



# UNLOCKING THE HIDDEN COSTS OF POOR LOAD PLANNING

How to Eliminate Waste and  
Boost Your Bottom Line

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# Table of contents

Introduction	<b>3</b>	Tribal Knowledge-Based Loading Rules	<b>10</b>
What Is Load Planning?	<b>4</b>	Poor Picking = Poor Pallets	<b>11</b>
Inaccurate Item Master Data	<b>5</b>	What Happens When 3 Cases Break the System?	<b>12</b>
Loads Being Designed Too Small	<b>6</b>	Damage as a Cause of Loss	<b>13</b>
Truck Capacity Not Being Accurately Understood	<b>7</b>	A Checklist for Smarter Load Planning	<b>14</b>
Missing Mathematical Optimization for Cube/Weight Utilization	<b>8</b>	About ProvisionAI	<b>15</b>
Inefficient Payloads With Legacy Load Builders	<b>9</b>		


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# Introduction

Load planning often is the missed lever to eliminating otherwise hidden cost. Even with advanced transportation management systems (TMS) and route optimization tools, many organizations still struggle with inefficiencies that quietly drain profits.

Too often, companies overlook the root causes of loss in their load planning processes. From underutilized trailers to misapplied tribal knowledge, these hidden inefficiencies add up quickly, translating to increased freight costs, customer dissatisfaction, and missed revenue opportunities.

Let's break down the most common sources of loss in load planning and explore practical, data-driven strategies to eliminate them. If you want to drive ROI, streamline your warehouse-to-dock operations, and fully utilize your transportation assets, this is the guide you need.



***“Load planning is one of the most powerful yet overlooked profit levers.”***

## SECTION 1

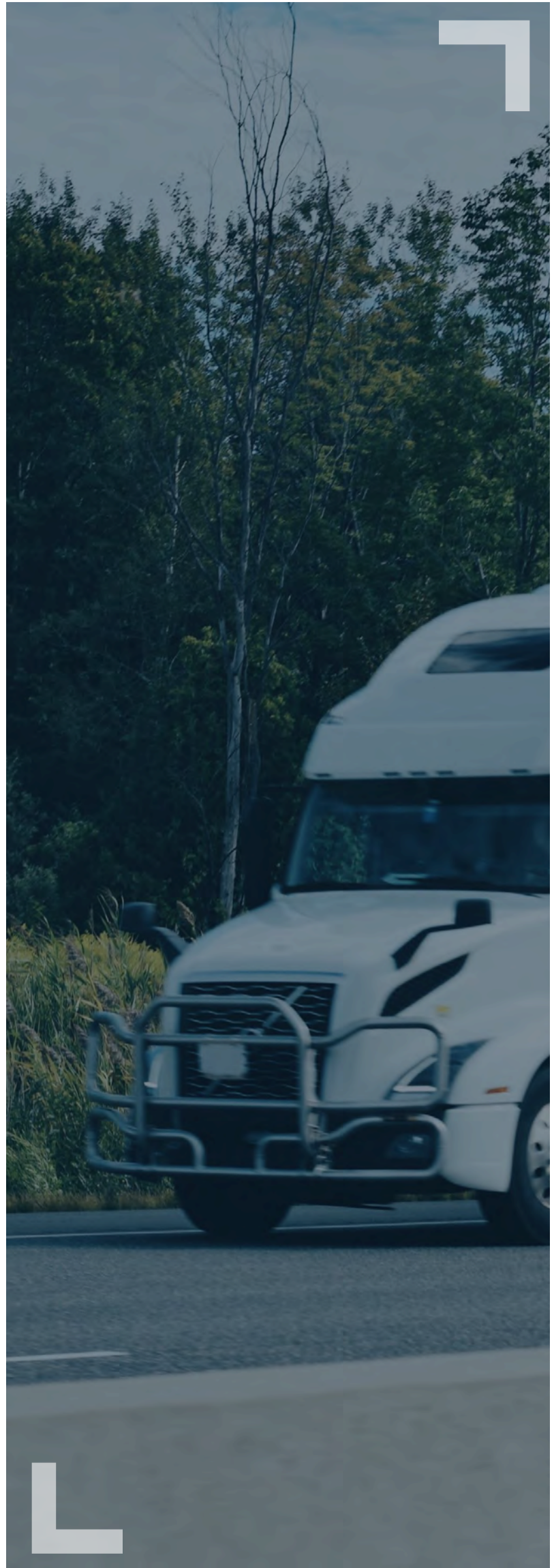
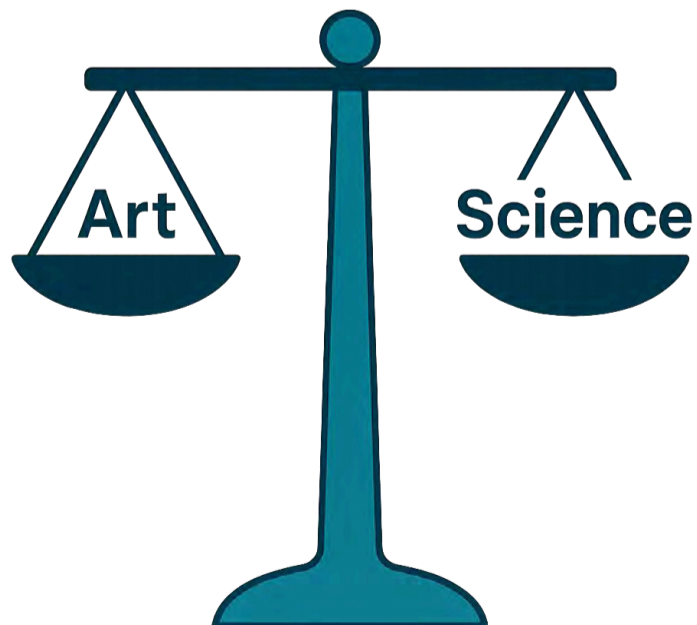
# What Is Load Planning?

