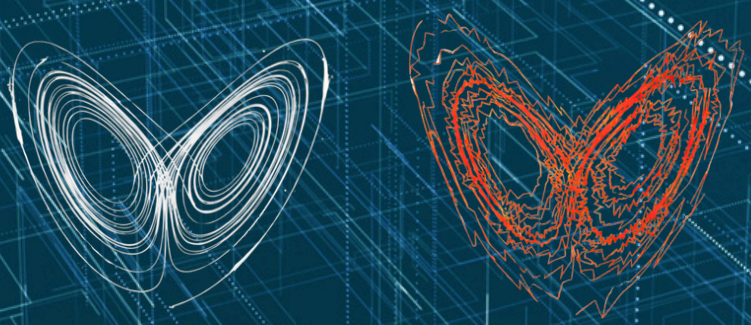
DOLIREX
TECHNO & ASSOCIATES

PROCESS STABILITY AUDIT

They see FAILURE. ***We see it COMING.***

Locating your **TRUE** stability limit
Operating **CONFIDENTLY** within it



Physics-First Stability Intelligence for Industrial Processes

PhD-Led · Physics-First · Data-Driven

WHY COMPANIES HIRE US

Real production challenges where our framework is applicable

THEY CALL US WHEN . . .

MACHINING
Tool life varies
High scrap rate
Poor surface finish
Cannot raise feed
Behaves differently

STEEL
Quality varies daily
Frequent mill stoppages
High energy use
Process oscillations
Yield keeps dropping

AUTOMOTIVE
Line balance unstable
Cycle time increasing
Rework increasing
OEE keeps falling
Ramp-up not possible

WELDING
Weld quality varies
Distortion increases
Spatter increases
Heat unstable
Frequent rework

CHEMICAL
Reactor oscillations
Frequent plant trips
Product off-spec
Energy cost rising
Control loops hunting

CASTING
Random defects
High rejection rate
Yield inconsistent
Process drifts
Process won't stabilize

BEARINGS
Unexpected failures
Life unpredictable
Vibration increasing
Maintenance rising
Failure unexplained

POWER
Boiler instability
Efficiency falling
Unexpected trips
Load fluctuations
Hidden degradation

CEMENT
Kiln unstable
Energy rising
Output fluctuates
Frequent shutdowns
High maintenance

SEMICONDUCTOR
Yield suddenly drops
Same recipe, new yield
Process drift
Equipment looks healthy
Root cause unknown

AEROSPACE
Capability drifting
Tolerance failures
High rework
Tool wear varies
Certification risk

OIL & GAS
Pump instability
Flow fluctuations
Unexpected shutdowns
Energy losses
Maintenance rising

ADVANCED MFG.
Scale-up fails
Laser instability
Additive defects
Parameter uncertainty
Yield unpredictable

ROBOTICS
Quality varies
Cycle drift
Unexpected downtime
Calibration unstable
Repeatability drifting

WIND ENERGY
SCADA looks normal
Power fluctuates
Hidden efficiency loss
Unexpected trips
Power curve drifting

PHARMA
Batch failures
Process validation fails
Yield inconsistent
Long deviation reviews
Scale-up uncertain

FOOD
Batch inconsistency
Quality variation
Yield losses
Frequent stoppages
Recipe no longer stable

Don't see your INDUSTRY

Let's discuss it.

CURRENT TOOLS DO NOT DETECT INSTABILITY

THEY DETECT ITS CONSEQUENCES

STATISTICAL PROCESS CONTROL (SPC)

What it Does

- Tracks variation after it appears in measurement
- Flags deviations from a historical average

Physics Reality

- Process instability begins before any statistical measure changes.

AI / DATA ANALYTICS

What it Does

- Learns patterns from historical production data
- A process that fails in a new mode is invisible to trained models

Physics Reality

- Instability is a change in process behaviour — not a pattern in historical data.

