TOYOTA

Vehicle Delivery Quality Improvement

NEW VEHICLE TRANSPORT OPERATIONS MANUAL

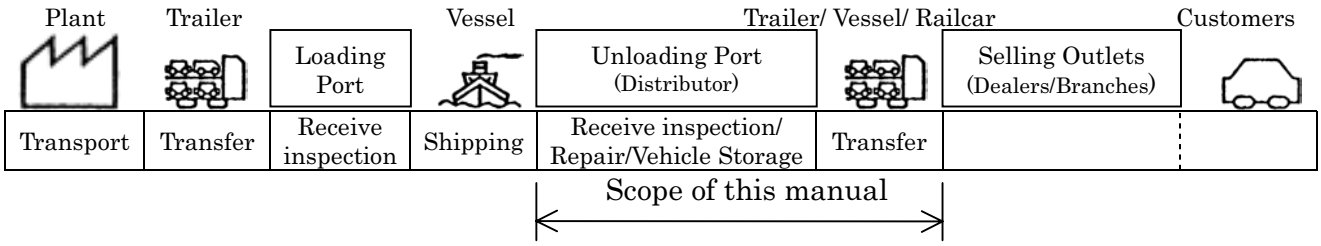
TOYOTA MOTOR CORPORATION

Introduction

This manual is a guideline to prevent logistics damage of vehicle exterior and interior such as dents, scratches, rust, stains, parts missing, and so forth.

Please note that this manual is general instructions, and there are some exceptions in some specific models, especially as for tie-down operations. Concerning tie down operations, please follow the specific instructions issued for each model by TMC. (cf. Vehicle Tie Down Procedure)

Also, this manual covers the logistics process from vessel discharging at overseas port to arrival at dealers.



Order of the contents in this manual follows to the operations order after discharging at overseas port, that is, how to do round check, getting on and out vehicles, trailer, vessel and rail transport.

We hope you forward this manual to relative sections, divisions, departments and cooperate companies.

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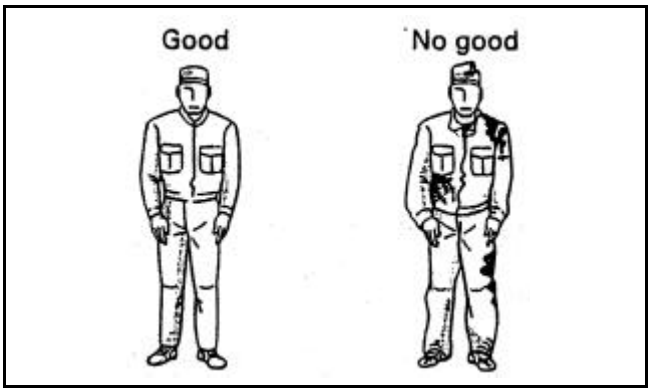
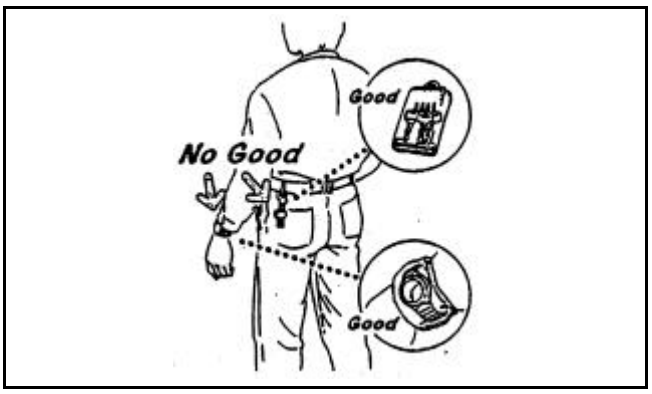
1. Requirements for working clothes

Clean and simple wearing is necessary to prevent damage such as making scratches on vehicle surface and getting dirty on the interior.

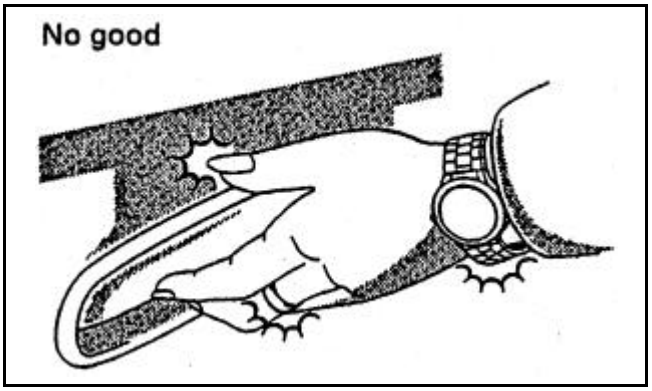


Always wear clean and well-fitting clothes, and keep your shoes and gloves free of dirt and mud.

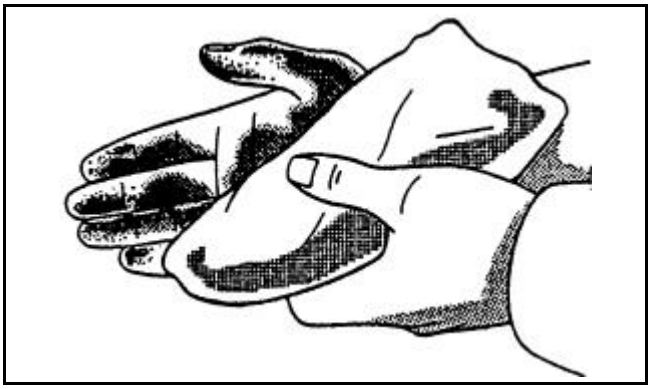
Working clothes must be buttonless and buckleless.



Don't wear your watch, rings and keys.
If you wear them, they must be covered properly.



Don't have your fingernails grow long.



Always keep your hands clean.
Wipe your hands clean immediately when they become dirty.

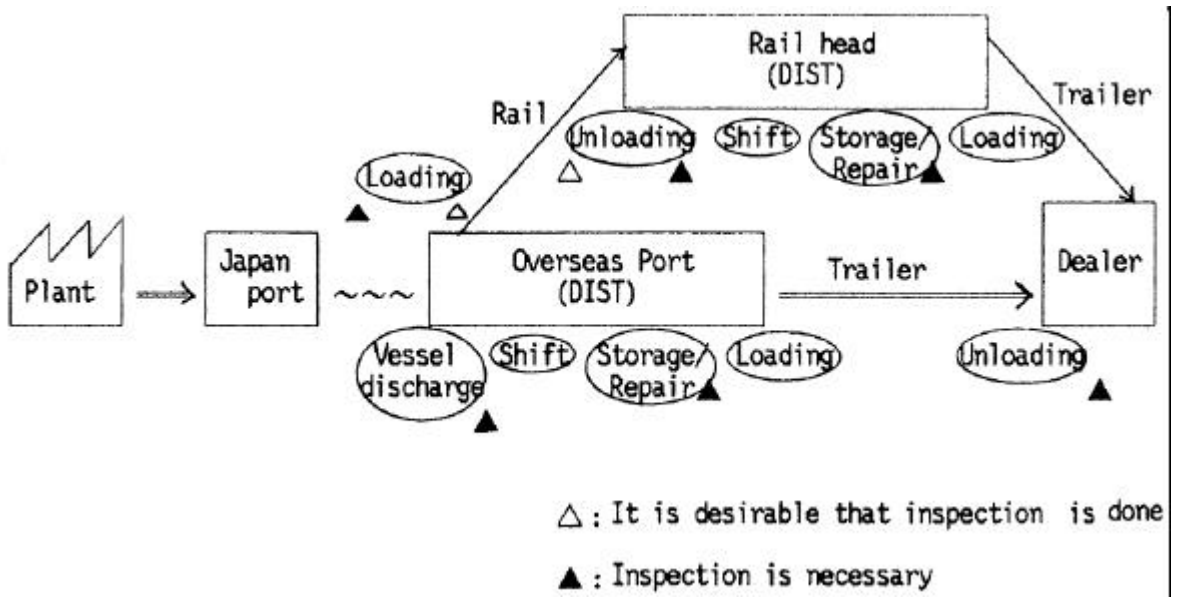
We recommend you to put on gloves when you engage in work that your hands get dirty.

2. Requirements and procedures for round check

-Round check is required in order to prevent damaged vehicles from forwarding to the following process at each transport stage.

-Result of the check must be immediately reported logistics sections and suitable counter-measure should be taken after root cause investigation.

-It is desirable that check should be done before and after each transport process such as trailer, vessel and rail transport.



Please refer to inspection procedures indicated in the next page.

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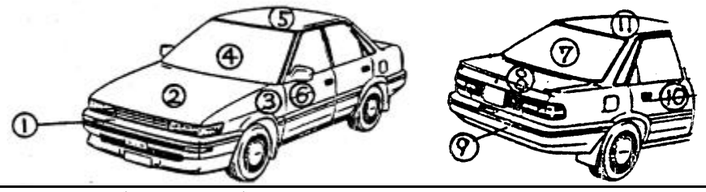
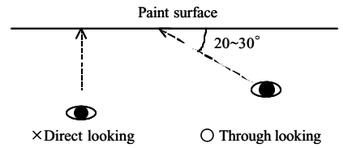
Receipt and shipping inspection procedure for logistics flow

1. Purpose

-Help to establish the principal method of quality acceptance inspection concerning the logistics programs particularly on the surface of the outer body and in the area around front seat.

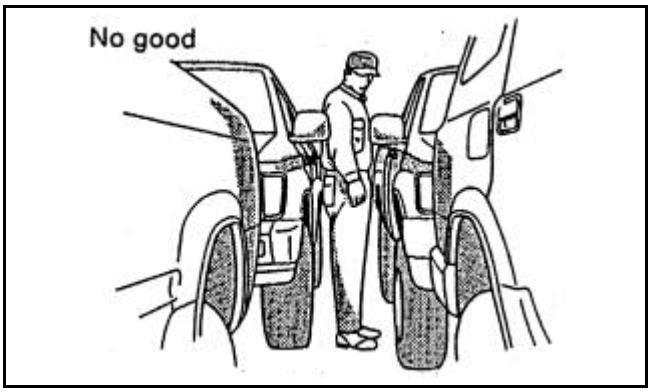
-We hope that through this method you will be able to establish the standard inspection work and the better clarification of judgment for inspection. As the result, you will be able to find out any major quality problems and improve the level of vehicle quality in transit.

-We recommend that you establish your feedback network to get damage information which helps you analyze the detail content of the damages and take proper countermeasure for improvement of the quality level.

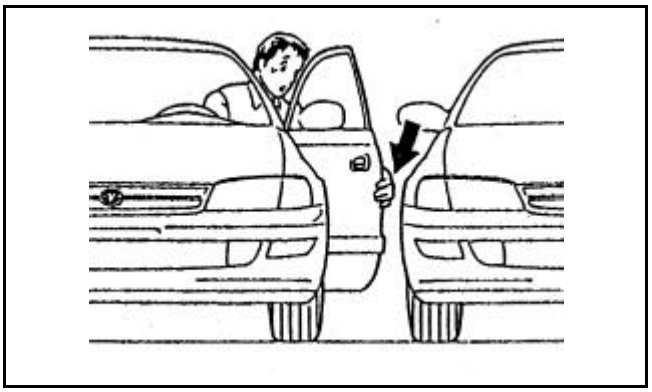
Items	Contents	Points for inspection
i) Vehicle to be inspected	-All new vehicles belonging to your responsibility regardless of their manufacturing origin (domestic or import) and distribution process.	-Paint damage occurs often during rail and/or trailer transport.
ii) Inspection place	-At every distribution point throughout your distribution flow such as factory sub-yard, consolidation point, discharging port and so on.	-More damage is reported at the adjacent point of loading /discharging operations. -Pay attention to the environmental situation of the inspection place associated with it in the surrounding area. (ex. See if there are factories generating fallout which spoil the surface of the body.)
iii) Inspection items	-Any kinds of damage on the outer body and the area around front seat such as dents, scratches, rust, stains, parts missing, and so forth.	-Major items need to be examined are scratches, stains, smears, dents, dirt, unevenness.
iv) Part of body to be inspected	-Surface of body and the area around the front seats. 	-Horizontal surface of body …Pay special attention to stains and paint damage caused by fallout. -Vertical surface of body …Pay special attention to dents and scratches. -Around front seat …Pay special attention to dirt on the door steps and door trim.
v) Inspection method (looking)	1. Front bumper ✍ 2. Hood ✍ 3. R(L) fender ✍ 4. Front windshield ✍ 5. Roof ✍ 6. R(L) side body 12. L(R) fender ✍ 11. Roof ✍ 10. L(R) side body ✍ 9. Rear bumper ✍ 8. Luggage ✍ 7. Rear glass 	-Inspect paint surface by through-looking (looking at 20~30-degree angle to surface) to make it easier to find out defects. Don't observe at right angles. -Keep 0.5-1.0m away from the body surface while inspecting. 
vi) Inspection time	-Guideline: 30 seconds/vehicle (per person)	-Spend more time to survey white color vehicles especially on a fine day.
vii) Clarification	-Scratch……It would be unacceptable if it exposes the under coat. -Stain/Dirt/Smear……..It would be unacceptable if the defect is supposed to affect the quality of the paint or the interior parts. -Unevenness……It would be unacceptable if it can be perceived by hand touching.	-When you come to hesitate to judge, you had better treat it as NG defect.
viii) Operational advice for inspection	-Must wear clean clothing which is free from exposed buttons and fasteners. -Avoid putting on any metal object such as watches, rings, bracelets and belts with metal buckle.	
ix) Necessaries	-Soft cloth such as flannel or gauze, and water	-Cloth and gloves must be clean to prevent scratch and dirt.

3. Requirements for getting on and out vehicles

When you get on and out the vehicle, pay attention to your movement to prevent damage such as making scratches/dents and getting the interior dirty.

