

The Cost of Unknown Time

Why warehouses struggle to improve what they cannot explain.

Every warehouse loses time. Far fewer can explain why.

This report examines the gap between the time a facility knows it lost and the time it can actually account for. Drawing on federal transportation research into truck detention, dock congestion, and driver hours of service, it introduces a concept we call *Unknown Time* — operational activity that occurred, but cannot be confidently reconstructed after the fact.

Unknown Time is not idle time, and it is not simply delay. It is the absence of a reviewable record. It is the reason two warehouses can experience the same disruption and produce two very different explanations for it — or no explanation at all.

No public dataset measures Unknown Time directly. What the research assembled here measures are its symptoms: hours drivers spend waiting without documented cause, delays that recur without being diagnosed, and a mounting cost — in dollars and in safety — carried by operations that cannot see their own bottlenecks clearly enough to fix them.

The conclusion is straightforward. Visibility into receiving operations is not a technology preference. It is a precondition for improvement.

This report calls that missing evidence Unknown Time — and examines what the research says about it.

What the published research says about time lost at the dock.

\$15B Cost of truck driver detention to the trucking industry in 2023. American Transportation Research Institute, 2024	135.9M hrs Hours lost to detention in for-hire trucking in 2023 alone. American Transportation Research Institute, 2024
39.3% Of all stops in 2023 involved detention beyond the industry’s two-hour threshold. American Transportation Research Institute, 2024	+6.2% Rise in average expected crash rate for every 15-minute increase in average dwell time. U.S. DOT Office of Inspector General, 2018
\$1B+ Estimated annual reduction in earnings for for-hire truckload drivers linked to detention. U.S. DOT Office of Inspector General, 2018	1 in 10 Stops resulted in detention beyond the 2-hour standard — averaging 1.4 hours over it. FMCSA, 2014
94.5% Of fleets charge for excessive detention — fewer than half of those invoices are ever paid. American Transportation Research Institute, 2024	2 of 3 Commercial drivers reported experiencing some detention in the past month. U.S. Government Accountability Office

A large, well-documented, and worsening cost.

Federal and industry research on truck driver detention is unusually consistent. Every major study over the past decade has reached the same direction of finding: time lost at the dock is significant, it is expensive, and it has grown rather than shrunk as freight volumes and facility complexity have increased.

The American Transportation Research Institute, which has tracked detention since 2014, found that drivers experienced detention — defined as dwell time beyond the standard two-hour grace period — at 39.3 percent of all stops in 2023. Refrigerated freight, spot-market loads, and female drivers all experienced detention at meaningfully higher rates, evidence that the problem concentrates rather than distributes evenly across an operation.

The financial picture is equally clear. ATRI estimates that detention cost the for-hire trucking industry \$15 billion in 2023 alone — \$3.6 billion in direct expense and \$11.5 billion in lost productivity — even though 94.5 percent of fleets charge a detention fee. Fewer than half of those invoices are ever paid, largely because the charge is difficult to substantiate after the fact.

The safety findings carry the same weight. A 2018 analysis by the U.S. Department of Transportation's Office of Inspector General found that a fifteen-minute increase in average dwell time raised the average expected crash rate by 6.2 percent, and that detention reduced the collective annual earnings of for-hire truckload drivers by more than a billion dollars.



These studies estimated overall wait times, but were not able to separate normal loading and unloading time from detention time — delays that disrupt a driver’s available duty time. This is a critical data gap in our understanding of the detention issue.

— Federal Motor Carrier Safety Administration, *Impact of Driver Detention Time on Safety and Operations*

Even the agency responsible for regulating detention acknowledges it cannot fully explain it. The distinction between ordinary loading time and disruptive detention time — the difference between work happening and time simply passing unaccounted for — remains, in the FMCSA’s own words, a gap in the data.

That gap shows up elsewhere too. The U.S. Government Accountability Office found that roughly two of every three commercial drivers experienced some detention in the past month, while carriers, drawing on their own records, reported detention on only about 12 percent of deliveries. The two figures describe the same events. The distance between them is a measure of how much happens at the dock that never makes it into a record either side can agree on.

Earlier academic research points to the same conclusion. A federally sponsored study by Crum and Morrow found that drivers attributed roughly 18 percent of their working time to schedule delays, and identified a strong positive relationship between time spent loading and unloading and involvement in a crash. Time at the dock is not a footnote to the trip. It is where a meaningful share of the trip’s risk and cost accumulates — and where the record of what happened is thinnest.

The same five handoffs, every time.

Every receiving event moves through the same basic sequence: arrival, queue, dock assignment, unload, documentation. Each stage is a handoff — from driver to gate, from gate to supervisor, from supervisor to dock crew, from dock crew to paperwork. Visibility is rarely lost all at once. It erodes one handoff at a time.



01	02	03	04	05
Arrival	Queue	Dock Assignment	Unload	Documentation
Recorded, if at all, by whoever happens to be at the gate.	Wait time exists only in the driver’s memory of it.	Reassignments happen by radio and are rarely logged.	Start and stop times are estimated, not captured.	Paperwork closes the loop late, or not at all.

Individually, each gap is small. A radio call that no one wrote down. A five-minute wait no one thought to time. Together, they compound into a receiving day that a supervisor experienced but cannot fully reconstruct — and a delay that will likely recur next week, for reasons no one can point to with confidence.

