

Casters for Electric Pallet Jacks

Turn your trucks into high performance race cars for maximum productivity

Sponsored by:



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Agenda

Discussion Scope

The Purpose of Casters in CL-III Trucks

Alternative Products to Casters

Why Adjust The Caster?

Basic Adjustment Methodology

Basic Adjustment Procedures for Individual Designs

Spring Rate Adjustable Caster

Caster Adjustment Vs. Caster Failure

Warning

This presentation is intended for basic knowledge training purpose and discussion only. It's also focused mainly on caster adjustment without taking detailed account of truck maintenance procedures and requirements. Please consult the truck manufacturer's Service Manual and truck manufacturer's representatives for further detail.

Start Your Engine!



Scope of Our Discussion

Casters...



Industrial Casters



Usage of Casters...



**Electric Pallet Trucks
(Industrial Truck CL-III)**



The Purpose of Casters in CL-III Trucks



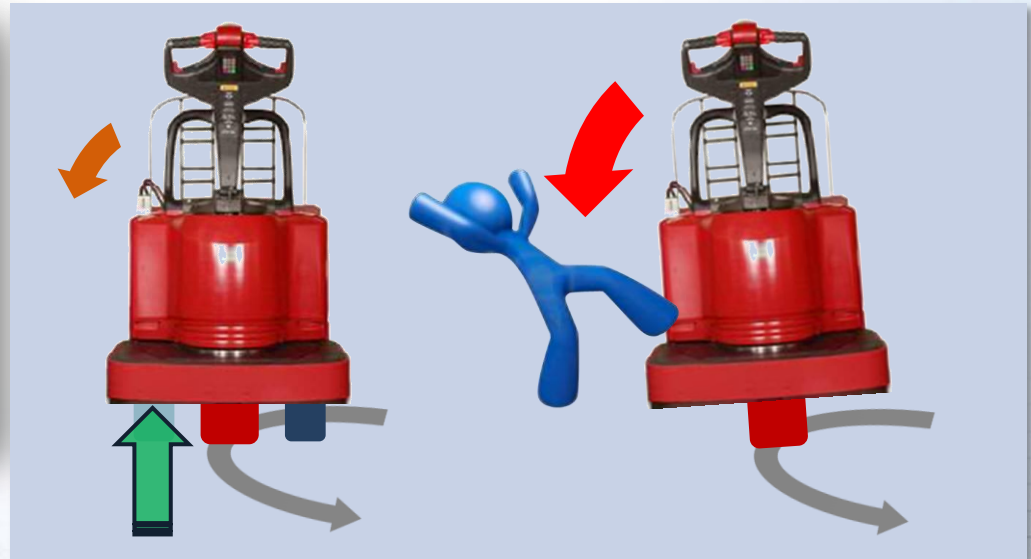
Stability in Cornering

Light Load Condition

- Prevents falling cargo

NO Load Condition

- Truck runs at high speed
- Caster will reduce roll rate of the truck – allowing the truck to be more leveled when cornering
- Allows higher speed cornering
- Prevents operator from falling

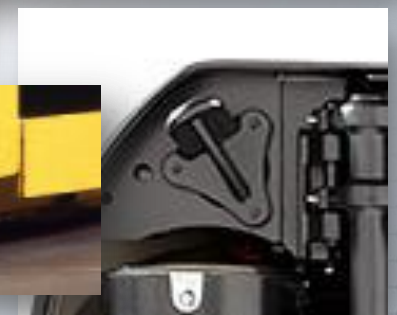


Alternative Products to Casters

Stability Bar, Skid Plate

Simple steel bar that helps limit the truck rolls – However, some draw backs are;

- Mostly available only in low speed Walkie units
- Damages the floor
- Reduces truck speed, hinders truck movement



Why Adjust the Caster? (1)