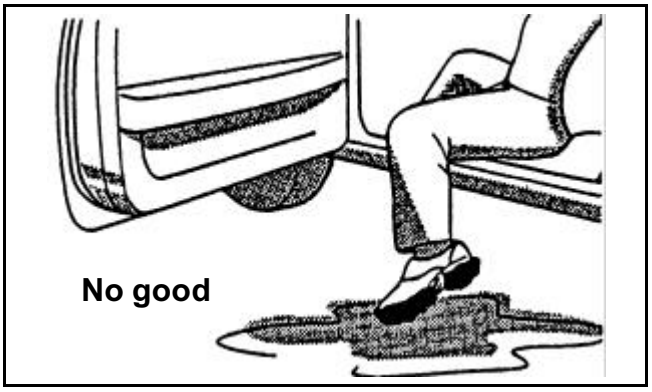


Do not pass through between vehicles when space is narrow.



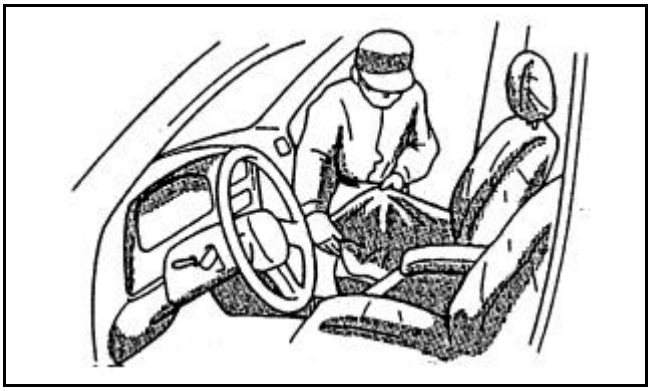
Take care not to hit to the next car when opening the door.

You must put your hand on the door edge when the next door is close.

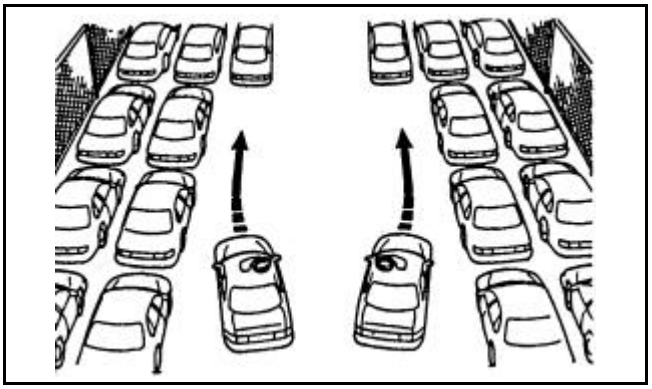


Do not wear dirty clothes and shoes to keep clean indoors.
(door trim, seat and carpet)

Take care not to get door trim and scuff plate dirty with your shoes.



Attach seat/carpet protectors properly when you get out the vehicle.



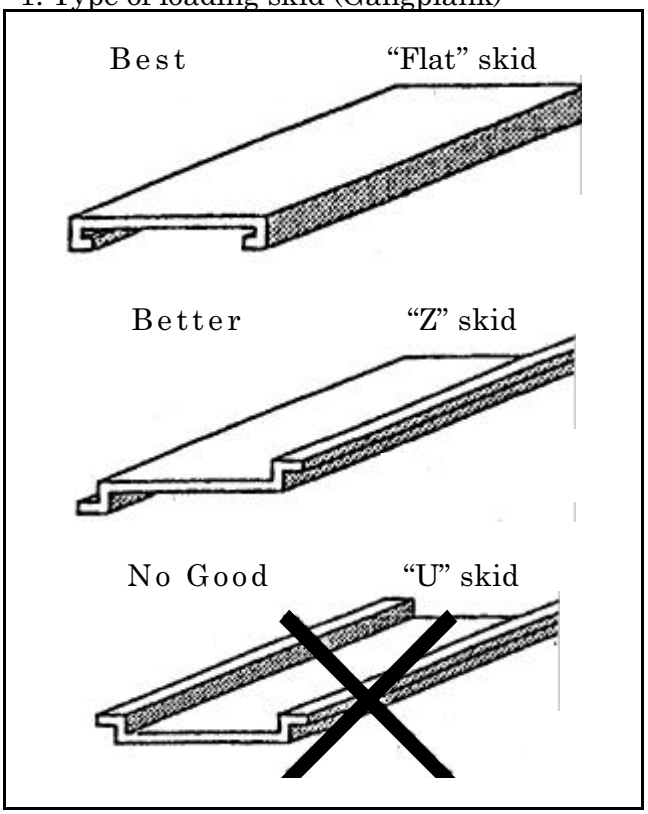
We recommend that right hand drive vehicles are parked from the left row first and left hand drive vehicles are parked from the right row to prevent door dents.

4. Requirements for trailer transport

(1) Requirements for trailer equipments

-We advise several points as for the structure of trailer to prevent damage during loading/unloading and transport operations.

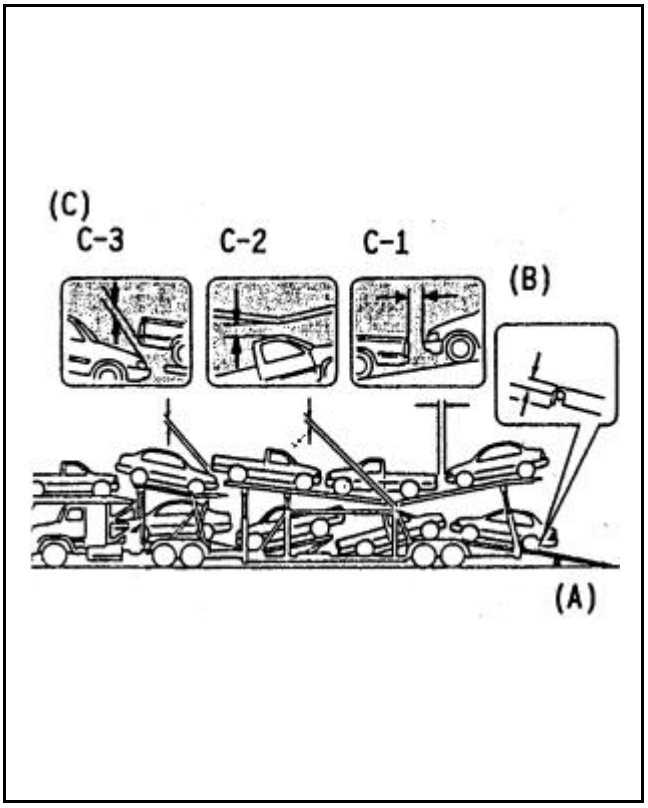
1. Type of loading skid (Gangplank)



"Flat" skid is the best to prevent damage of lower part of the body.

When "Z" skid is used, upward flange of skid should be positioned on the outside.

Do not use "U" skid to prevent damage of lower part of the body.



(A) The angle of approach ramp used for loading vehicles must be less than 11 degrees.

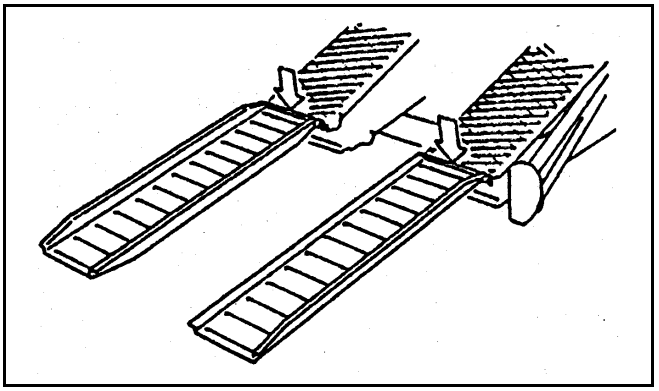
(B) The steps of the approach ramp must be less than 40 mm.

(C) We recommend that the following clearances are maintained.

C-1 Between bumpers
…Minimum 100 mm

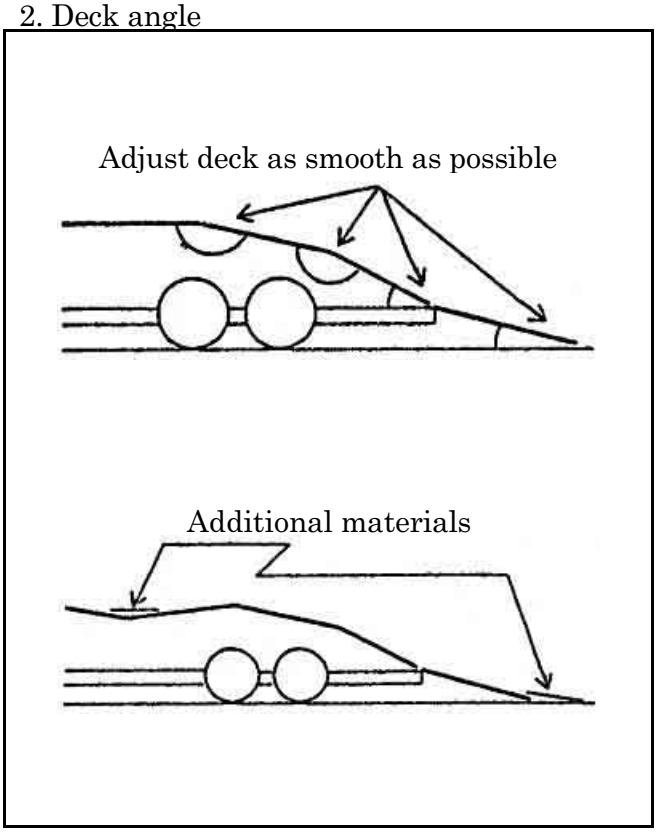
C-2 Between roofs of vehicles and upper deck
…Minimum 100 mm

C-3 When vehicles are overlapping, between them
…Minimum 100 mm



Ensure the approach ramps are safely secured prior to loading and unloading.

2. Deck angle

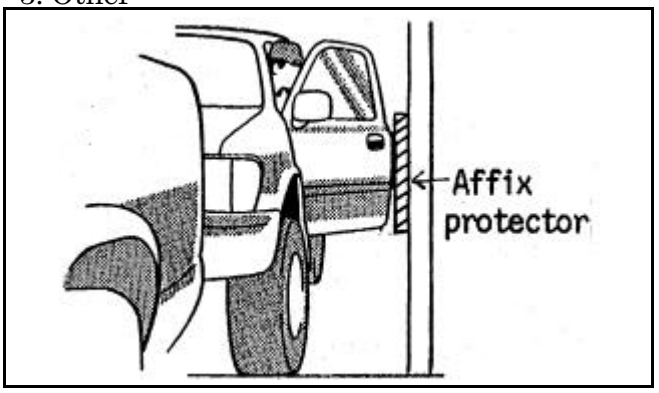


Adjust deck sections (upper and lower) to achieve a treadway with as few angle changes as possible.

Adjust upper deck sections to achieve the lowest possible approach angle.

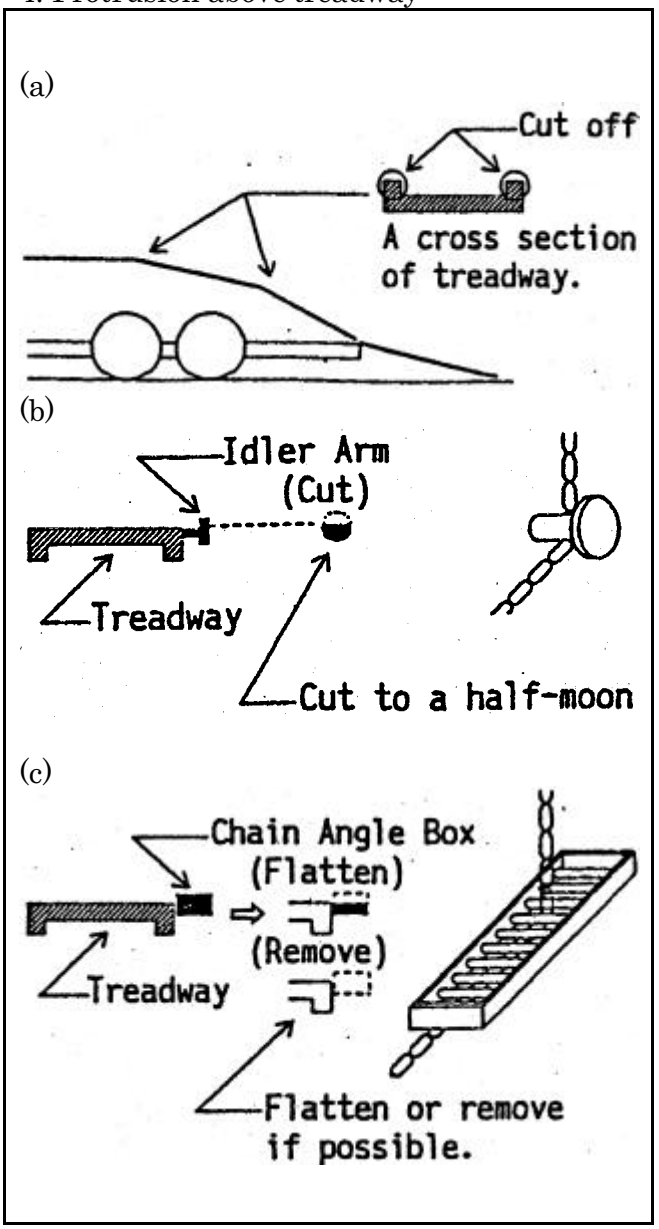
Explore the possibility of adding material to treadways that have large or sudden angle change.

3. Other



Affix protector such as rubber on the poles to prevent doors from damaging.

4. Protrusion above treadway



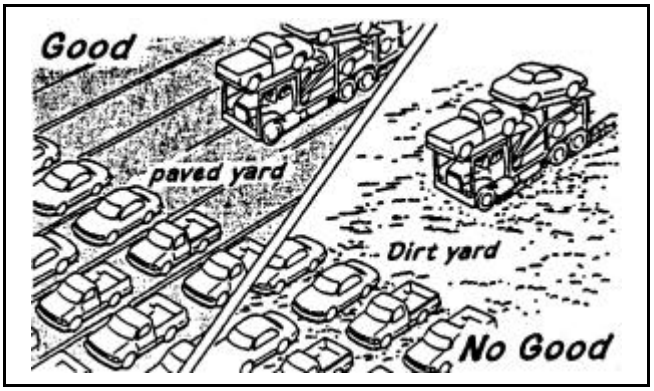
Eliminate or modify any idler arms, chain angle boxes or horizontal crossmembers that protrude above treadway.

