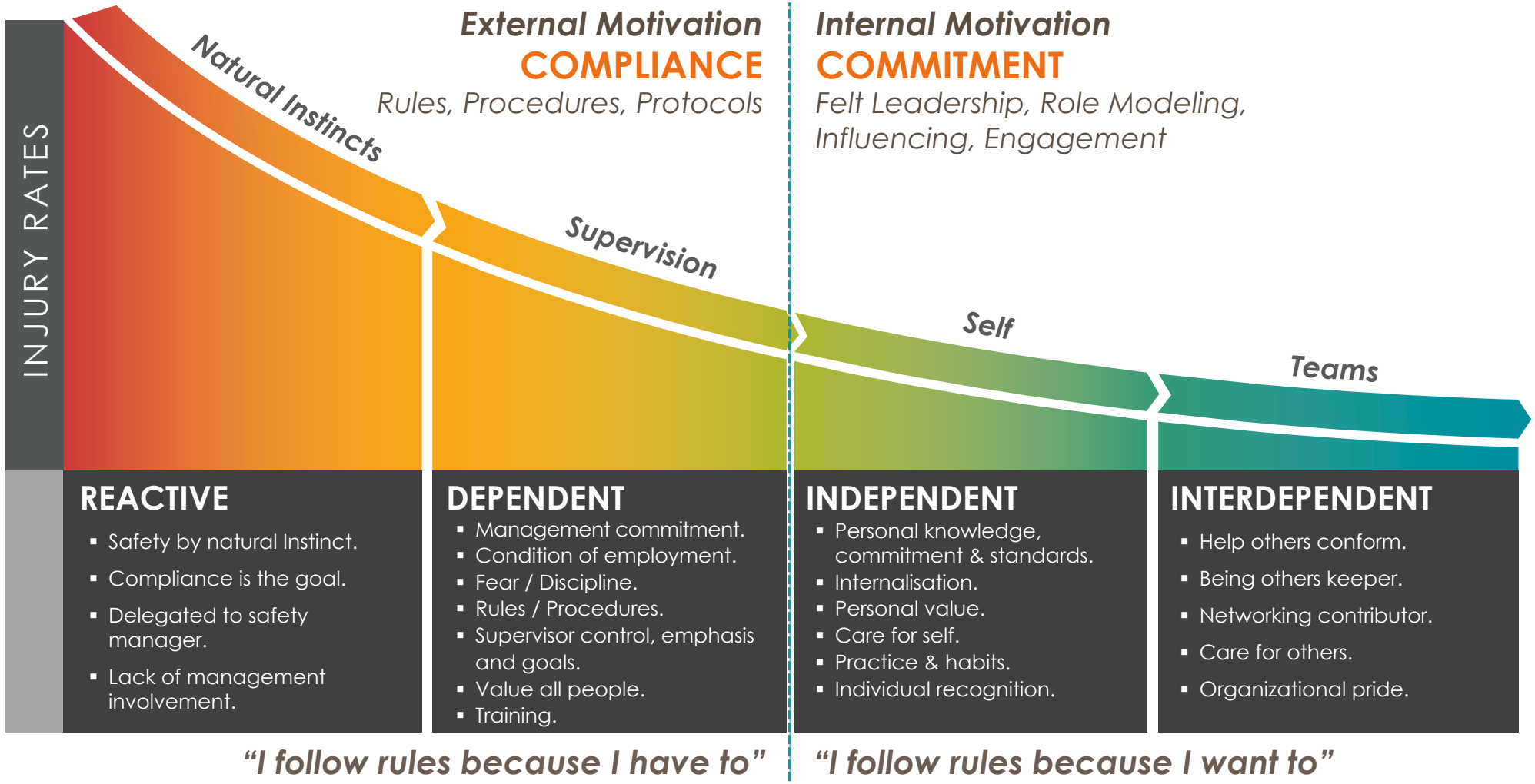
Brief History of 7 SIF Incidents in Laboratories

- December 2007 – T2 Jacksonville – reactive chemical explosion – 4 fatalities
- December 2008 – UCLA – spontaneous ignition – fatality
- January 2010 – Texas Tech – chemical mixture explosion – amputated fingers
- April 2011 – Yale – caught in lathe – fatality
- March 2016 – U of Hawaii – gas/static explosion – severed arm
- July 2017 – U of Utah – sodium hydroxide – cornea burn
- October 2021 – Nanjing University – explosion – 2 fatalities

US Chemical Safety & Hazard Investigation Board (CSB) Laboratory Incidents January 2001-July 2018. 8 pages. 261 incidents.