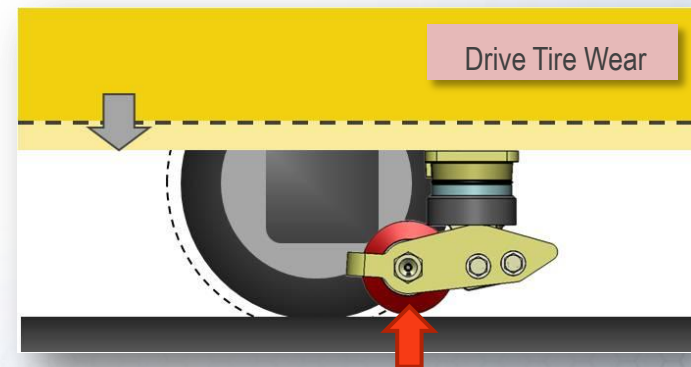
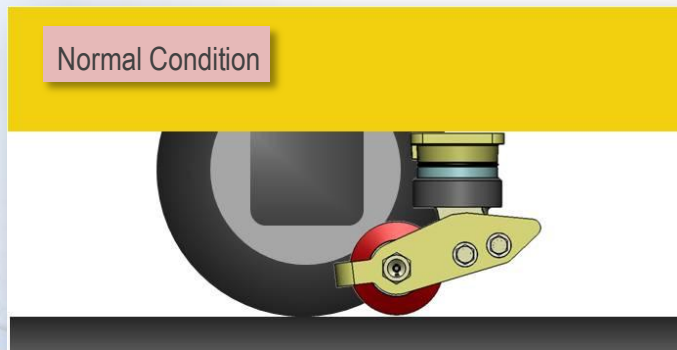


1 - Drive Tire Wear

- Truck is lowered
 - Casters are deflected more
 - Spring rate becomes stiffer

The Consequence

- Suspension becomes too stiff, cornering efficiency deteriorated
- Excess bouncing effect if the truck hits a bump or obstacle on one side
- Higher load on the caster, higher chance of caster failure
- Too much force from the caster trying to lift the truck back up, drive tire loses some of its ground pressure and traction – deteriorating both braking distance and motor efficiency



Why Adjust the Caster? (2)



2 - Caster Wheel Wear, new Drive tire installed

- Caster wheels float with less or no contact pressure
 - Casters are deflected less
 - Spring rate becomes softer

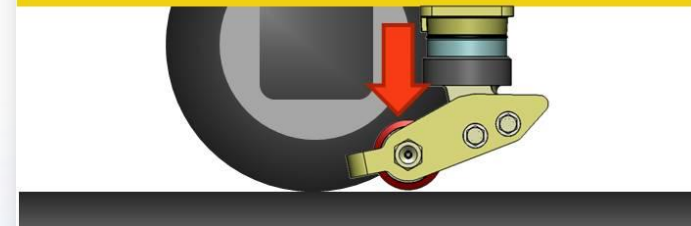
The consequence

- Suspension becomes too soft, cornering efficiency deteriorated
- Excess rocking effect, uncomfortable to the operator
- Requires higher steering force
- Less carrying weight distributed to the caster, drive wheel carries more weight and experiences more wear

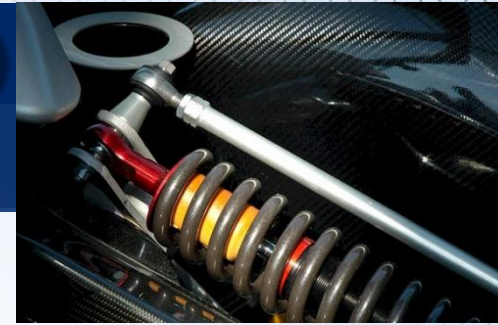
Normal Condition



Caster Wheel Wear



Why Adjust the Caster? (3)



3 - Caster Spring Deformation

- Typical steel spring has creeping and deformation effects
 - As the spring becomes softer, the caster loses its height

The consequence - Same as “Caster Wheel Wear”

- Suspension becomes too soft, cornering efficiency deteriorated
- Excess rocking effect, uncomfortable to the operator
- Requires higher steering force
- Less carrying weight distributed to the caster, drive wheel carries more weight and experiences more wear