(a) Cutting off sections of upward flanges that may get contact with treadway.

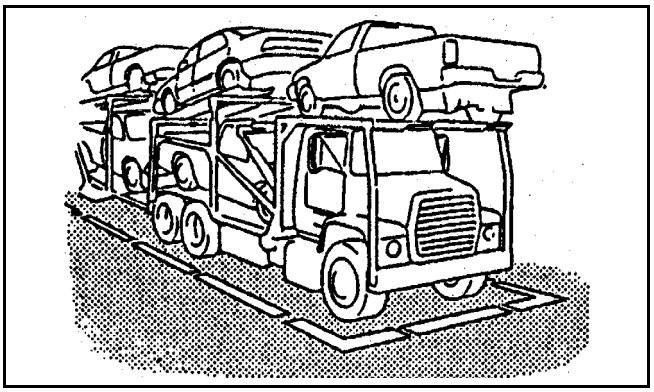
(b) On idler arms, reducing the circular end caps to “half moons”

(c) Modify the chain angle box as shown in the left hand figure.

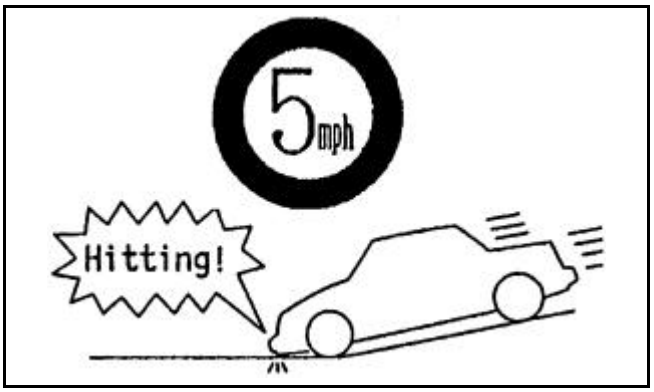
(2) Requirements for loading/unloading operations



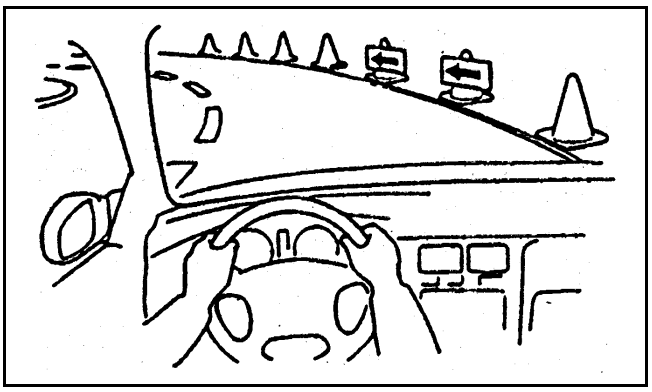
Loading/unloading operations should be conducted on paved yard.



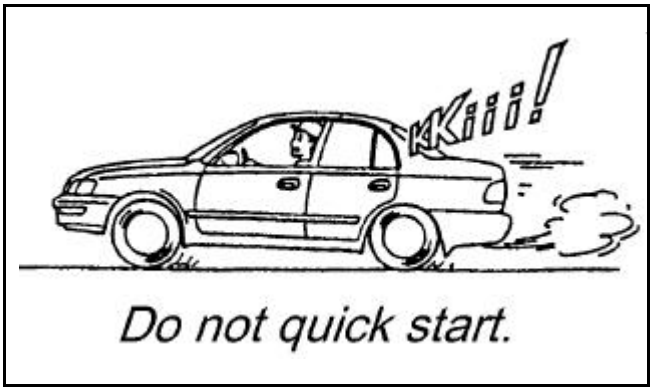
Trailers should be parked in unauthorized areas.



Loading/unloading speed must be kept at less than 5 mph (8 km/h) to prevent damage of lower part of the body.

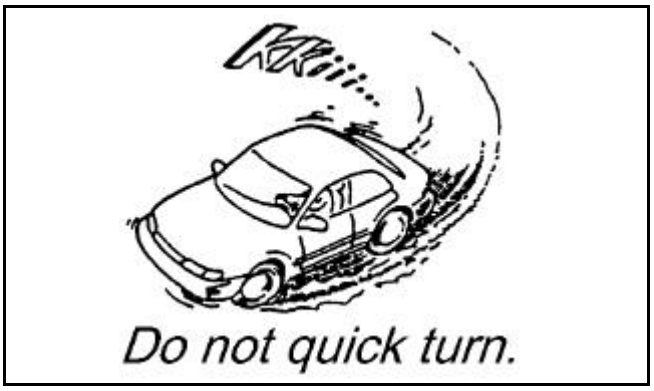


Indicate the routes and the parking areas clearly by signs, tapes or other proper devices.

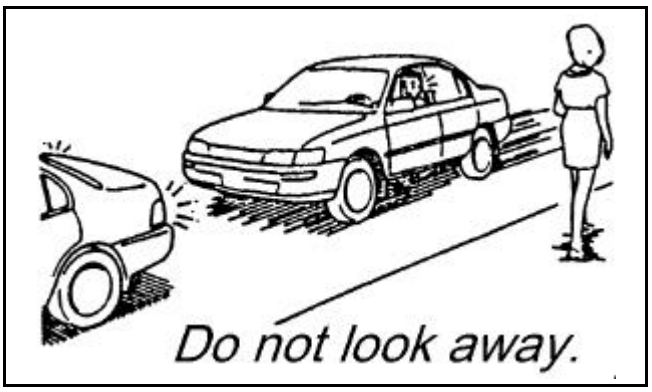


Quick starting is prohibited.

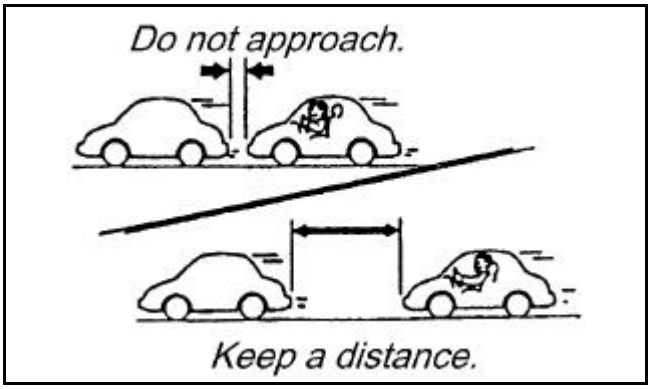
Quick braking is prohibited.



Quick turning is prohibited.



Looking away is prohibited.



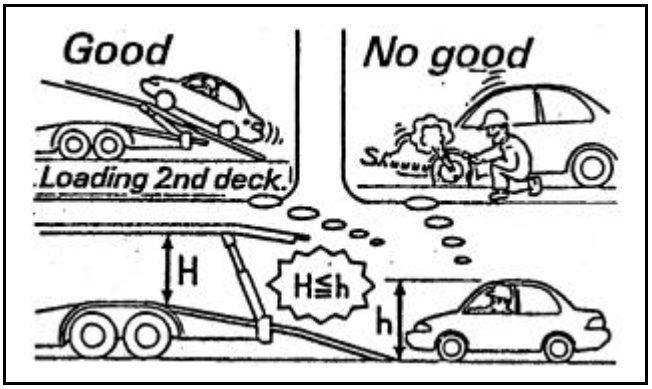
Never follow the vehicle in front closely when driving.

Keep a distance between vehicles.

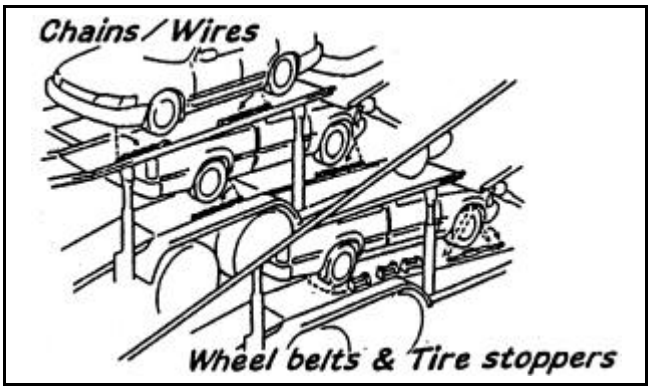
Vehicles should never be used as a shuttle bus.

Smoking, lounging, eating in vehicles is prohibited.

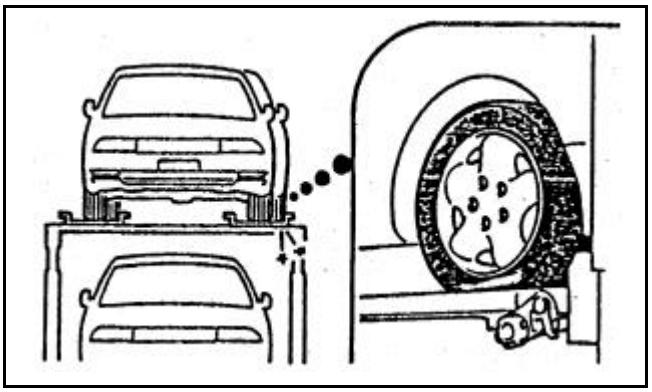
Do not allow to keep engines idling for a long time.



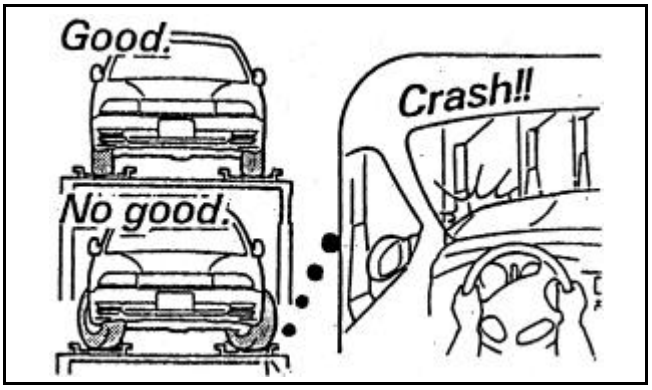
Never deflate tires to reduce the height of vehicles when loading onto trailers.



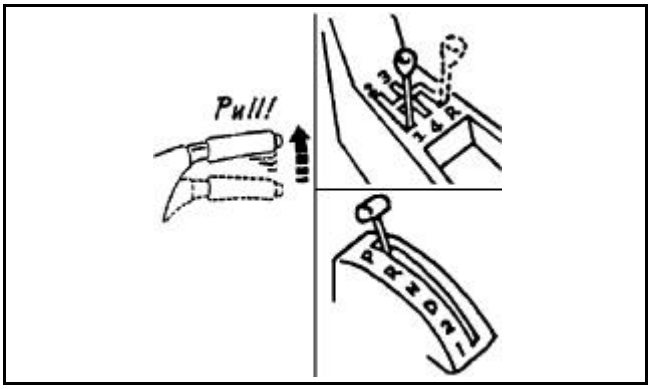
Remove all vehicle tie down devices and clear away them from car passages.



Vehicles must be centered on tie-down channels.



Front wheels must be straight ahead.



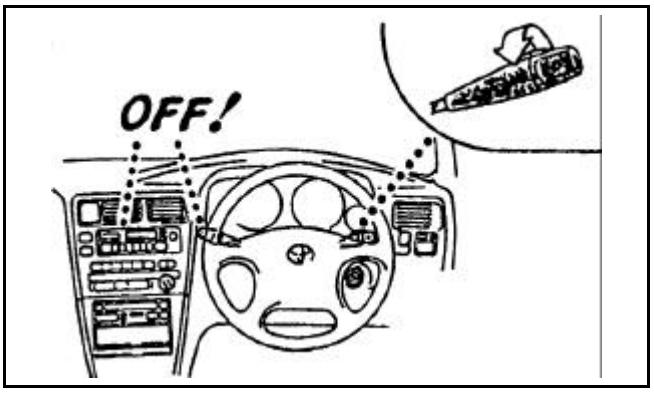
Fully apply parking brakes for the safe transport.

Manual vehicles must be placed in “LOW” or “REVERSE” position.

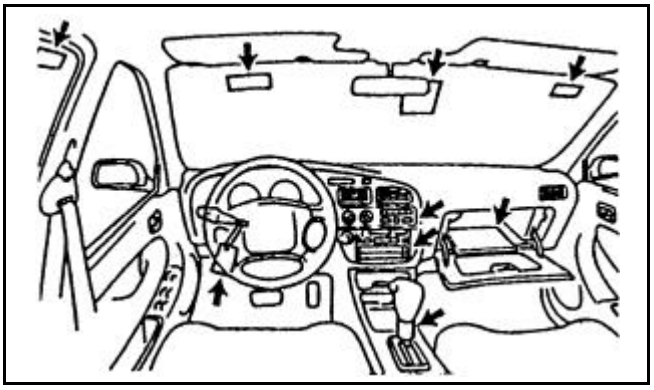
Automatic vehicles must be placed in “PARKING” range.

Do not enter or exit vehicles through a window.

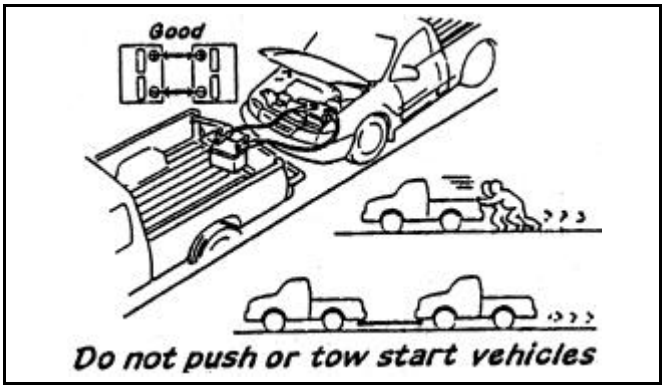
Doors must be opened carefully to avoid contacting with pillars of the car carrier.