CONTROL SYSTEMS & AUTOMATION

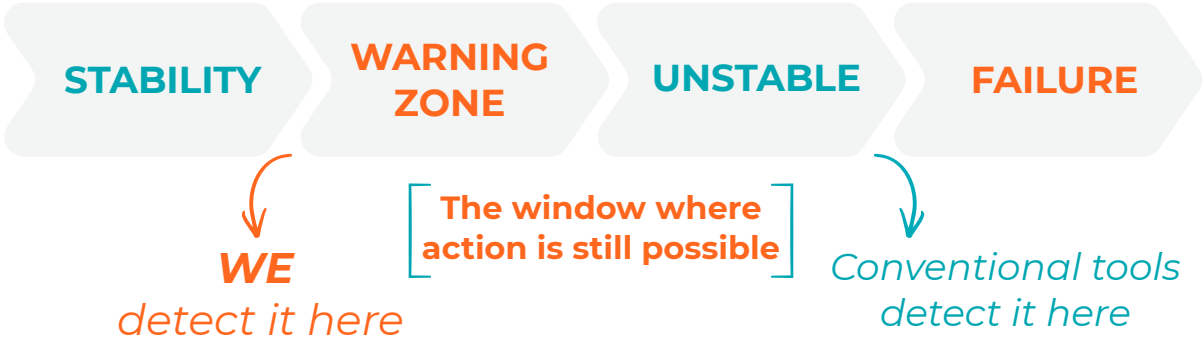
What it Does

- Holds process parameters at set values
- Reacts when a measurement drifts

Physics Reality

- A control system keeps you at a setpoint. It cannot tell you how close that setpoint is to failure.

All three approaches operate the same way.
They respond after a problem becomes measurable.
The window where intervention is still reversible - is never seen.



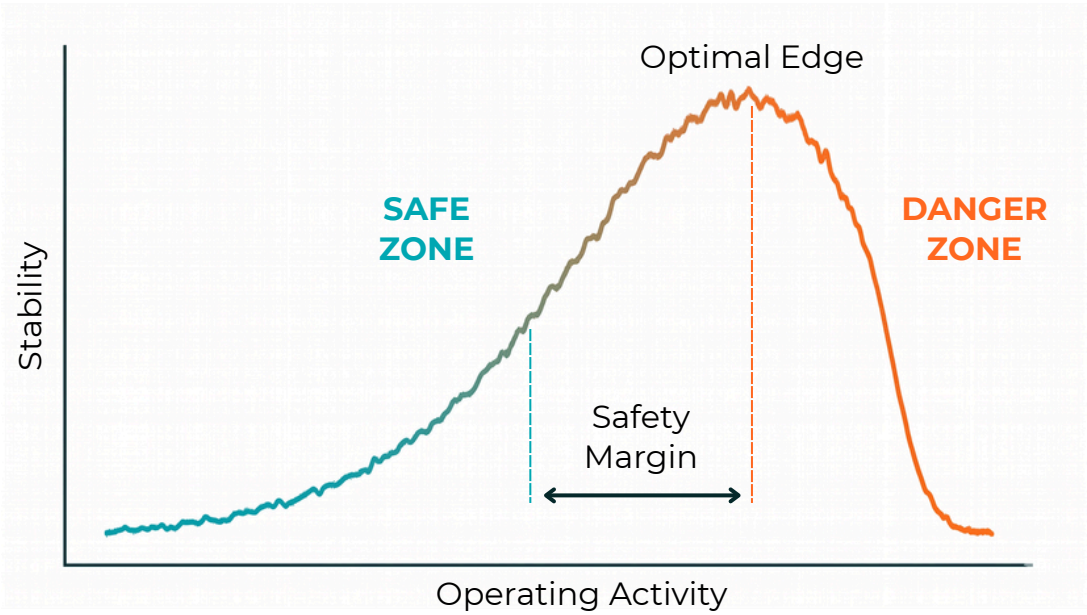
By the time your tools respond,
The process has **already crossed the line.**

WHAT YOU RECEIVE

- Stability Boundary Map
- Safety Margin (%)
- Operating Activity
- Early Stability Warning
- Recommended Operating Window
- Recommended Parameter Changes