Basic Adjustment Methodology



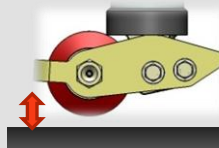
Common Methodology

Performance Targeted Table

Setting	Up	Down
Caster Load	↓	↑
Drive Tire Load	↑	↓
Traction/ Brake performance	↑	↓
Stability/ Handling Performance	↓	↑
Steer Effort	↑	↓

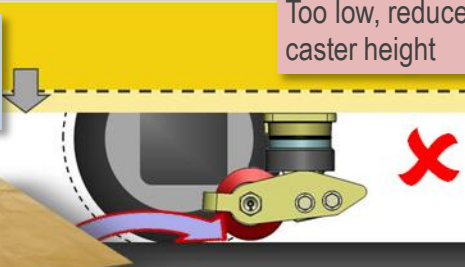
Paper Method

1) – check if the caster is floating?



Floating = low high, lower the caster

2) – if not, slide the paper in



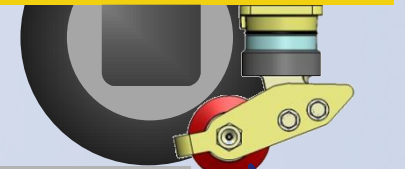
Too low, reduce the caster height

3) – OK, if the paper “just” slides through



Paper & Steel Plate Method

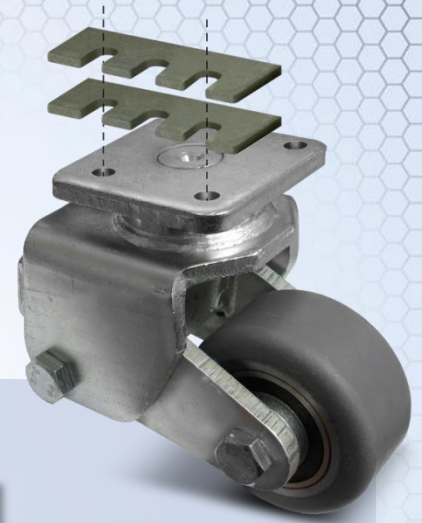
Same as paper method but with steel plate



Steel plate – specific thickness for each caster design

Caster wheel “just” touches the floor...

Basic Adjustment Procedure Shim Design



Shim-style Caster

Adjustment Locations

1) – **Under the truck**, truck lifting is required



2) – **From the deck**, truck lifting is required when caster is too low



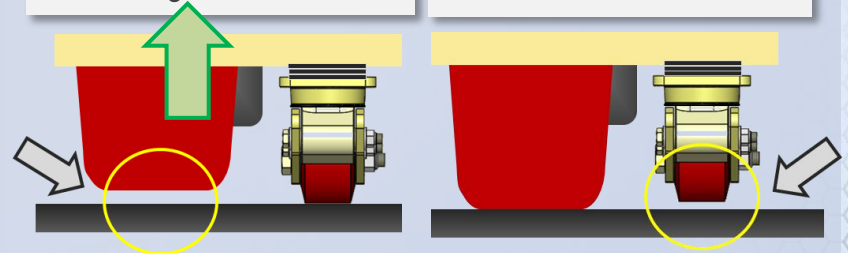
Basic Procedures

1) Height check - Lift the truck, if adjusted under the truck

2) Prepare the shims, loosen caster bolts

3) If the caster is too low – lift the truck until the caster wheel touches the floor, add shims equal to the raised height

4) If the caster is too high (floating) – remove the shims equal to the distance between floated wheel and the floor



Basic Adjustment Procedure Easy Adjust

Shim-less, Easy-Adjust Caster (STR1000 and STR2000 series)