Ensure that all doors and windows are closed and all electrical appliances are turned off.



Never remove printed interior items such as starting instructions, owner’s manuals, vehicle labels and tapes etc., and put them in the original place.

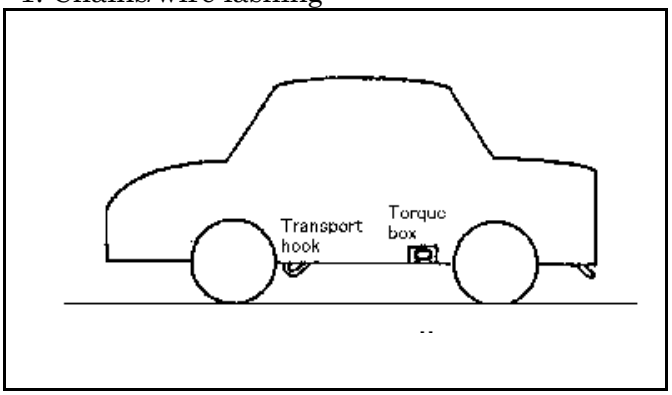


Do not pull or tow to start the vehicles with flat battery.

Use proper battery cables, taking care to battery polarity.

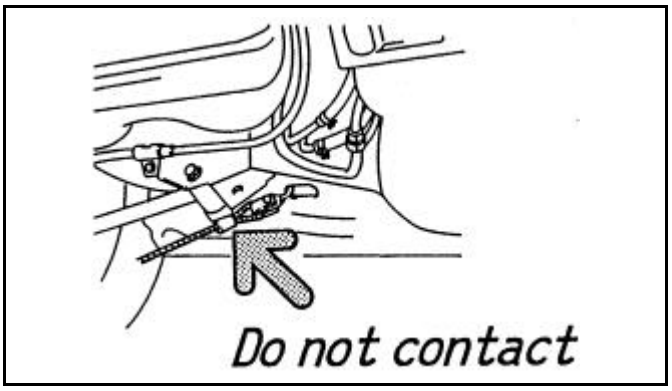
(3) Requirements for tie down operations

1. Chains/wire lashing

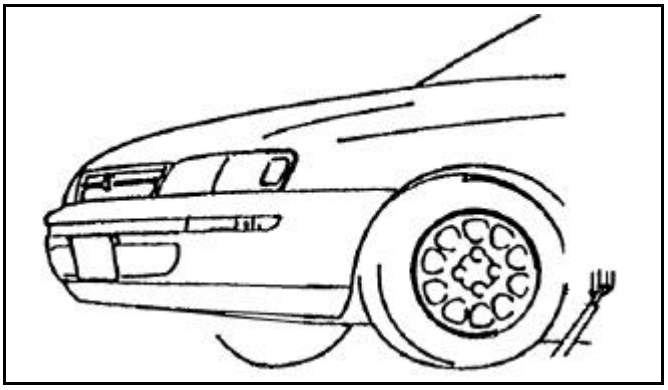


Chains/wires must be tied down within the proper angle.
As for tie down point and angle, please refer to "Vehicle Tie Down Procedure" issued by Vehicle Control Dep., Vehicle Logistics Division, TMC.

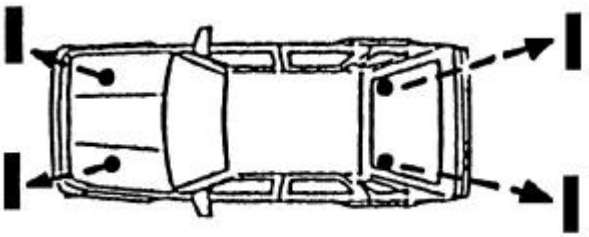
Rear marine hooks must not be used for rear tie down points.
As for tie down points, there are some exceptions in some specific models.



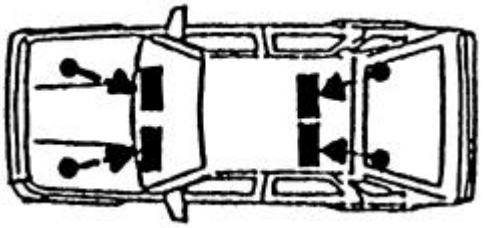
Make sure that chains/wires do not contact with lower part of the body.



Tie down chains/wires must not contact with vehicle's spoilers, bumpers, suspensions, exhaust components, or underbody.



Outboard tie down



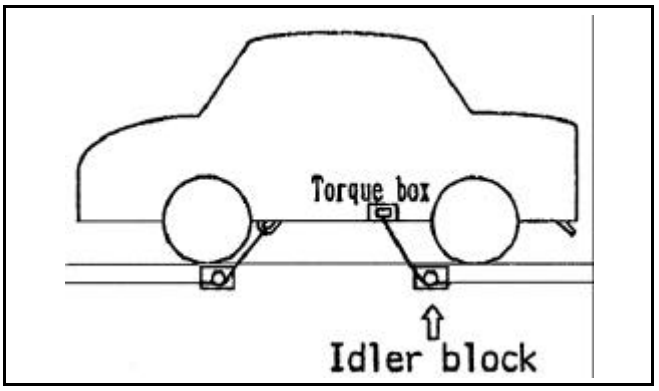
Inboard tie down

The direction to pull chains/wires is shown in the left figure.

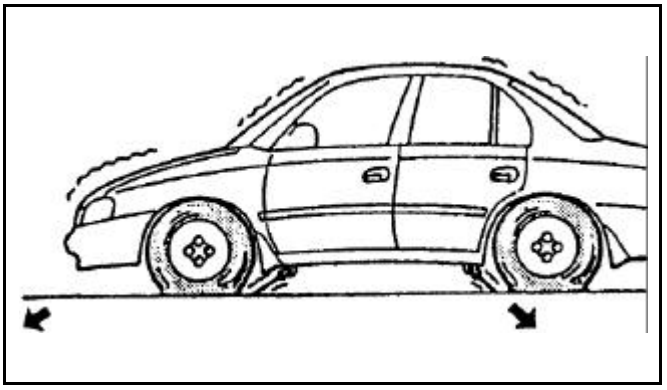
Notice
When tying down into the torque box, take care not to hit against lower parts of the body listed below.

Examples:
[Outboard tie down]
-Rear suspension lower control arm bracket

[Inboard tie down]
-Body floor

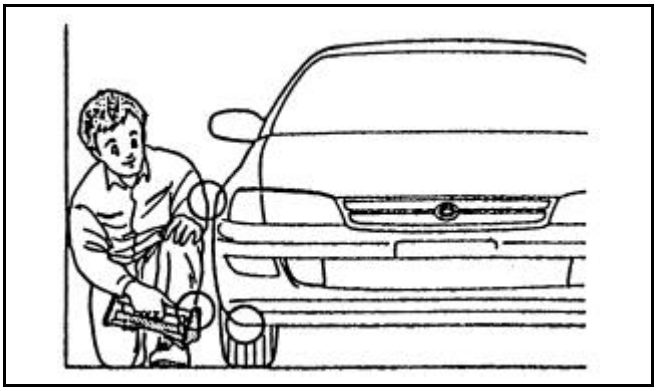


If you cannot get an appropriate angle when tying down, use idler blocks to assure the appropriate angle.

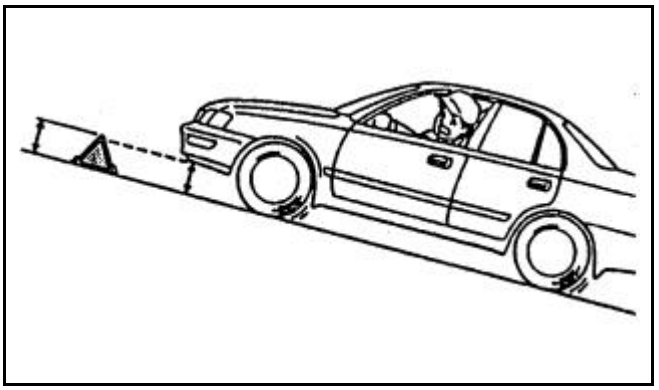


Do not overtighten.

The tension applied to chains/wires must be sufficient not to pull further but to remove any slack.

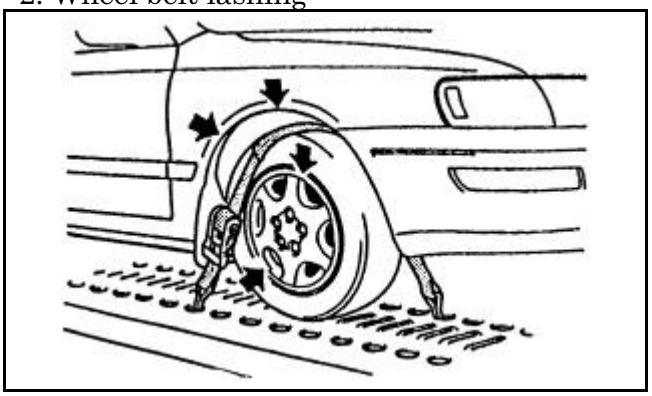


Do not damage paint surface when applying/removing the tire stopper on/from the tire.

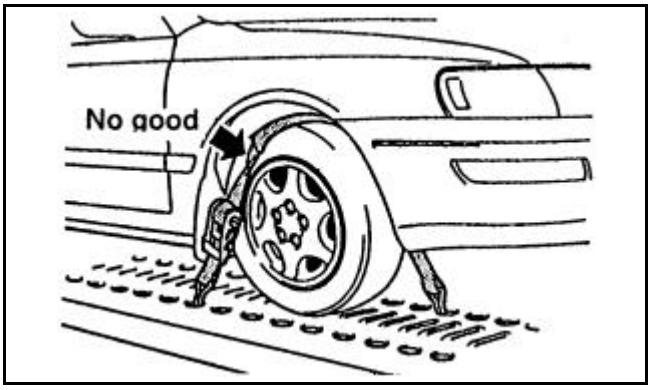


Take care not to hit against tire stopper, when loading after setting tire stopper on the treadway.
Pay attention to the height of tire stopper.

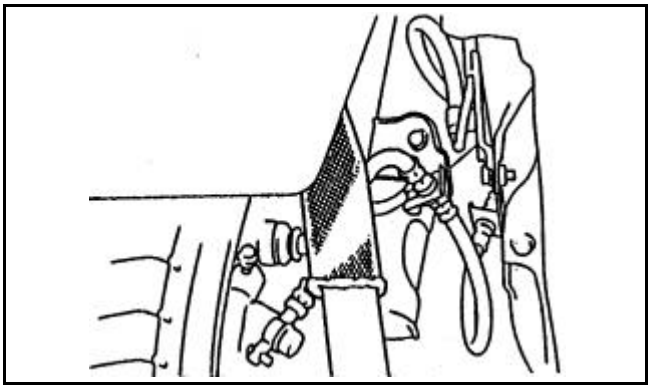
2. Wheel belt lashing



Do not damage paint surface when applying /removing the strap belt on/from the tire.

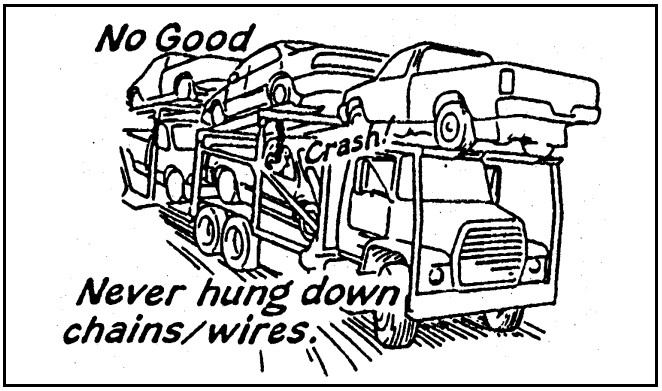


Make sure that the strap belt is not twisted.

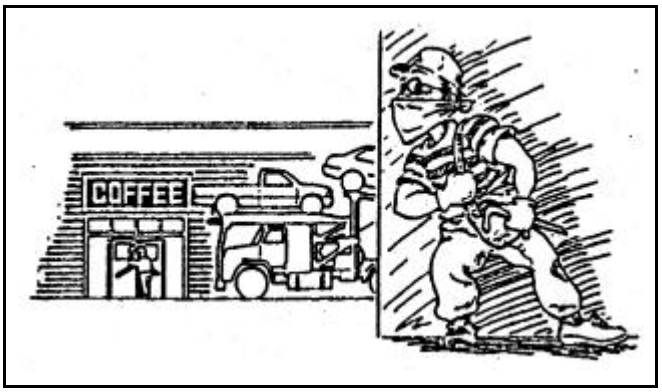


The strap belt must not contact with brake tubes, pipes and hoses.

(4) Requirements for trailer transport



Do not let top-deck chains/hook hang down onto vehicles on lower deck.



Do not leave vehicles in any place where there is a risk of theft.

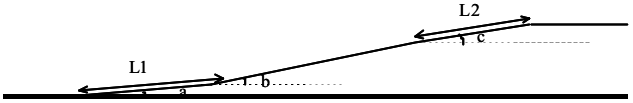
5. Requirements for vessel transport

(Equipments, Maintenance, Berthing operations, Loading/Unloading operations, Tie down operations)

(1) Requirements for vessel equipments

To secure the safety and prevent possible vehicle damage, we hope you take the following matters into consideration when designing and constructing vessels.