- ETSN

Energy Transformation Stability Number (0-10 scale) - Overall Process Stability Score

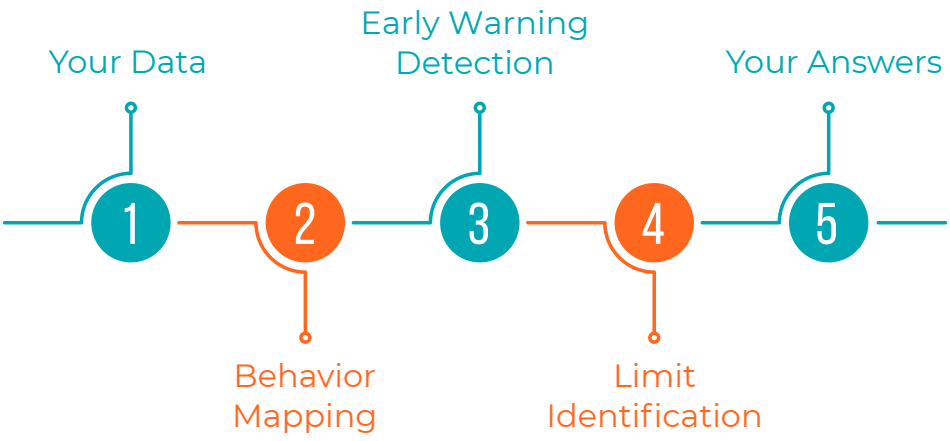


Every process has a hidden operating limit.
We make that limit visible.

The boundary your alarm cannot see already exists in your data.
We extract it before it extracts your output.

After this audit, you stop reacting to defects.
You start managing the boundary that creates them.

FROM THE DATA YOU ALREADY HAVE, TO A QUANTIFIED INSTABILITY BOUNDARY



ENERGY FLOW MAPPING

How energy is distributed through your process.

PROCESS BEHAVIOUR ANALYSIS

How energy begins to destabilize under load.

STABILITY LIMIT MAPPING

Where stable operation ends, and how far your process currently sits from it.

EARLY WARNING INDICATORS

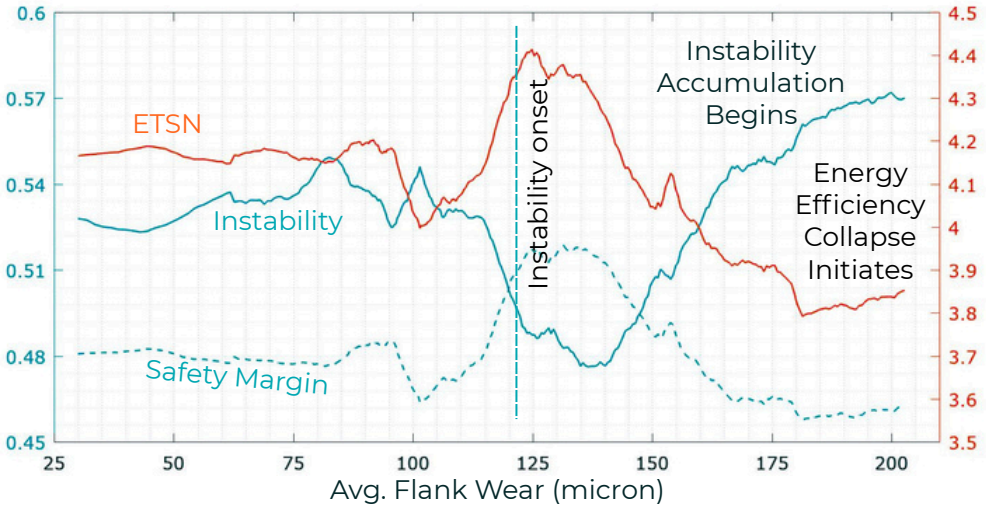
The first signs of drift, before any sensor or alarm registers the shift.

NO prior history of failures needed. NO additional hardware. WORKS ON THE DATA YOU ALREADY HAVE.

