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The clock nobody reports

At a refinery in 2012, about 40 people worked at a leak for 2 hours 40 minutes before it ignited. The repair was not the problem. Nobody owned the decision to restrict.

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Ask for last month's report on impaired controls. It will probably tell you how many were found and how long each took to repair. It will rarely tell you how long work continued while the control was failed or its state unknown.

That second number is the one that matters to the person standing next to the hazard.

Two hours forty minutes

On 6 August 2012, at about 15:50, an operator at the Chevron refinery in Richmond, California found a leak in a crude unit pipe. The refinery fire department arrived at about 16:07. Around 40 people gathered. At about 17:00 the feed was reduced. The group considered a clamp, then removed insulation to see the leak better. The leak worsened. Managers decided to shut the unit down, which takes hours. At about 18:30 a vapour cloud formed and ignited.

Nineteen employees were engulfed in the cloud and escaped. Six had minor injuries. About 15,000 people nearby sought medical treatment in the following weeks.

The US Chemical Safety Board found that the refinery had no leak response guidance or formal protocol on the day. Some people at the scene were uncomfortable and suggested shutting the unit down. Nobody formally invoked stop-work authority.

For about 160 minutes the organisation did one job, diagnosis, with energy and skill. A second job had no owner: restricting exposure while the diagnosis ran.

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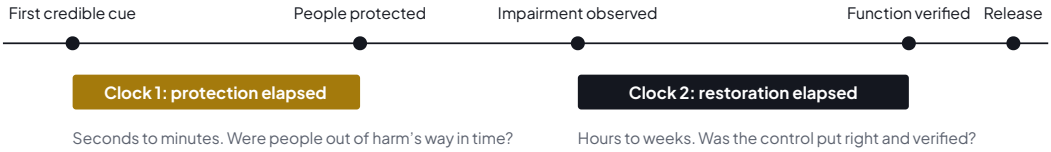
EXHIBIT



Seconds to minutes. Were people out of harm's way in time?

Hours to weeks. Was the control put right and verified?

During Clock 2, report separately the time under a verified restriction and the time work continued exposed.
Release is a third record, signed by the person with authority. A clock with a missing end is open. A clock with missing evidence is unknown.

Nineteen days

In Florida in 2018, cracks in a pedestrian bridge under construction were first recorded on 24 February. They grew. On the morning of 15 March the engineer of record told a meeting of the parties that there was no safety concern. The bridge fell at 13:46 onto a road with six of eight lanes open. Six people died.

The US National Transportation Safety Board found the probable cause in design errors. It also found that five parties could have stopped work or closed the road, and that none did.

Neither interval was a safe window that anyone could have counted on. Both were measured afterwards. That is the argument for restricting first and diagnosing from a distance.

Two clocks, kept apart

We propose that every impairment of a critical control carries two clocks.

Clock 1, protection. From the first credible warning to the moment people are observed to be protected: the vehicle at rest, the area clear, the job held. It runs for seconds or minutes.

Clock 2, restoration. From the first observation that the control was impaired to a competent functional check. It runs for hours or weeks.

Inside Clock 2, split the hours in two: those under a verified restriction, and those in which work continued. Report the second. An impairment open for 31 hours, 26 of them with the machine locked out, is five hours of exposed time. A stopped job waiting for parts and a running job waiting for parts are different decisions.

Release is a third record, signed by the person with authority. A release logged before its evidence is disputed.

What it changes for the executive committee

Three things become visible.

- **Whether restriction waits for diagnosis.** If exposed time tracks the time experts need, nobody owns the decision to restrict.
- **Whether repairs close on paper.** "Repair complete" stops no clock. A functional check does.

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- **Whether nights are covered.** Clocks that run long after 22:00 point to a verifier or an authority with no relief.

Each has an owner above the shift: a rule, a maintenance system, a roster.

The strongest objections to this article

"It will be gamed like every other indicator." It will, if it carries a target or a bonus. Use it to choose where to look, and have someone independent sample the records.

"You are judging those people with hindsight." We are not judging them. Nobody at the pipe or under the bridge knew how long they had. The fault we describe is one of design, and it can be found beforehand: no named person, no trigger that works without knowing the outcome.

"Restricting on every unexplained signal would stop production." It would cost production, and that cost should be decided in advance by the person who owns the schedule. After the fire, the refinery's own new protocol required a shutdown for a similar leak.

"We cannot time things to the second." For Clock 2 you do not need to. Hours are enough. For Clock 1, where seconds matter, say when the evidence cannot settle it. An unknown is an honest entry. It is never a pass.

What would change our view

A field evaluation of this kind of record, with outcomes measured independently. None exists that we know of. The two clocks are a proposal.

Ask for the exposed hours next month. If nobody can produce them, you have learned what the present system times.

> **Read the full report.** *Who can act in time: leadership, staffing and authority behind critical controls* is published by Riskopilot Research on Riskolabs.

Sources

1. US Chemical Safety and Hazard Investigation Board (2015). Chevron Richmond refinery pipe rupture and fire. Final investigation report 2012–03–I–CA. Times are approximate in the report.
2. US National Transportation Safety Board (2019). Pedestrian bridge collapse over SW 8th Street, Miami, Florida. Highway Accident Report NTSB/HAR-19/02 and its illustrated digest.
3. UK Health and Safety Executive (2006). Developing process safety indicators. HSG254. The paired-indicator idea behind the two clocks.

The 31-hour example is invented. The two clocks are a Riskopilot proposal and have not been validated against injury outcomes. Accounts of past events summarise the official reports cited. Nothing here is engineering or legal advice.

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