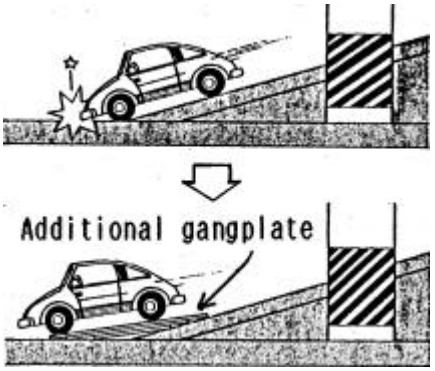
Ramp angle



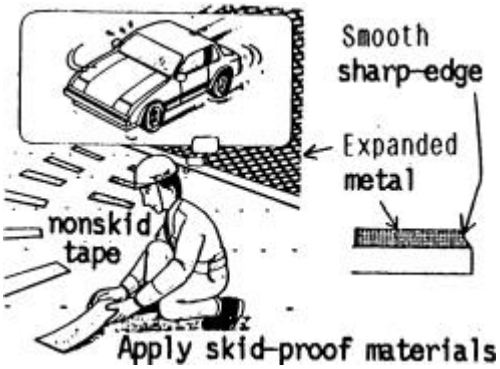
a: less than 6 degrees
b: less than 10 degrees
c: less than 6.5 degrees
L1: more than 3.8m
L2: more than 2.8m

The ramp angle must be less than 6 degrees and the each corner should be smoothed.

The length at L1 is more than 3.8 meters.

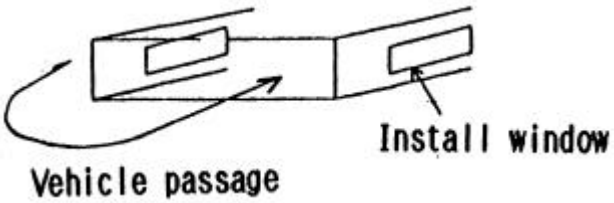


Put additional materials such as rubber mat on the end of ramps to modify the angle in order to prevent damage during loading /unloading operations.

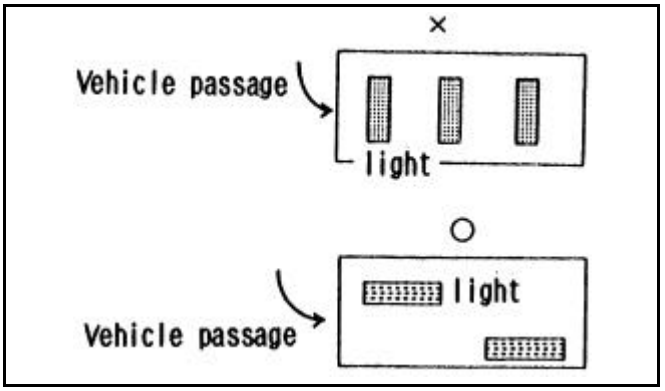


Apply skid-proof materials such as non-skid tape on the ramp.

In case of using expanded metal that is reticulate metallic board as a skid-proof metal, grind or weld round bars around the edges to smooth the sharp edge part in order not to damage the tires of the vehicles.

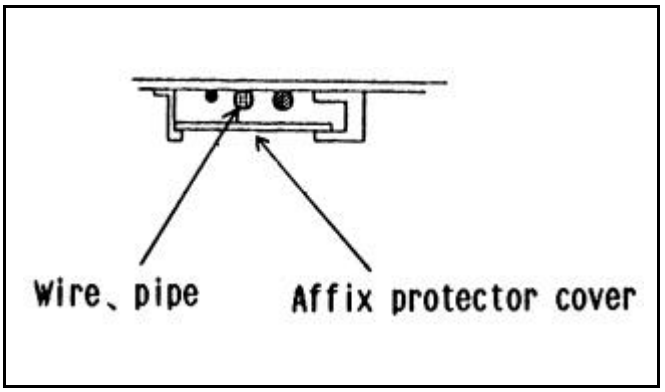


Build windows on the walls of the vehicle passage to ensure the wide and clear view for drivers.

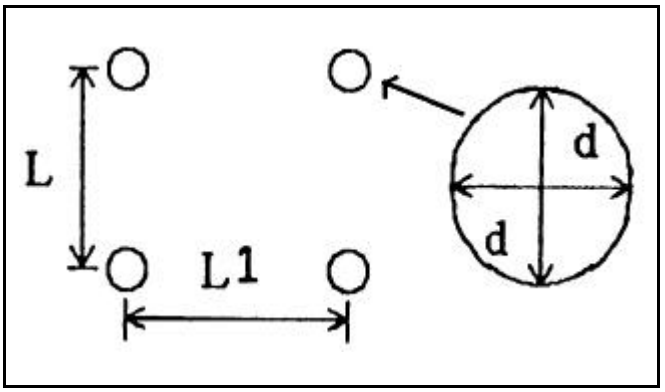


Keep the illumination intensity on the deck and ramp more than 30 lux.

Take care about the position of the lights above the vehicle passage (especially at ramps) not to dazzle drivers' eyes.



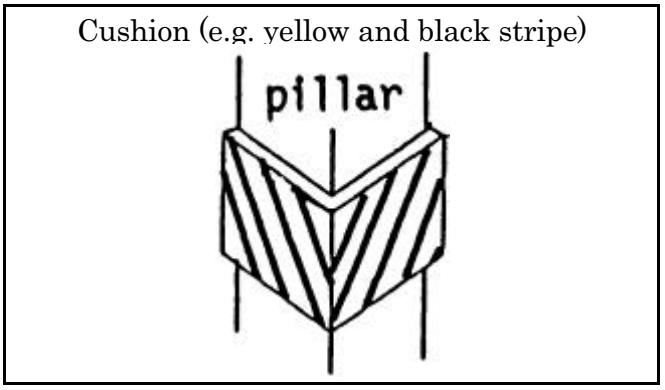
Affix protector covers around wires and pipes in order to prevent oil/grease dropping on vehicles or decks.



Interval between lashing points on decks should be keep less than 600 – 800 mm.

Decide the diameter of a lashing hole to enable to hang 4 hooks at one hole.

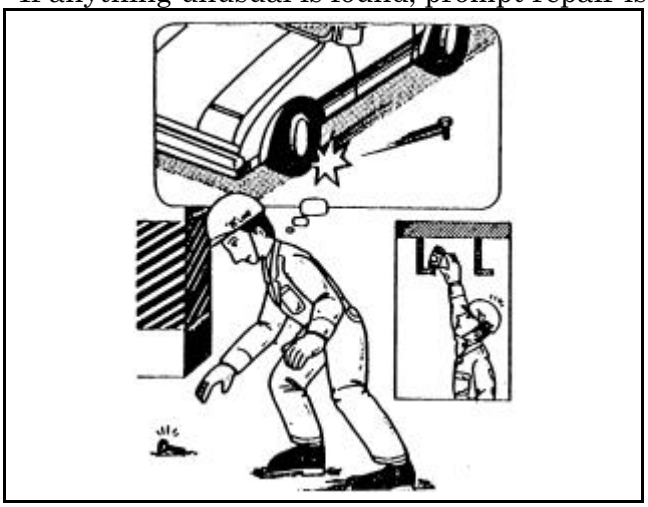
L(Longitudinal interval): Within 600 mm
L1(Athwartships interval): Within 800 mm
d: About 60 mm



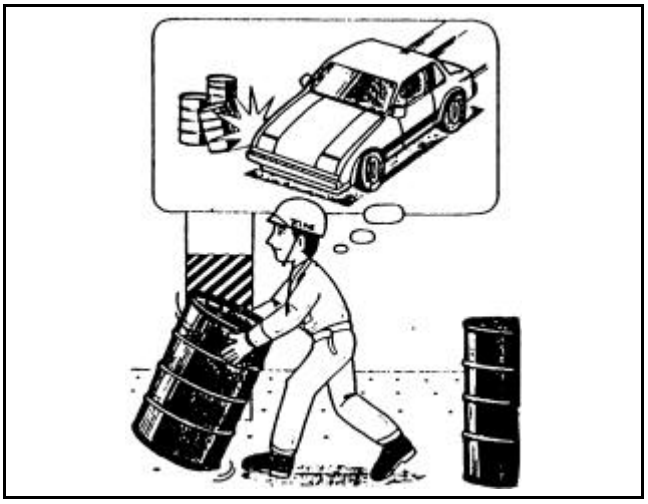
Affix noticeable-colored cushions on pillars and protruding structures at ramps and decks in order to attract workers' attention.

(2) Requirement of check and maintenance of vessel facilities.

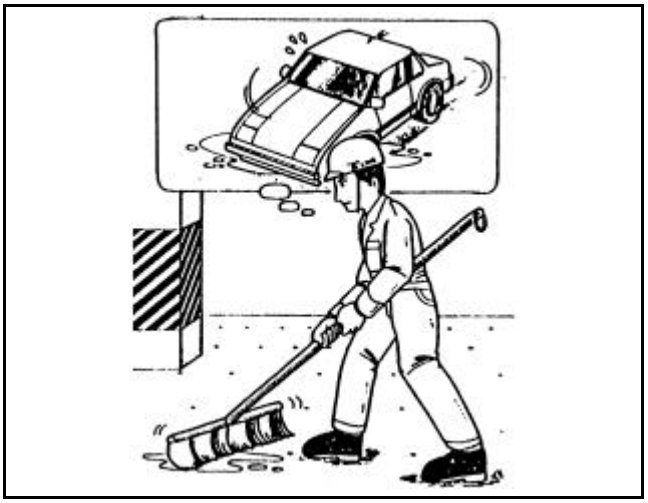
For the safe transport, it is necessary to check and maintain the vessel facilities periodically. If anything unusual is found, prompt repair is required.



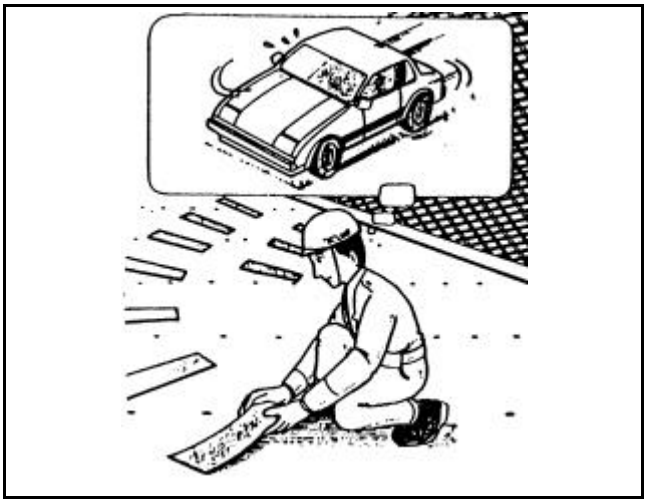
Pick up any stones, bolts and cans on decks and ramps.



Remove obstacles on the vehicle passage for safe driving.

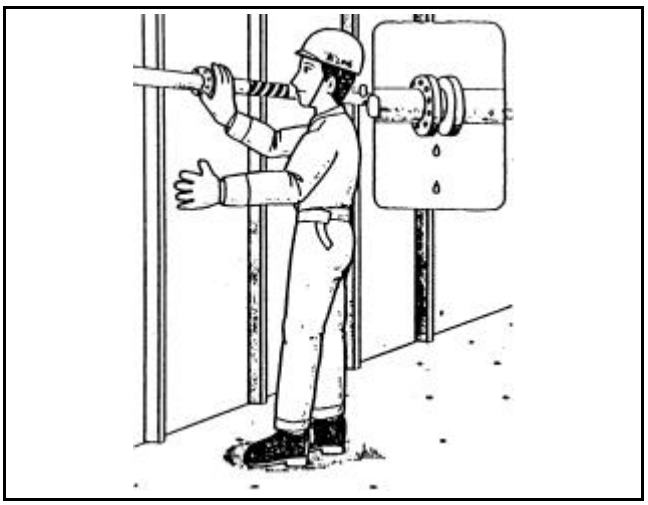


Clean up any water, oil and rubber dust on decks and ramps.



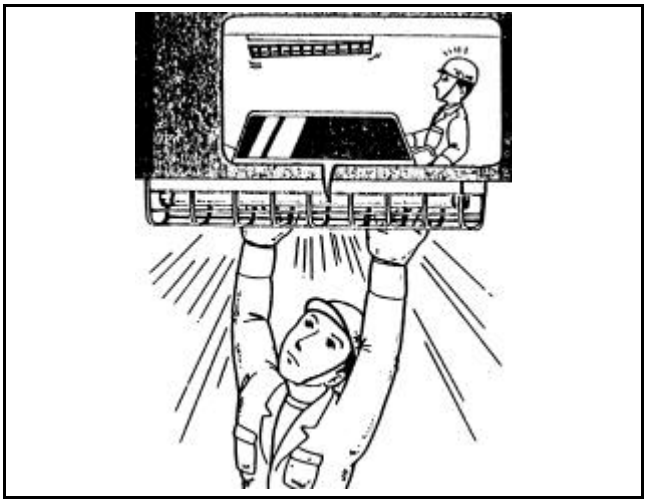
Check and maintain non-skid tape applied on ramps periodically.

Remove rust and paint scale from ceiling and ramps. Repaint is necessary.

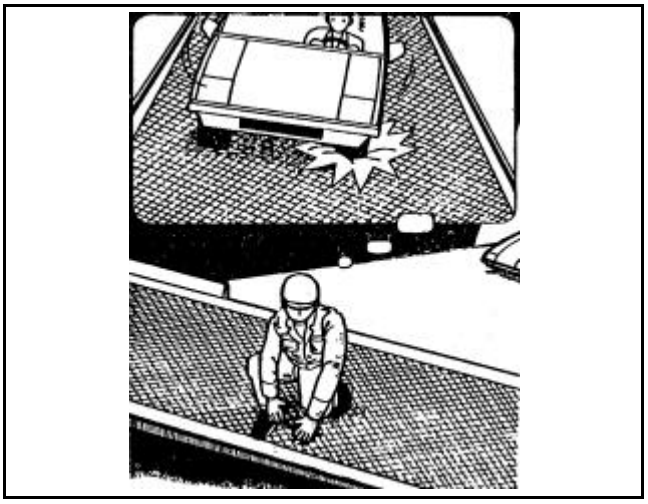


Always inspect pipes in holds.
Repair immediately if anything wrong is found.