This is the condition this report calls Unknown Time.

Unknown Time is operational activity that cannot be confidently reconstructed after it occurs.

It is not idle time — the truck may have been moving, the dock may have been active. It is not simply delay — a delay can be timestamped even when it is not explained. Unknown Time is what remains when a supervisor is asked a direct question about their own operation and cannot answer it with evidence.

Why did this truck wait?

Why was this dock reassigned?

Why did paperwork finish late?

Why does this delay keep happening?

If the honest answer to any of these is a shrug, a guess, or “let me ask around” — that time has become Unknown Time. It is not a failure of any one person. It is what happens when a receiving operation has no reviewable record of itself.

A delay is a fact. Unknown Time is an absence.

The two are often confused because they usually appear together. But they are not the same thing, and treating them as the same thing is why so many delay-reduction efforts stall.

DELAY	UNKNOWN TIME
A measurable span between two points in time.	A missing explanation for what happened inside that span.
Can be recorded after the fact, from a clock or a log.	Cannot be reconstructed after the fact, at any distance from the event.
Shows up in a dwell-time or on-time metric.	Shows up as the same metric, unmoved, month after month.
Can be addressed once its cause is understood.	Prevents its own cause from ever being understood.

A warehouse can reduce delay without ever reducing Unknown Time — by adding staff, adding capacity, or simply absorbing the cost. What it cannot do is *improve* without reducing Unknown Time, because improvement requires knowing what to change.

It costs more than the delay itself.

Disputed costs

Ninety-four percent of fleets bill for excessive detention, but fewer than half of those invoices are paid — largely because neither side can point to a record precise enough to settle the disagreement.

Recurrence without diagnosis

A bottleneck that is never explained is a bottleneck that returns. Teams treat symptoms — add staff, shift schedules — without addressing a cause they never identified.

Strained carrier relationships

Carriers experience detention directly; facilities often do not record it the same way. That mismatch — visible in the gap between driver- and carrier-reported detention rates — erodes trust on both sides.

Safety risk

Longer, unexplained dwell time is independently associated with higher crash rates. Federal research links a fifteen-minute rise in average dwell time to a 6.2 percent increase in expected crash rate.

Decisions made on memory

Without a record, operational decisions rely on whoever remembers the incident best, not on what actually happened. Institutional memory is not an operating system.

Compounding uncertainty

Every unexplained hour makes the next one harder to explain. Without a running record, an operation loses not just today’s data, but the pattern that only shows up over weeks.

None of these costs appear as a line item labeled “Unknown Time.” All of them are downstream of it.

A short test of how visible your operation really is.

01 Why did this specific truck wait as long as it did?

02 Why was this dock reassigned, and by whom?

03 Why did paperwork finish late on this load?

04 Why does this same delay keep happening?

05 Which carrier contributes the most detention time, and why?

06 What was different about the day this went well?

A team that answers most of these with evidence, not memory, is operating with real visibility. A team that cannot is not necessarily performing worse — it may simply be unable to prove it, or to know, when it improves.

What separates the operations that can answer these questions.

Every stage is timestamped

Arrival, queue, dock assignment, unload, and documentation are each captured as they happen — not reconstructed afterward from memory or a driver’s estimate.

Delays are attributable, not just measured

A dwell-time number by itself explains nothing. High-visibility operations can trace a specific delay to a specific cause: a door, a shift, a carrier, a documentation step.

The same bottleneck isn’t still unexplained next month

Recurring issues are identified as patterns, reviewed on a cadence, and closed — rather than re-discovered from scratch every time they resurface.

Yesterday can be reconstructed without asking around

A supervisor can review what happened at any dock, on any shift, without depending on who happened to be present or what they remember.

Review is a routine, not a response

Operational data is examined on a regular cycle — weekly, not only after a serious incident forces a look back.

The goal was never more data. It was fewer unknowns.

The research reviewed in this report was not designed to describe Unknown Time — it was designed to measure detention, dwell, and driver hours. But read together, it describes the same underlying condition from different angles: an industry that can quantify how much time it loses, and still struggles, study after study, to say with precision why.

That is not a criticism of the people running these operations. Warehouses were built to move freight, not to produce evidence about how freight moved. The record that would answer these questions was never part of the job.

It can be. The remainder of this series looks at what that record requires, and what changes once it exists.



YardVis was founded around a simple belief: operations improve when what actually happened becomes visible enough to understand.

The goal isn't more data. It's fewer unknowns.

YardVis captures every stage of a receiving event — arrival, queue, dock assignment, unload, and documentation — in one connected, auditable record, and turns recurring activity into weekly operational intelligence. It is built to run quietly in the background of a live dock, without adding steps to receiving.

Sources

American Transportation Research Institute. *Costs and Consequences of Truck Driver Detention: A Comprehensive Analysis*. 2024.

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Crum, M. & Morrow, P. “The Industry Impact of Truck Driver Detention.” *Transportation Journal*, 2001. Sponsored research referenced in FMCSA analysis.

All statistics in this report are drawn from government and federally sponsored research. Figures describe truck driver detention and dwell time as measured by these studies; Unknown Time, as introduced in this report, is an operational framework proposed by YardVis and is not itself a metric reported in the sources above.