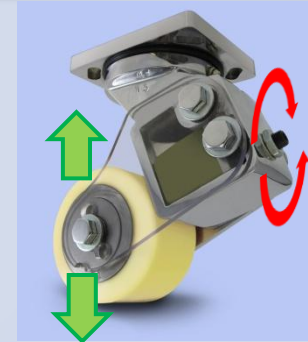
Adjustment Locations

Under the truck, truck lifting is required for some truck designs



Basic Procedures

- 1) Height check – removes the lock nut if adjustment is needed
- 2) Turn the adjustment bolt until the wheel just touches the floor



- 3) Refit the lock nut

Basic Adjustment Procedure Axle/Side-plate Adjust

Axle Adjusted Caster/Side-plate Adjusted Caster



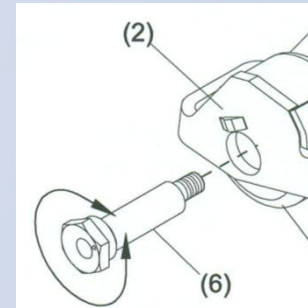
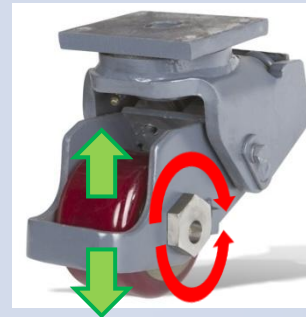
Adjustment Locations

Under the truck, truck lifting is required for some truck designs



Basic Procedures

- 1) Height check – loosen the axle nut or side-plate lock nut until the axle or side-plate can move freely
- 2) Turn the axle or side-plate up or down until reaching desired set level



- 3) Re-tighten the axle nut or side-plate lock nut

Basic Adjustment Procedure

Quick Adjust, Battery Component



“Quick Adjustment Caster”

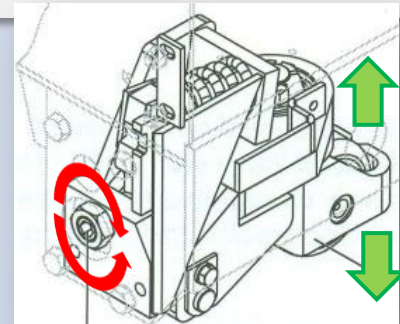
Adjustment Locations

Under Battery compartment, truck lifting is required in some situations



Basic Procedures

- 1) Height check – raise forks
- 2) Loosen the adjustment screw lock nut
- 3) Using Hex key to rotate set screw to adjust caster height



- 4) Re-tighten the adjustment screw lock nut

Basic Adjustment Procedure Porthole Adjustment



European “Sitting Rider Pallet Jack”

Adjustment Locations

Via Porthole, truck lifting is **NOT** required



Basic Procedures

Not common in US market – please consult manufacturer's recommendation

Basic Adjustment Procedure

Easy Adjust, Side Adjustable

Shim-less, Side Adjustable Caster (STR5200 and STR5400 series)



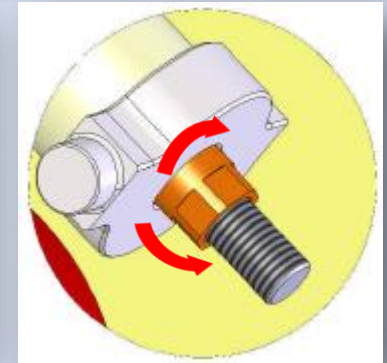
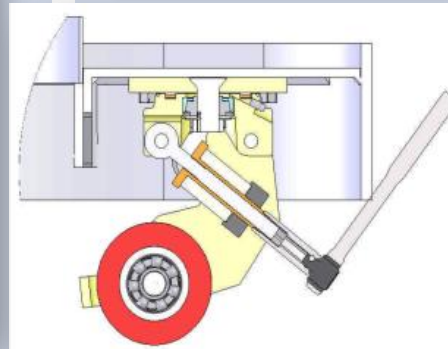
Adjustment Locations

Side of the truck, truck lifting is **NOT** required



Basic Procedures

- 1) Height check – If adjustment needed - Remove the lock nut and collar
- 2) Using a standard wrench to turn the Hex bolt to adjust the height
- 3) Reinstall and re-tighten the collar and lock nut