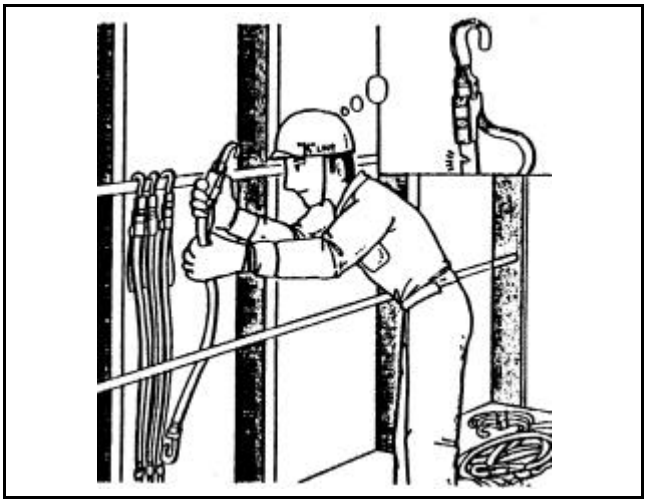
If necessary, apply protective covers over pipes.



Check the condition of lights periodically.
If anything wrong is found, fix it immediately.
Keep the illumination intensity more than 30 lux.



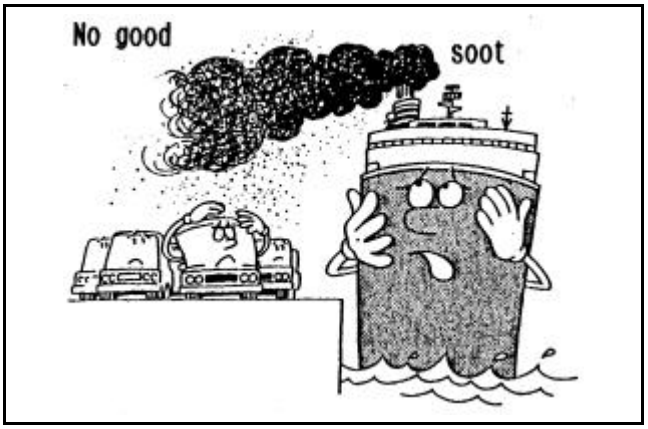
Check the condition of the car ladder periodically.
If anything wrong, repair it immediately.



Check the condition of lashing devices periodically.
If anything wrong, repair or replace it immediately.

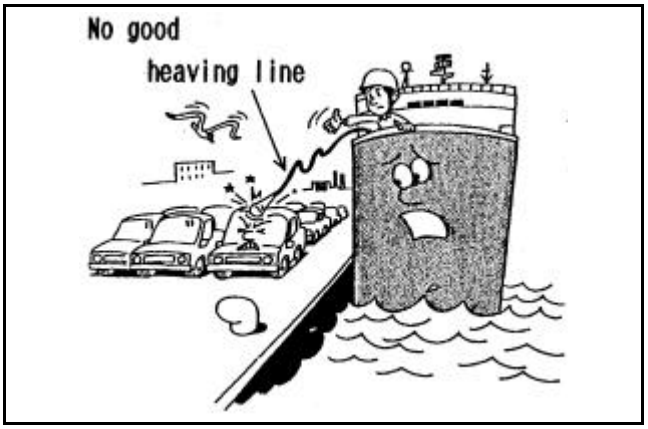
(3) Requirements for berthing operations

When berthing, take care about the following matters in order to prevent vehicle damage.



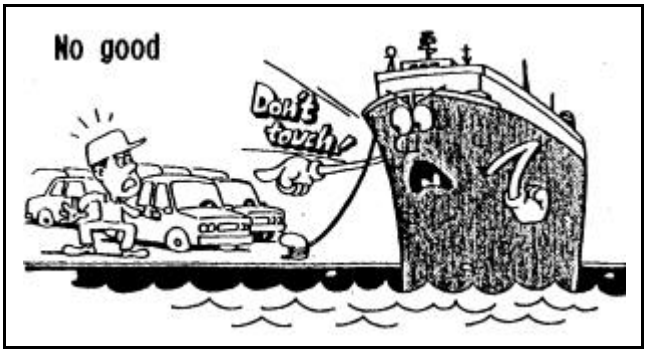
Pay attention to the following matters in order to protect the stored vehicles in the yard from the soot from the vessel funnel.

(1) Carry out soot blowing procedure and wash down the decks before entering the port.
(2) Take account of the direction of the wind when berthing. If necessary, drive the boiler of the ship continuously during the berthing.



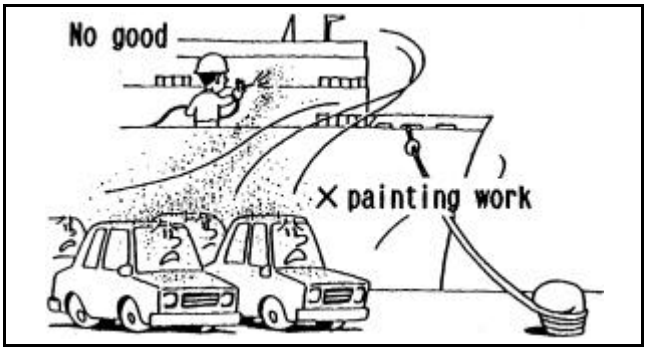
Pay attention to the following matters in order to avoid damaging the stored vehicles by heaving lines when berthing.

(1) The leader on duty should give clear instructions for throwing time.
(2) Heaving lines should be thrown down vertically onto the quay after the ship comes as close as possible to the quay.
(3) Utilize a line handling boat as far as the circumstances permit.

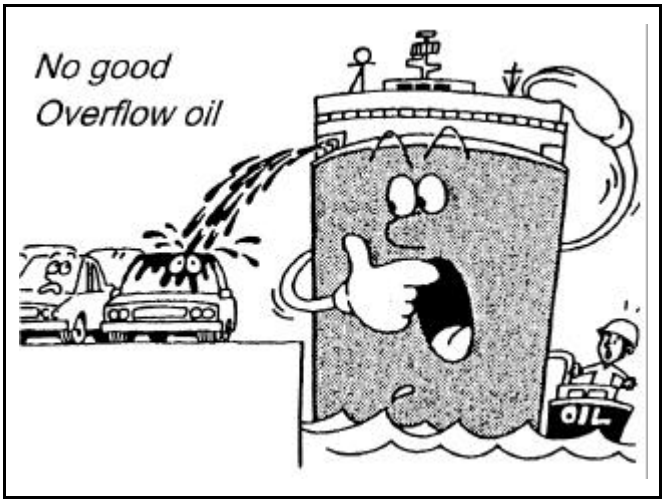


Prohibit vessel crews from touching or driving new vehicles at the storage yard.

Also, walk out of the designated traffic routes.

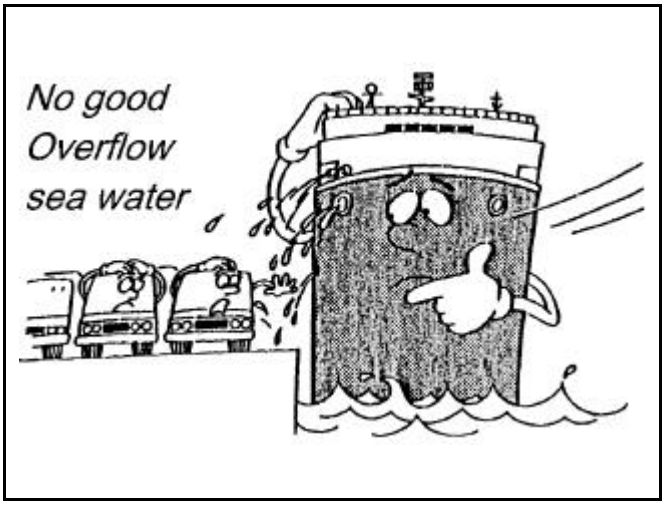


Strictly prohibit painting works on ships (especially with spray guns) near the vehicle storage yards.



Pay attention to the following matters in order not to stain the stored vehicles at the yard with overflow oil through the air pipe while bunkering.

(1) Make manuals for bunkering operations and observe it.
(2) Make devices that can judge open/shut position of the tank valves at first sight.
(3) Pay special attention to air cock phenomenon and keep enough vacant capacities on each tank.

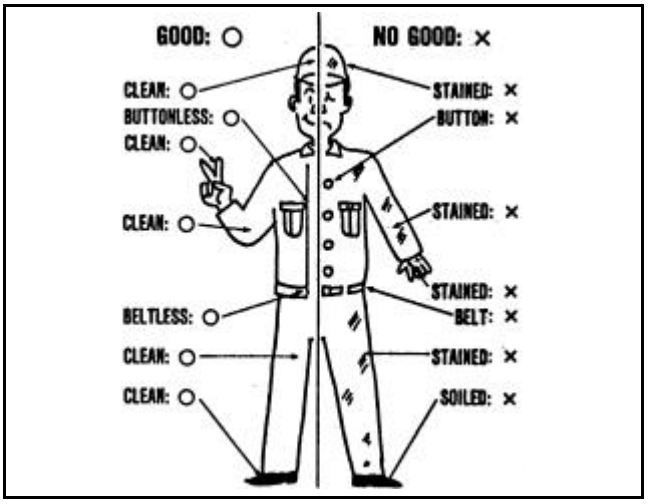


Pay attention to the following matters in order not to wet the stored vehicles at the yard with overflow seawater during ballasting operations.

(1) Check whether unnecessary valves are all closed tightly.
(2) Pay special attention to air cock phenomenon and keep enough vacant capacities on each ballast tank.
(3) Check and maintain the pumps, valves, float gauges, control units and associated equipment concerned periodically.

(4) Requirements for loading/unloading operations

Hold a meeting before every loading /unloading operations in order to instruct all personnel concerned with the operation in working methods and cautions against damage.

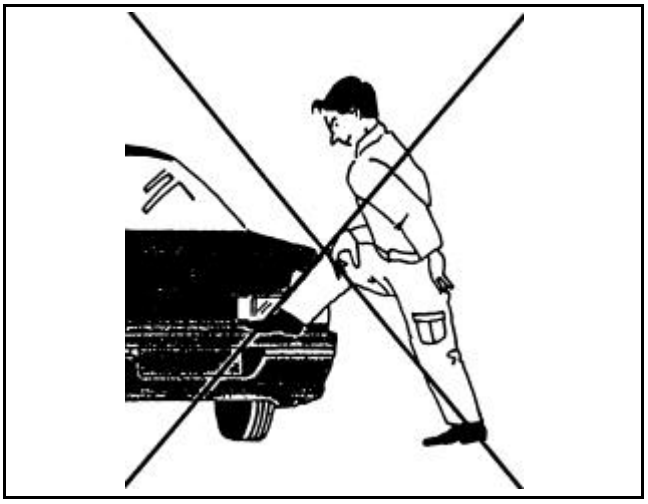


Always wear clean, well-fitting uniform without buttons and buckles.

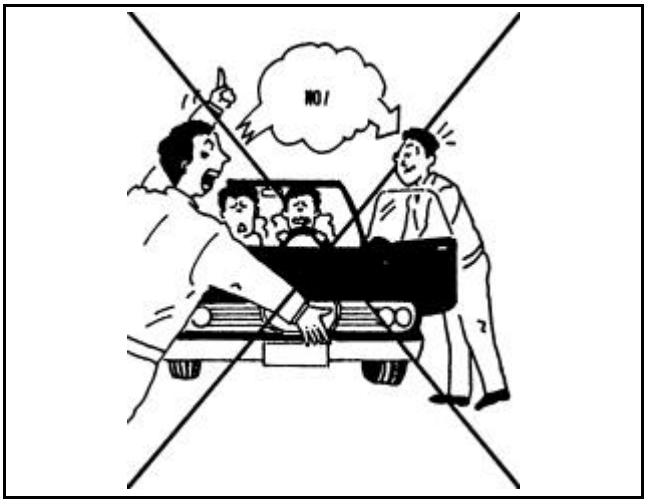
Also keep shoes and gloves free of dirt or mud.

Smoking, eating, drinking are prohibited in new vehicles and on the decks.

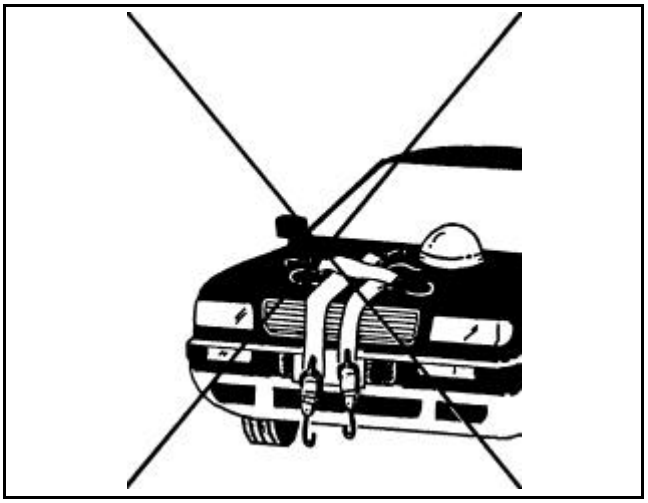
Never lean the elbow or hands on the vehicles. Also never lean your body over the vehicle.



Don't step on the bumpers.



Never use the new vehicles for shuttling.

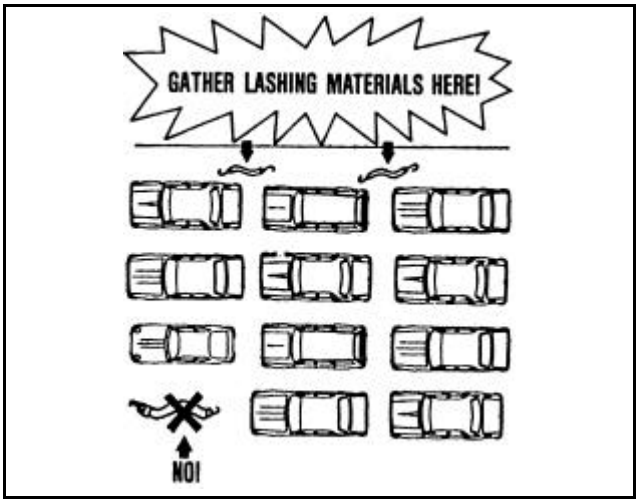


Never place any materials such as lashing belts, helmets etc. on vehicles.