Before we dig into the sources of loss, it's important to understand what load planning actually entails. Load planning is the process of organizing shipments to optimize space, weight, delivery routes, and schedules. It's a combination of (too much) art and (too little) science that determines how freight gets loaded into a trailer, container, or truck to minimize costs and ensure timely, damage-free delivery.

Done correctly, load planning improves:

- Trailer utilization (cube and weight)
- Fuel efficiency
- Labor productivity
- On-time delivery performance
- Carrier satisfaction
- On-shelf presence and sales

Now, let's dive into the critical areas where poor load planning causes losses – and how to fix them.



## SECTION 2

# Inaccurate Item **Master** **Data**

One silent killer in load planning efficiency is inaccurate or outdated item master data. When your system doesn't reflect the true dimensions, weights, or stacking rules of your SKUs, every downstream planning decision is flawed – regardless of how good your load optimization software is. For example, one company we worked with hadn't updated the item master for a line of products shipping to Canada. As a result, the system overestimated the height of each pallet. Because of this, they were leaving four full pallets off every trailer – even though there was physically room for them. Over the course of just one month, that single data gap translated into 20 extra truckloads and thousands in avoidable freight costs.

This isn't just a data maintenance issue – it's a systemic loss driver. Good load planning starts with clean data. If your item master is wrong, your loads will be too.



## SECTION 3

# Loads Being Designed Too Small

Many companies unintentionally ship partially filled trailers. In a sample of over 150,000 heavily loaded trucks, 91% could have added additional payload. Whether due to miscommunication, siloed systems, or unclear loading rules, underutilized trailers are one of the most obvious and avoidable sources of loss.