DSS Bradley Curve™

The Bradley Curve benchmarks progress in the journey towards world-class safety performance.



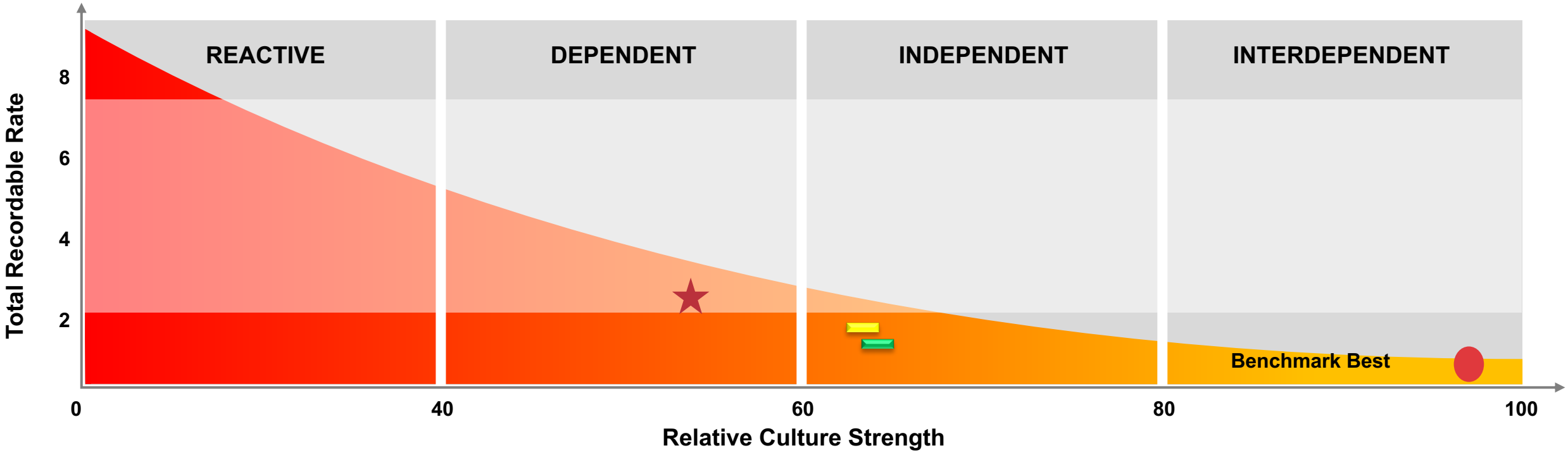
DuPont Sustainable Solutions

© 2021 DSS Sustainable Solutions. All rights reserved.

Position on the Curve is Indicative of Cultural Maturity to Anticipate, Recognize, and Control Risk

Comparisons to Industry Norms and Benchmark Bests Provides Context

Average industry RCS from DSS Safety Perception Survey database



DuPont Sustainable Solutions

SIF Metrics – Balanced Scorecard/Dashboard

SIF Indicator	Current Results	Trend/Comments
SIF Exposure Risk rate (from recordable cases)	25% (8 of 32 cases reported in OCT, no actuals). 20% YTD (one actual)	Increase in % SIF potential due to more reporting and more consistent use of SIF logic tree
% of SIF Risk cases reviewed by BU executive leader	87% (7 of 8 cases)	Better than last 3 month's avg. of 65%
Hierarchy of Controls (at least one CAPA in top half of HOC?)	1 of 8 in OCT = 12%. YTD = 11%	No improvement. Needs attention.
# Executive-led on-the-ground verifications of SIF CAPAs	2 occurred in OCT. YTD = 6	First time this year with 2 in one month!
% SIF-Protection Validations (SIF-PV) on-the-ground vs. target	79% - Goal – 100; Executed – 79 in OCT YTD monthly goal = 100 x 10 = 1000 Execution 540 total = 54%	Progress made in OCT, but major improvement still needed
SIF Protection % (% of SIF-PV's where all persons 100% protected)	76% - 60 of the 79 SIF-PV's were 100% protected. YTD = 65% (350 out of 540)	The highest level of SIF Protection we've seen this year. Progress. Still needs improvement.
Near-misses with SIF potential reported	30 in OCT. 150 YTD.	Highest number reported this year. The climate for reporting is improving. Trust is building.