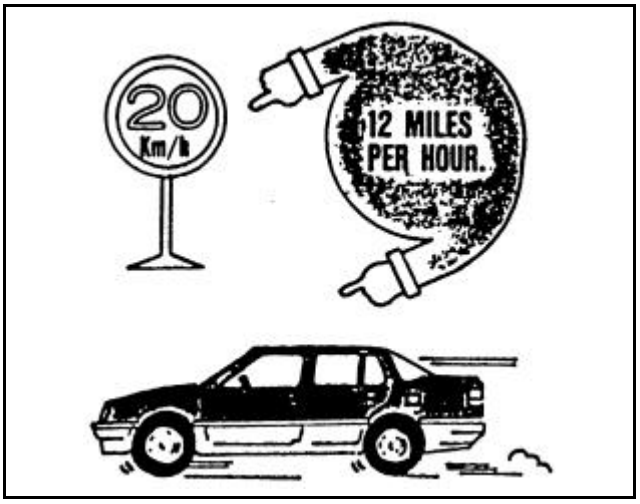
Be careful not to hit lashing materials against vehicles.

Confirm that all vehicles are free from lashing when unloading.

Place aside all lashing materials in order to not to contact with vehicles.

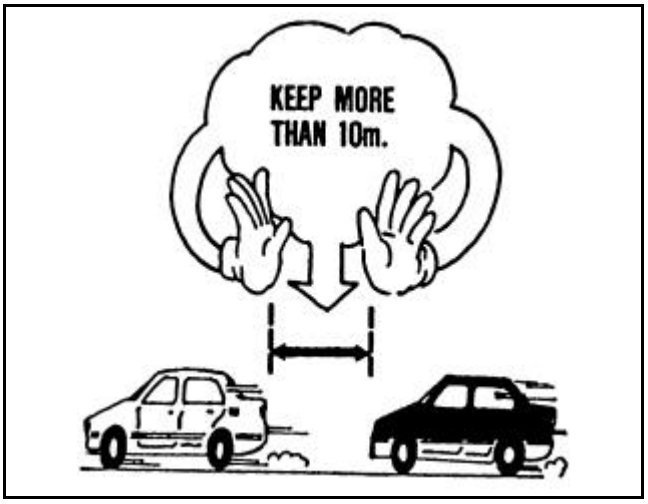


Clear all lashing materials from vehicle passage.



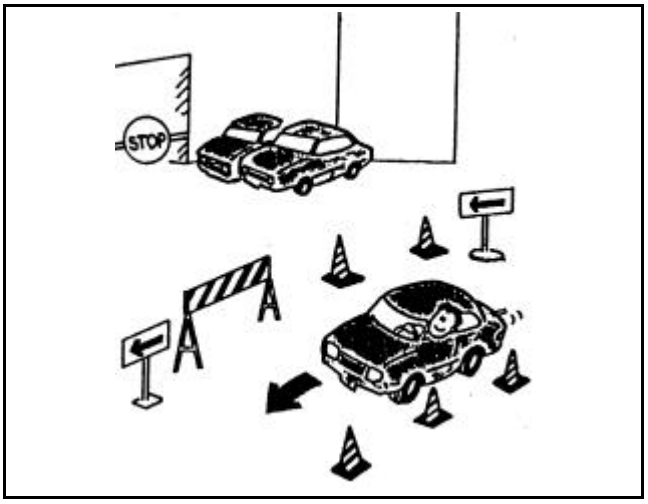
Pay attention to the driving speed to secure safety and prevent damage.
We recommend that the driving speed in the vessel is less than 12 mph (20 km/h).
Especially as for the sporty type models (cf. Celica, Supra, MR2 etc.), we recommend that the driving speed in the vessel is less than 9 mph (15 km/h).

Never start, stop or turn suddenly.

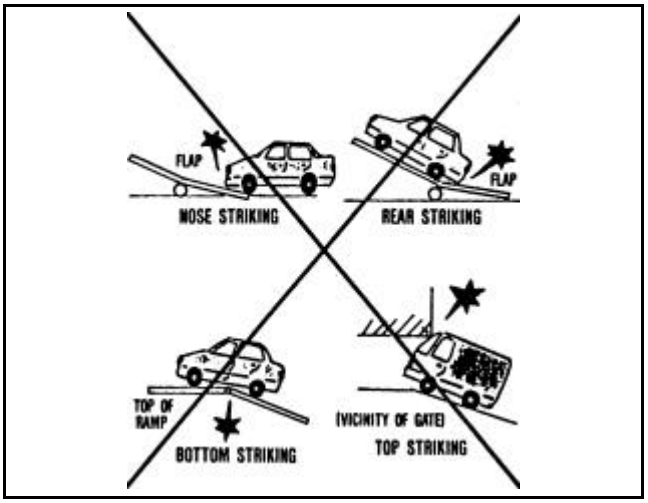


Keep a distance between the vehicles and never follow the vehicle in front when driving.

The recommended distance between vehicles is more than 10 m in the vessel.

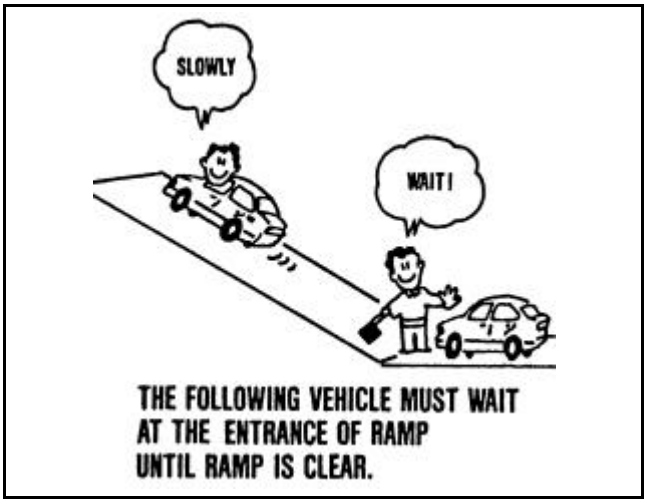


Indicate the driving route by safety cones, bars, or other proper devices.

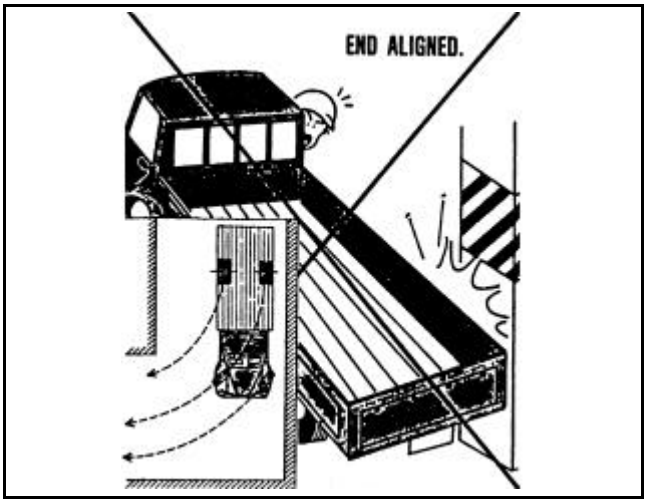


Pay special attention not to hit the nose, bottom and rear of the vehicle on the ramp and vicinity.

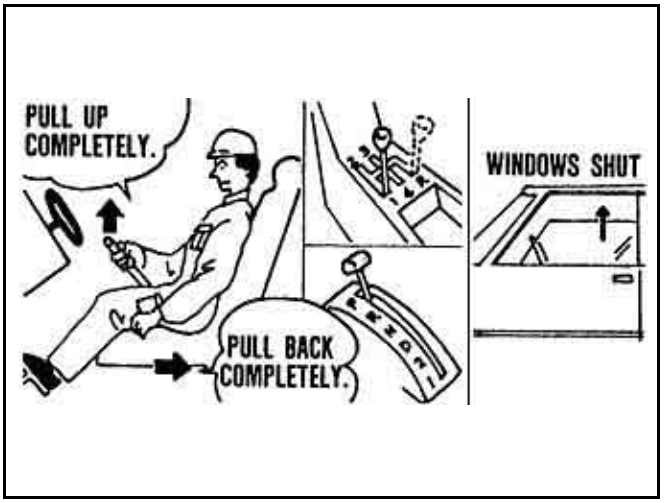
Reduce the speed at the ramps and gates.



Drive slowly near each top of the ramps.

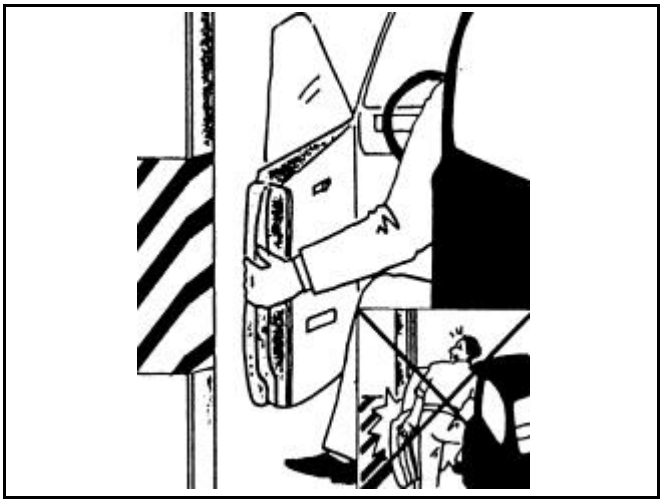


Pay attention to the rear part of the vehicles when turning.



Check the following matters after placing the vehicles in position.

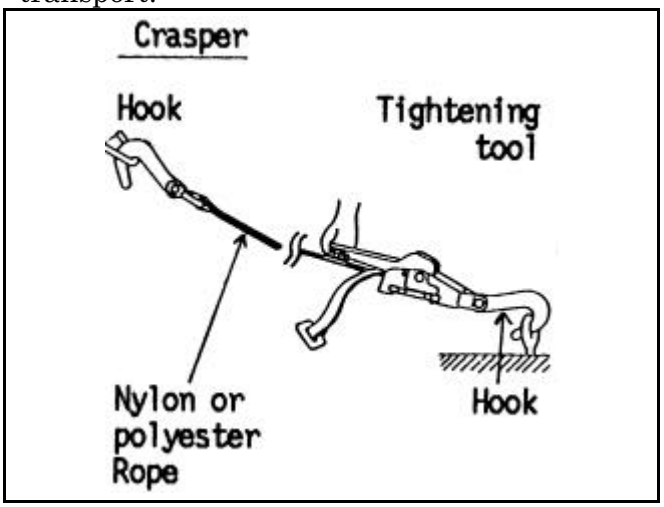
(1) Shift the gears into "LOW" or "REVERSE" position for manual transmission, and "PARKING" position for automatic transmission.
(2) Apply the parking brake.
(3) Turn off all lights and electrical switches.
(4) Fully close all windows and doors.



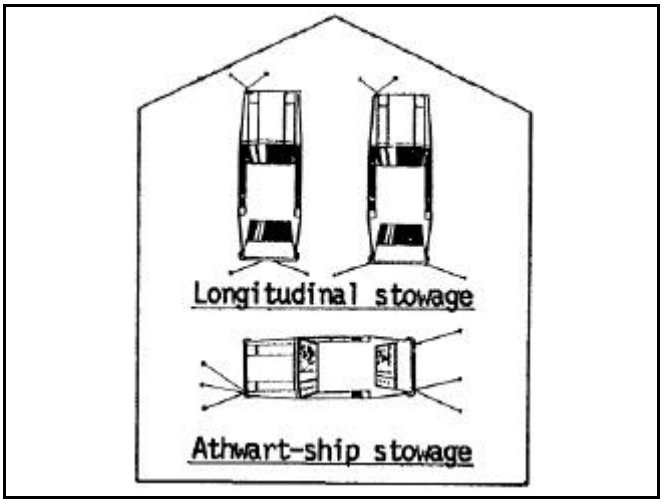
Doors should be opened/closed with caution, putting hand on the edge to prevent damage.

(5) Tie down operations

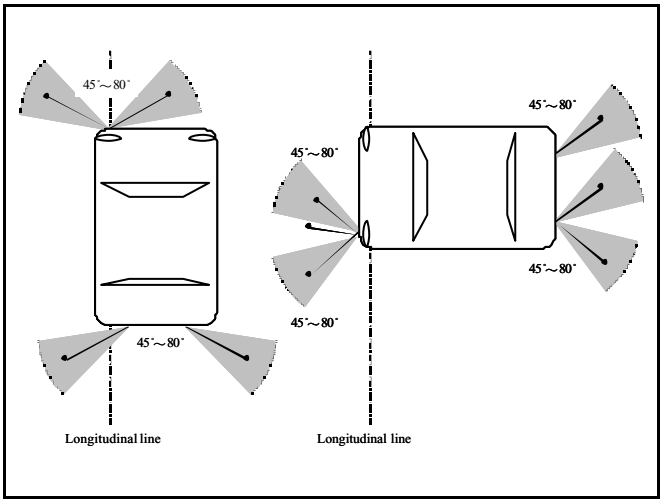
It is necessary to tie down the vehicles with lashing materials to prevent damage during vessel transport.



Currently, claspers are used for lashing during transport from Japan port to overseas port.

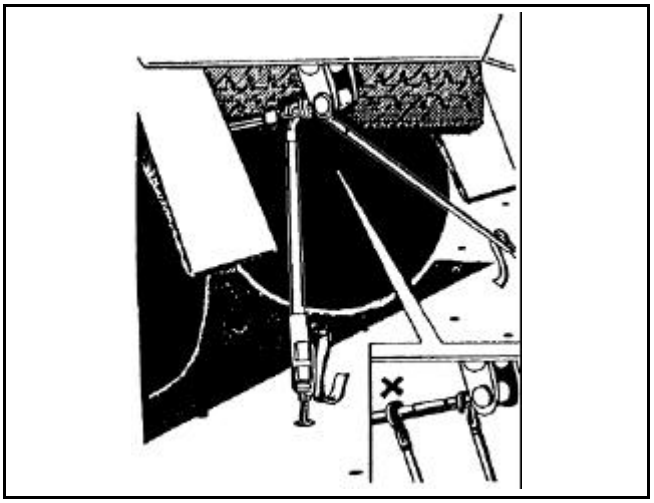


Number of lashing points:
The number of lashing materials to secure one vehicle depends on the intensity of the materials, rolling and pitching force, and vehicles weight, etc.
*The number of lashing points for transport from Japan port to overseas port is as follows.
Longitudinal stowage: 4 points per unit
Athwartships stowage: 6 points per unit
The vehicle over 1.8 t in weight (cf Land Cruiser, Dyna) is secured at 6 points even in longitudinal stowage.