### Why it happens

- Shipments are designed based on outdated data and rules of thumb like you can only put 24 pallets in a truck (reality 30 GMA pallets fit on the floor), not real volume and weight data
- Fear of late deliveries leads planners to ship incomplete loads just to meet deadlines
- Lack of visibility into how things can fit together (use our example of 2000 and 2500 lb. pallets)

### Why it hurts

- Increased freight cost per unit
- More trucks on the road than necessary
- Unused trailer space that you're still paying for

### How to fix it

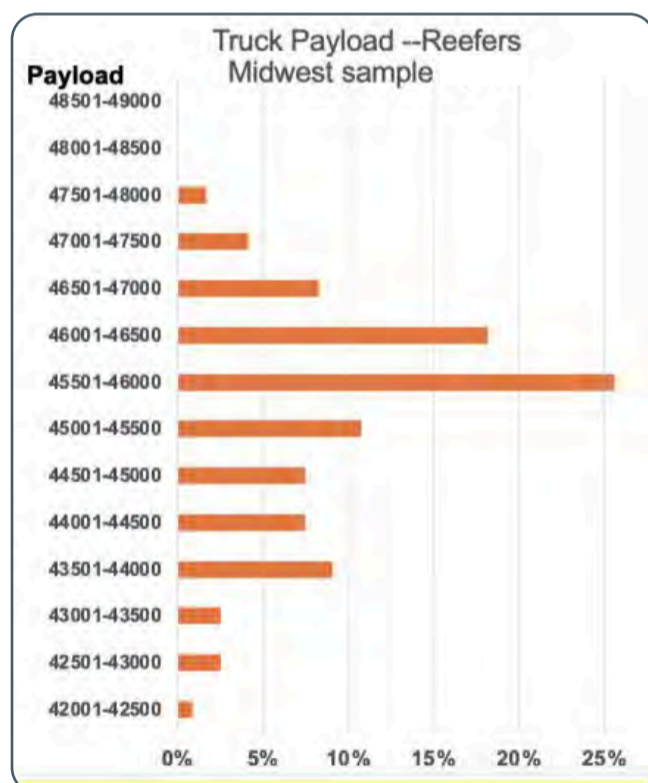
- Use mathematical load building tools that account for all the factors from cut-off time and inventory availability to product stacking rules and axle weights for the states or countries being traversed. Use such a tool as: <https://provisionai.com/autoo2/>
- Implement cross-department visibility (inventory, warehouse, transportation)
- Set thresholds for minimum trailer utilization before release, with real-time exceptions only

# Truck Capacity Not Being Accurately Understood (Tribal Knowledge Trap)

Planners and loaders often rely on “tribal knowledge” – informal, experience-based guidelines passed down over time. While valuable, this knowledge can lead to significant inefficiencies if not verified or standardized.

## Common examples

1. Asking carriers what their load capacity is – and believing them
2. Working to the lowest common denominator – see the graph
3. Basing cube/weight decisions on what “worked last time”



BASING CUBE/WEIGHT DECISIONS ON WHAT “WORKED LAST TIME”

## Consequences

1. Underestimating capacity
2. Misaligned equipment usage
3. Reactive, error-prone planning

## Solutions

1. Weigh empty trucks – yes it takes time and cost, but it is a verifiable approach that replaces opinions with facts
2. Use 3D load configuration software to optimize loads
3. Train planners using real-world capacity metrics



# Missing Mathematical Optimization for Cube/Weight Utilization

Even companies with decent load planning procedures often fail to apply true mathematical optimization. Instead, they use static templates or manual adjustments.