FRAMEWORK VALIDATION

Representative benchmark validations demonstrating the methodology

Milling Process (Validated on PHM Industry Dataset)



Tool wear does not trigger failure

↓

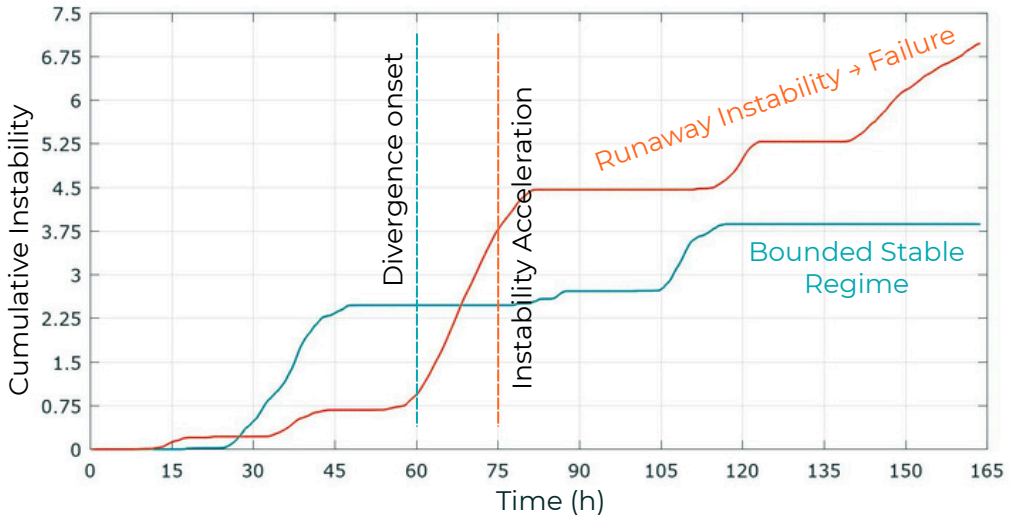
Instability accumulation does

*Scrap appeared **later**. Instability appeared **first**.*

Rotating Machinery Bearings (Validated on NASA Reliability Dataset)

Two **Identical** bearings.

Only **ONE** fails.



*The failure was written in the **physics**, **long before** the bearing gave way.*

Validated on Wind SCADA, Semiconductor plasma-etching & more

WHY CLIENTS TRUST US

- PhD-led techno consultancy
- No additional hardware required
- Physics-first methodology
- Applicable across multiple industries
- Uses your existing process data
- Decision-focused technical reports

WHO WE ARE

Dr. Ushasta Aich
PhD (Engg.). ME (Mech.)
Managing Partner & Technical Lead - DOLIREX TECHNO & ASSOCIATES
Industrial Stability Intelligence

Shri Tusar Kanti Ray
PG Financial Management, Marketing & Sales Management
30+ years of experience in Industry Collaboration
Partner, Marketing Lead - DOLIREX TECHNO & ASSOCIATES

In support of

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Dr. Sanjiban Bandyopadhyaya
FCMA, PH.D, M.COM, L.LB, AASM, ABIM, MIIA, FRMAI - Managing Partner

If instability is **not measured**, it is **not controlled.**

START WITH ONE PROCESS

INPUT
Your existing process data
(signals, video, or parameters)

You already have the data

PROCESS STABILITY AUDIT

What you don't have is visibility into the stability boundary

ONE Audit. ONE Dataset. THREE Answers

- Where your stability boundary is?
- How far are you from it?
- What to change and by how much?

WHAT YOU CAN DECIDE AFTER THE AUDIT

- Safe Operating Limit
- Safety Margin (%)
- ETSN - Process Stability Score
- Safe Operating Activity
- Early Stability Warning
- Recommended Parameter Changes

NO system changes · **NO** additional hardware
Works on your **EXISTING** data

IF INSTABILITY IS NOT MEASURED, IT IS NOT CONTROLLED

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Measure stability. Make better decisions.