Basic Adjustment Procedure

Easy Adjust, Top Adjustable

Shim-less, Top Service Caster

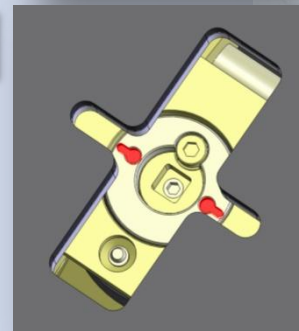
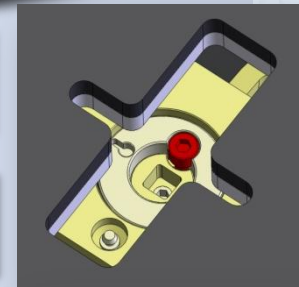
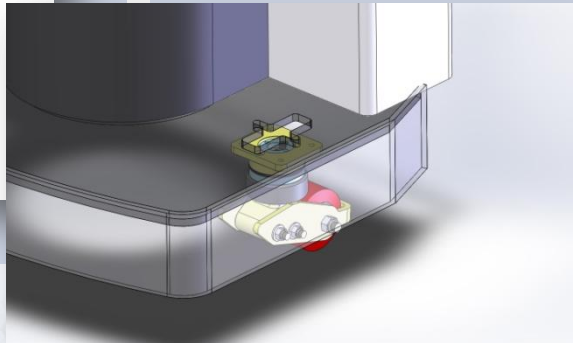
Adjustment Locations

Top of the truck, truck lifting is **NOT** required



Basic Procedures

- 1) Height check – If adjustment needed
- Remove the lock nut
- 2) Turning the main height adjustment bolt to the appropriate height
- 3) Reinstall the lock nut



Spring Rate Adjustable Caster, Independent of Height

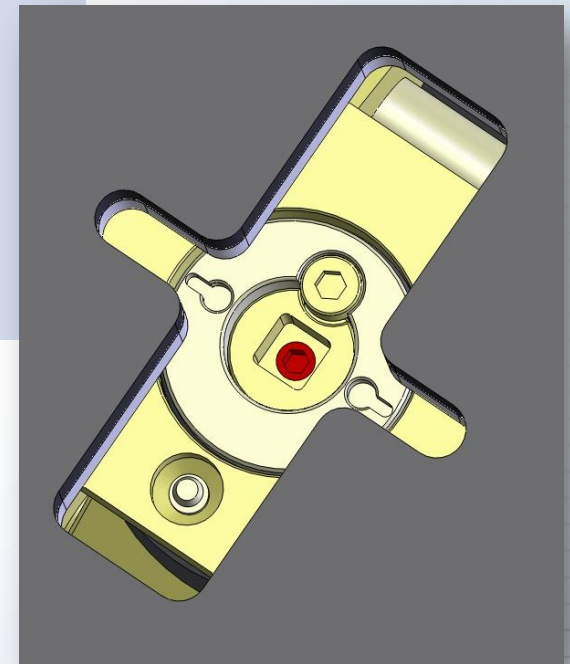
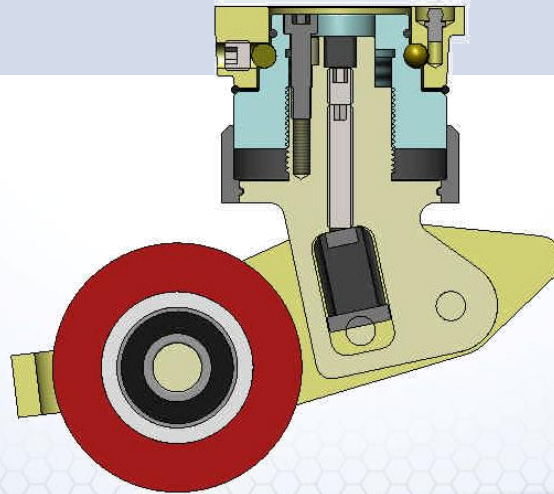


Shim-less, Side or Top - Height and Spring Rate Adjustable Caster

Set the caster to become “Soft” or “Hard” based on operator’s preference, without performance compromises.