## Loss drivers

- Loading to a percentage of weight or volume without reconciling the other
- Not balancing cube vs. weight trade-offs
- Ignoring axle weight distribution, leading to violations or underuse

## Financial impact

- Excess freight spend
- Wasted capacity
- Non-compliance with DOT regulations

## Why Math and AI matter

- Two trucks, each with a capacity of 45,000 pounds
- Two different pallets, 20 of 2200 pounds and 22 of 2000 pounds



Here is what the legacy load builder did to create two trucks:

# Inefficient Payloads With Legacy Load Builders



**20 Pallets at 2,200 lbs**  
**Waste = 1,000 lbs**



**22 Pallets at 2,000 lbs**  
**Waste = 1,000 lbs**

However, observe that the weight capacity of each truck is not entirely used. What could be done to add another 2000-pound pallet? Using more advanced math, it's possible to solve this problem. The solution is shown in the following diagram:

## Optimize to Improve Payload



**15 Pallets at 2,200 lbs**  
**6 Pallets at 2,000 lbs**  
**Waste = 0 lbs**



**5 Pallets at 2,200 lbs**  
**17 Pallets at 2,000 lbs**  
**Waste = 0 lbs**

## Could you do that?

Now consider the additional complexities that must be accounted for:

- There are many items with differing weights and density
- The load must be built to be axle-legal for all the states or countries it crosses
- Should a driver brake rapidly or swerve, the product should not shift or be damaged

**You need math and AI**

## Fixes that work:

- Deploy algorithm-driven load planning software that factors in:
  - Case weight and dimensions, palletization, container size, stacking restrictions, weight, legal restrictions, and damage mitigation simultaneously
  - Axle weights
  - Stop sequencing and unload order
- Avoid knee-jerk reactions – one shipment is not a reason to throw out science – look at the root cause – it's normally very explainable
- Continuously report Plan vs. Actual vs. Target – this is a great motivator, especially if you pit one group against another

# Tribal Knowledge-Based Loading Rules (The "California Bridge Formula")

There are countless rules of thumb that get passed around loading docks like gospel, many of which cost you money.

## Examples we hear all the time

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- "Never load past the 48 feet line in a 53-foot trailer"
- "Take 2 pallets from the load if it's going to California" See a blog post about the ["California Bridge Formula"](#)
- "Only stack certain SKUs, even if the product could be safely double-stacked". One company said you can't stack items moving domestically, while the much rougher, inbound ocean shipments were double stacked
- Put the heavy product in the middle of the trailer. For example, double stack in the middle – which can be done, but is not good for load stability

## Why this matters

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- These blanket rules lack scientific backing
- They lead to inconsistent, sub-optimal utilization
- They may not reflect updated regulatory, equipment, or customer realities

## What to do instead

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- Replace guesswork with data-backed rules. Our loader guide is a great resource: <https://provisionai.com/ebook-truck-loaders-guide/>
- Incorporate dynamic load configurations based on destination, product type, and regulatory constraints
- Invest in tools that model live trailer loading scenarios

# Poor Picking = Poor Pallets

Load optimization isn't just a transportation problem. It starts upstream in the warehouse, with how inventory is stored, picked, and prepped.