Audience Survey Questions

Do any of the following situations exist in your lab?

- A person could be working alone
- Core life-saving rules, practices, critical controls, instructions are not known or not always followed
- Recommended Corrective and Preventive Actions have not been fully implemented
- Recognized hazards have gone unabated for long periods of time
- The environment promotes a culture of “something else” other than 100% safety

Where would you place your lab on the Bradley Curve?

- Reactive
- Dependent
- Independent
- Interdependent

Something to think about

Laboratory operating culture must promote anticipation, recognition, and control of SIF risk.

Do you believe that culture is a product of leadership?

Leaders must promote and build a culture of prevention and protection, going well beyond regulatory compliance.

DuPont Sustainable Solutions

Reliable Source Documents – Leading Indicators

Campbell Institute – An Implementation Guide to Leading Indicators

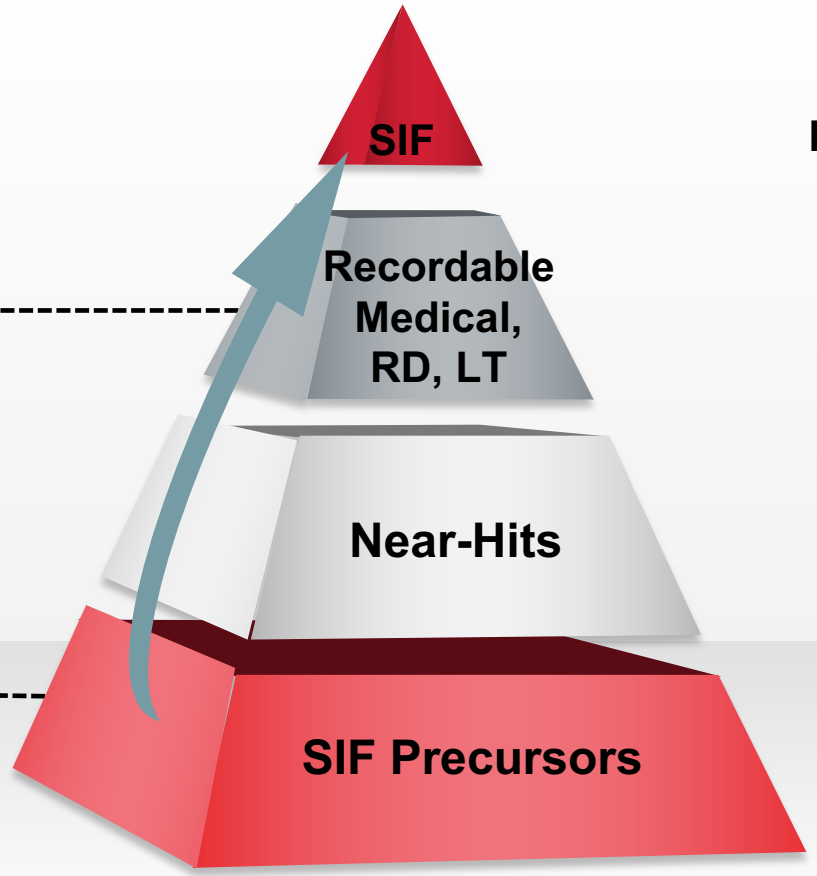
Center for Chemical Process Safety (CCPS) – Process Safety Metrics – Guide for Selecting Leading and Lagging Indicators

DSS Assessment of SIF Risk

Quantifying Your Organization's Potential for SIF Risk

Serious Injury and Fatality (SIF)
Life-Threatening
Life-Altering
Fatal

X% of recordable injuries contain SIF Risk Exposure



SIF Risk Situations where Protective Defenses are not present, not performing, not complied with, and persists over time, eventually leading to an SIF event

Analysis of Representative Sample of Recordable Injuries and Near-Misses

Identify Most Frequent SIF Risk Situations

Definitions and Decision Logic for Determining "SIF Potential"

DuPont Sustainable Solutions

Donald K. Martin MPH, CSP
Principal

+1 757.756.8296
don.martin@consultdss.com

DuPont
Sustainable
Solutions

DuPont
Sustainable
Solutions

PROTECTING **PEOPLE.**
IMPROVING **OPERATIONS.**