For example;

- Some operators want a softer set up for more comfort
- Some operators want a harder set up for more “sporty” feel
- Empty truck return route might be much longer than loaded route, some operators might prefer softer set up for faster return

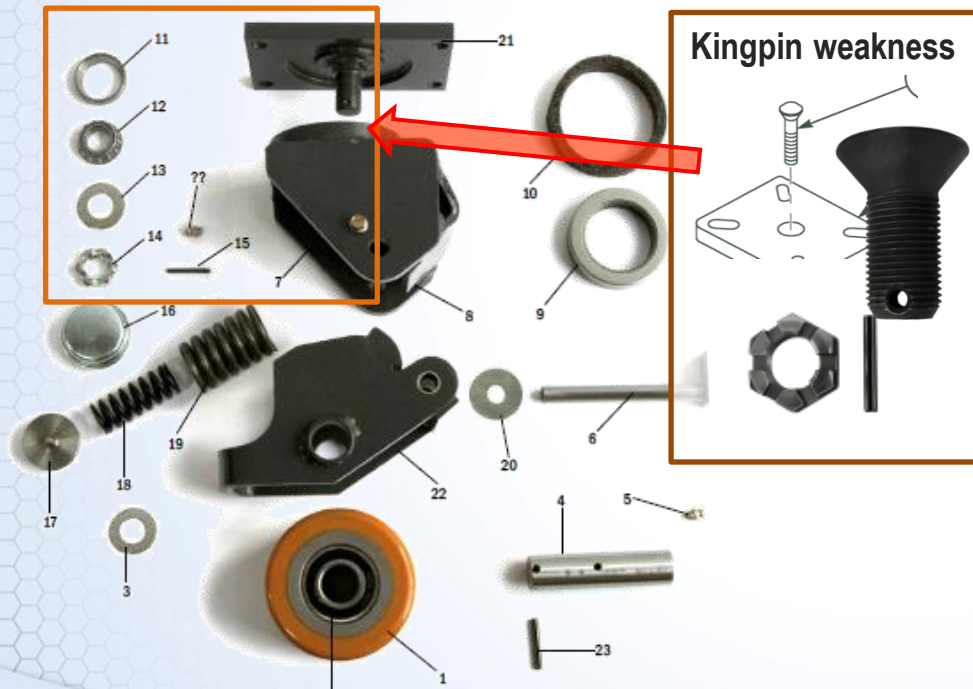


Myth – Caster Adjustment Vs Caster Failure



Plausible?

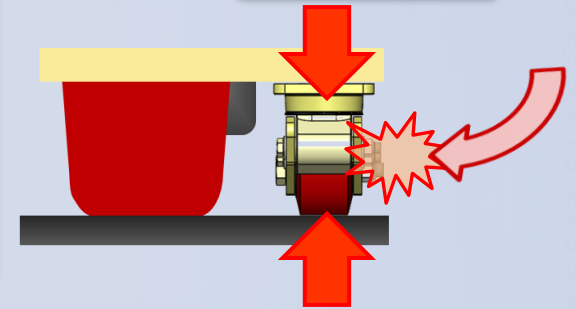
Weakest Link?



Yes....

If - the caster is too low = pushing against the floor with too much force

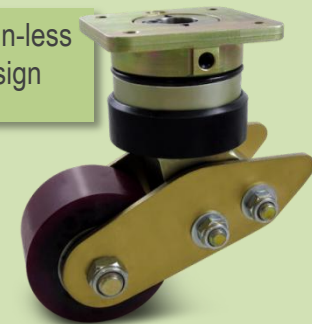
Heavily Compressed – restrict movement



But better design could help

Reinforced Kingpin Elements

Kingpin-less Design



Q & A

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