## Key issues include

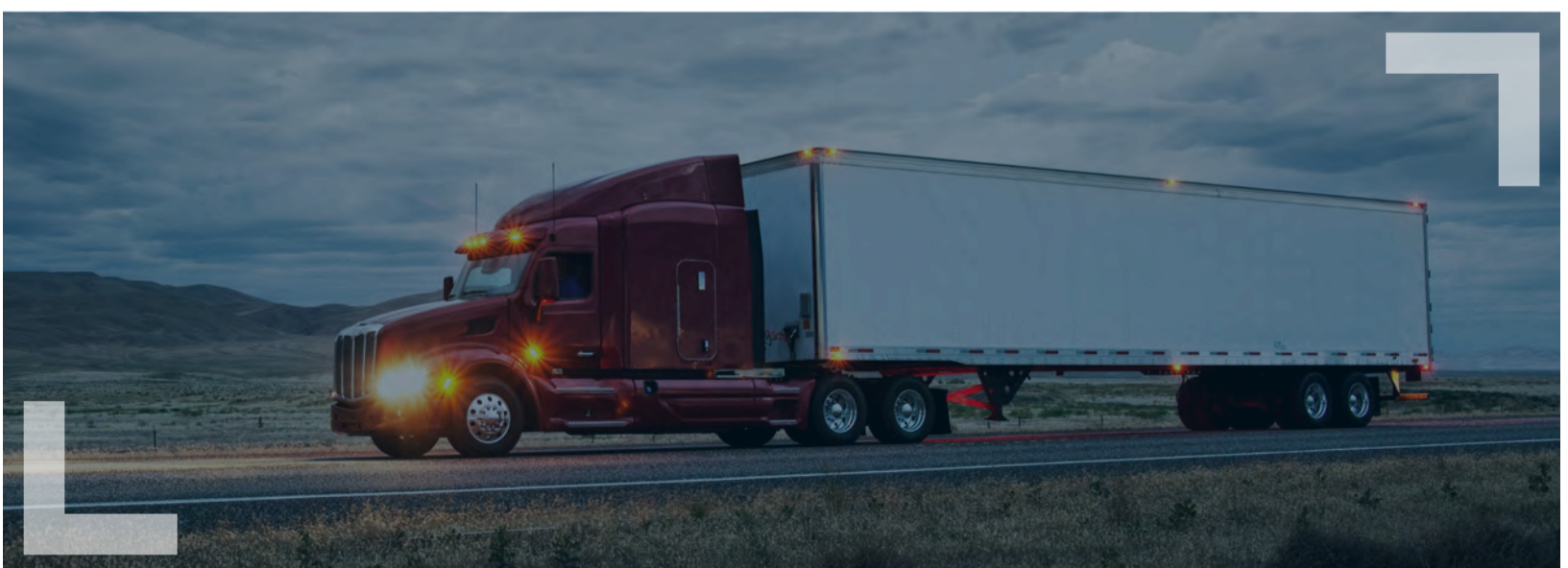
- Product being case-picked and split across multiple pallets unnecessarily. This normally happens when a picker gets to a location and is told to pick 10 cases – but only 5 are there. The order selector's choice is to wait for replenishment or "skip pick" and move on. When you are paid on cases/hour, guess which one you choose. This is caused by late restocking which is just bad warehouse scheduling and poor discipline
- Inconsistent pallet height and build rules
- Mixed SKU pallets that can't be double-stacked

## Resulting losses

- More pallets than necessary (which is a cost in itself), leading to more trailer space needed
- Damaged product from unstable loads
- Time wasted on re-palletizing at the dock

## Warehouse fixes

- Implement stricter picking and restocking rules
- Use WMS-integrated guidance <<Link to pages in website for case picking and truck loading>>. to pick with load planning in mind
- Educate warehouse staff on how their actions impact loading



# What Happens When 3 Cases **Break the System?**

Even with the best load plan in the world, execution falls apart without clear direction at the dock.

## **Common problems**

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- Loaders guessing how to place freight
- Load plans that exist only on paper, with no digital interface
- No feedback loop between planners and loaders

## **What happens**

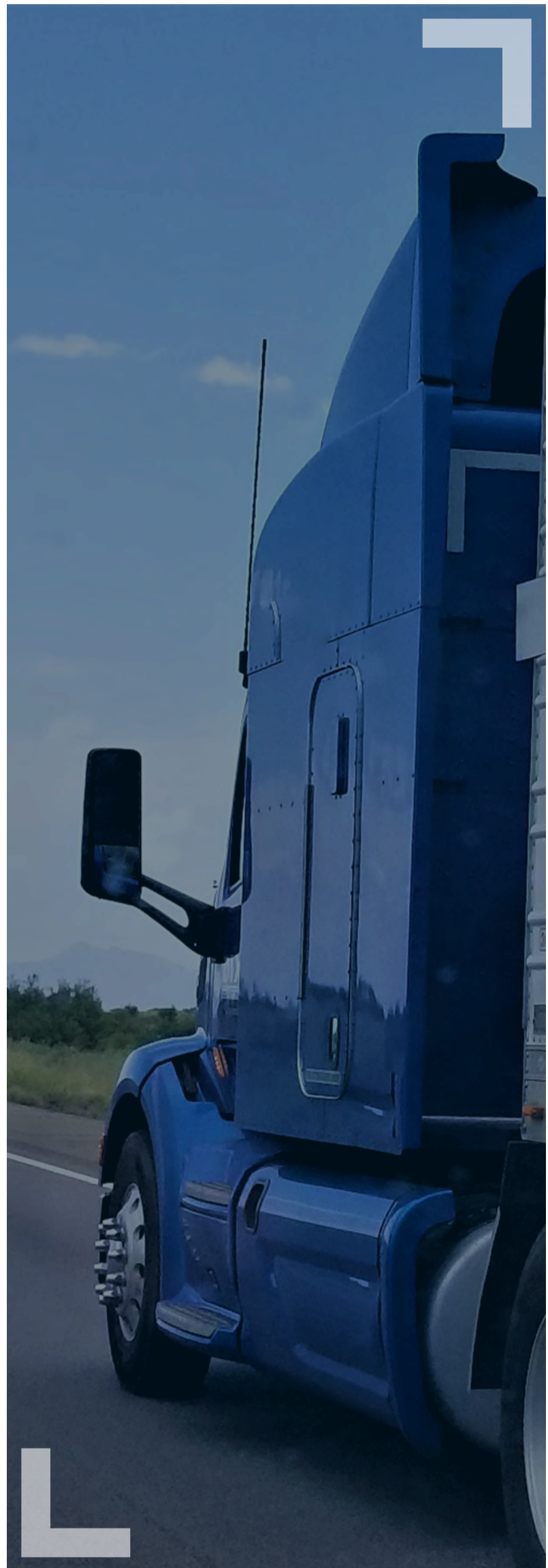
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- Loads get built incorrectly. And it's really painful when the truck driver brings them back to the dock to be reworked
- Plans take longer to execute. A simple thing like correctly sequencing items to the dock reduces load time by 30-40%
- Loaders resort to their own rules and habits. Ask 10 loaders how to put the same orders on a truck and you'll get at least 11 "best" ways for doing it

## **How to fix it**

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- Provide real-time loading instructions via tablets or dock screens
- Include visual representations (3D diagrams) of how loads should be built
- Empower loaders to provide feedback on load plan issues. These are often caused by loads being based on flawed item master data
- Create a feedback loop to continuously improve loading strategy





# Damage as a Cause of Loss

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One of the most overlooked yet costly consequences of poor load planning is freight damage. Improper stacking, poor weight distribution, lack of securement, and inadequate blocking or bracing can all lead to damaged goods during transit. This not only results in direct product loss and lost sales, but also increases claims, disrupts customer satisfaction, and adds administrative overhead.

Often, damage occurs because load plans don't account for product fragility, packaging stability, or the dynamic forces at play during transport. When warehouse or loading staff don't receive proper guidance, or when loaders deviate from optimized plans, the risk of damage skyrockets. Prevention starts with integrating packaging data, creating rules for data, creating rules for load sequencing and stacking, and ensuring that every team involved understands the physical realities of freight movement.

# Putting It All Together: A Checklist for **Smarter Load Planning**



Rethink Old Habits



Digitize and Optimize



Report and Analyze  
truckload utilization



Improve Warehouse  
and Loading Discipline



Fix the item master





# About ProvisionAI

[Book Your ROI Audit](#)

## Final Thoughts: Load Planning as a Profit Lever

Too many companies treat load planning as an afterthought. In reality, it's one of the most powerful levers you have to reduce transportation costs, improve customer service, and boost operational efficiency.

By addressing the eight hidden sources of loss we covered above, you can transform your logistics operations from reactive to proactive. Don't just fill trailers – optimize them. Don't just move freight – move it intelligently.

Ready to unlock smarter load planning? Start by tackling just one or two of these loss points and measure the impact. The gains may surprise you.

Need help auditing your load planning process or implementing optimization software? **Let's talk.**