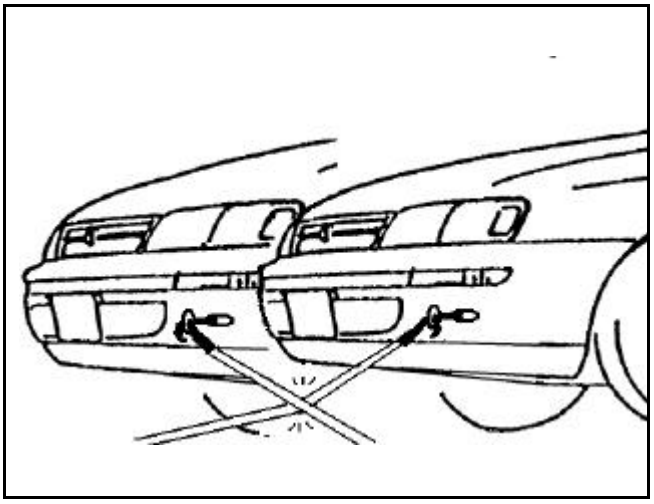
Tie down angle depends on the shape of lashing material and transport hook (or leaf spring) of the vehicle, the location of the lashing holes in the vessel, and rolling and pitching force.

When securing vehicles, pay attention not to contact lashing materials with bumpers suspensions and another lashing materials. Currently the lashing lines are taken to angle within the range of 45 – 80 degrees based on vessels' longitudinal line.

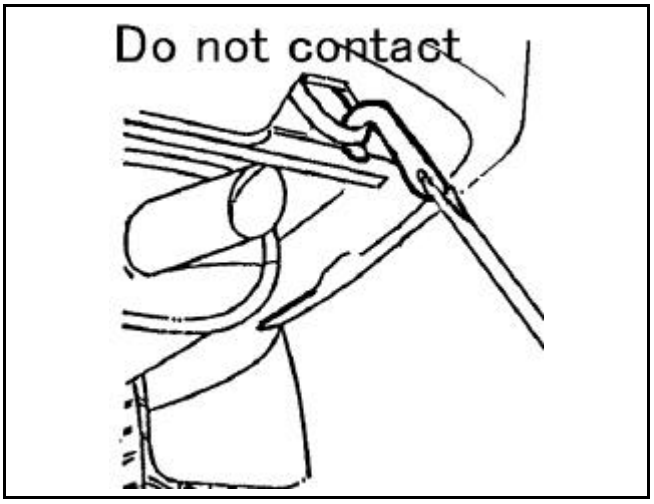


The lashing points of trucks are usually leaf spring.

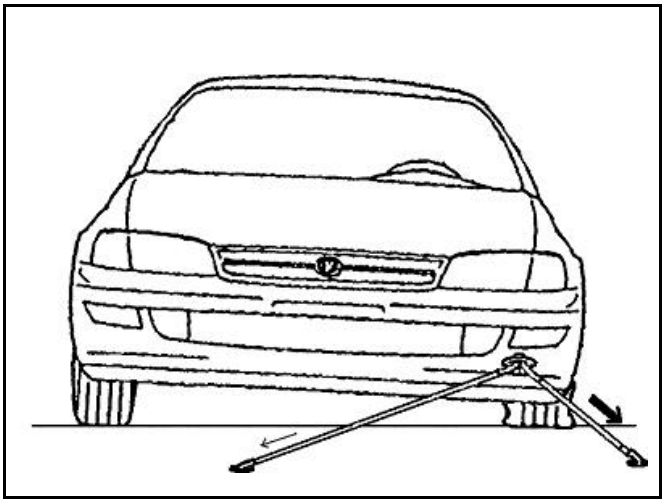
In this case, lashing materials are hung from above the eye at the end of the leaf spring.



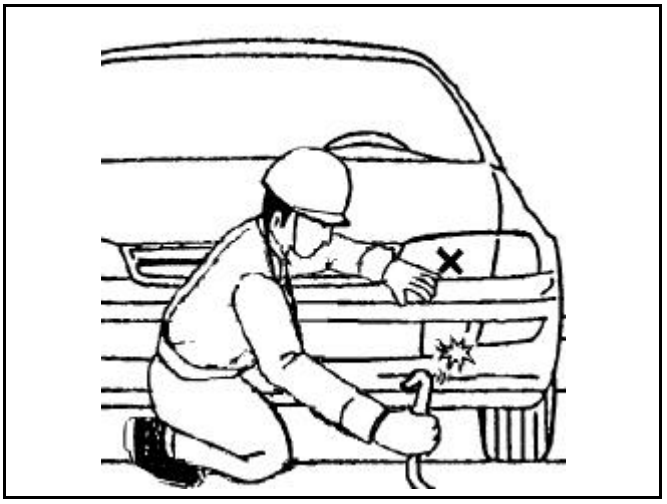
Avoid cross-lashing.
In case of some unreasonable reasons, take care not to come in contact with the lashing materials each other.



Take care not to bring the lashing materials into contact with spoilers, bumpers, suspensions, exhaust components or underbody.



Equally tighten each lashing material.

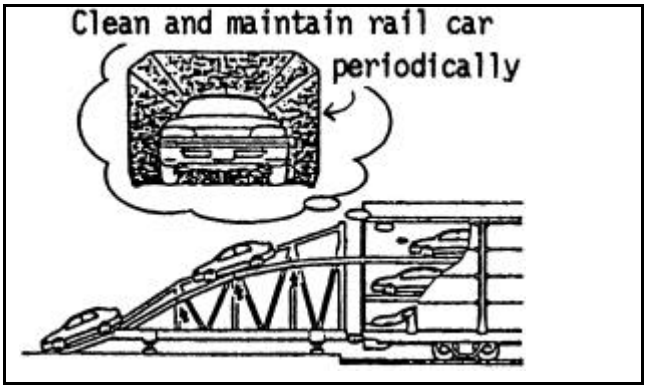


Take care not to damage the vehicle body and bumper when lashing.

6. Requirements for rail transport

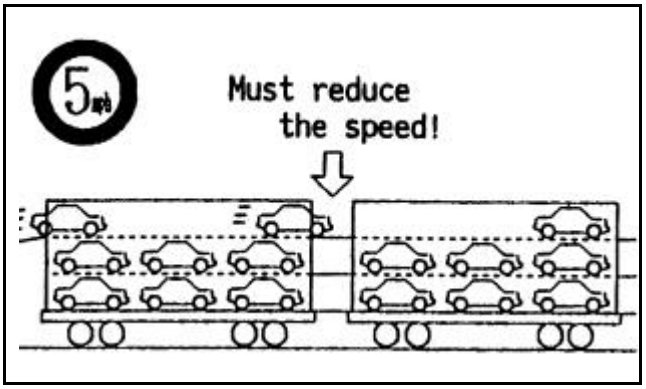
(Equipments, Loading/Unloading operations, Tie down operations)

(1) Requirements for railcar



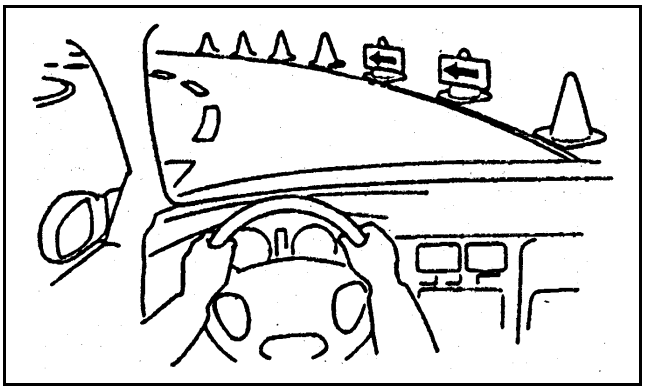
Clean and maintain railcar periodically to prevent the iron particles from ceiling and sidewall, which are caused by rusting.

(2) Requirements for loading/unloading operations



Loading/unloading speed must be kept at less than 5 mph (8 km/h) to prevent damage when driving around rails and railcars.

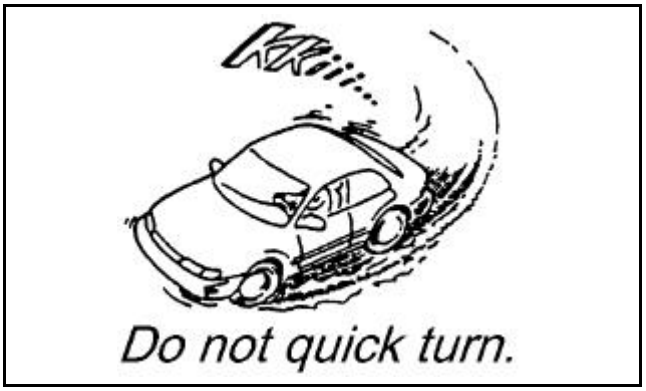
And must reduce the speed when driving across a railcar to next.



Indicate the route and the parking areas clearly by signs, tapes, or other proper devices.

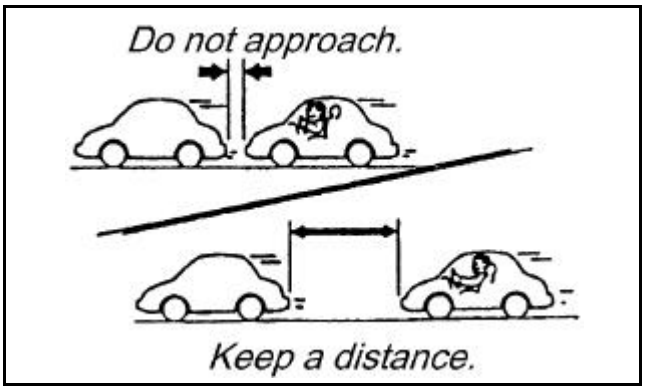
Quick starting is prohibited.

Quick braking is prohibited.



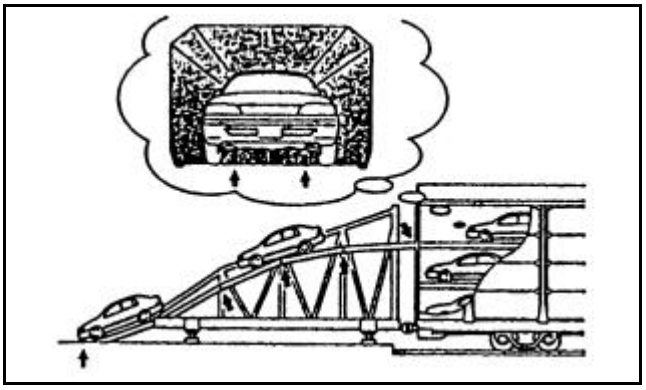
Quick turning is prohibited.

Looking away is prohibited.

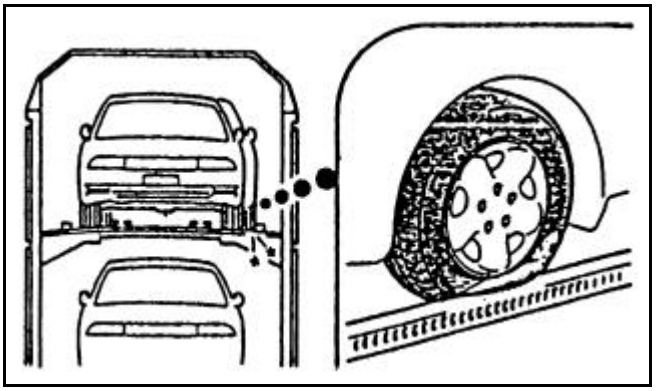


Never follow the vehicle in front closely when driving.

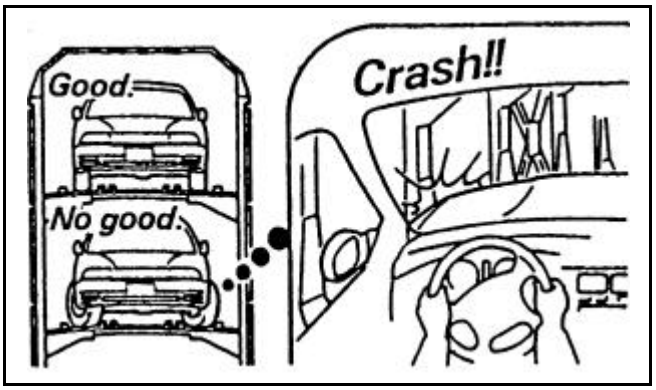
Keep a distance between vehicles.



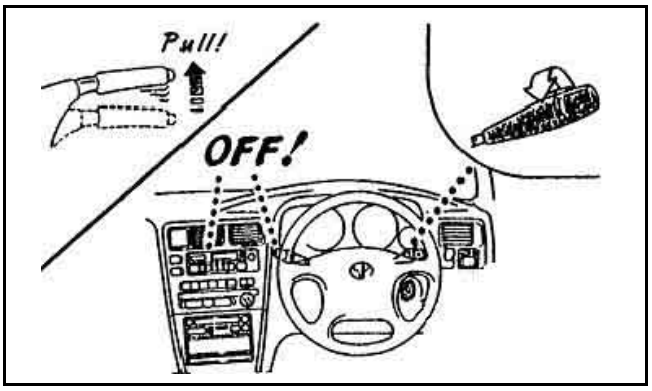
Take care to prevent any parts of the underbody (except tires) from contacting with the floors of railcars, approach ramp and the ground.



Vehicle must be centered on tie down channels.

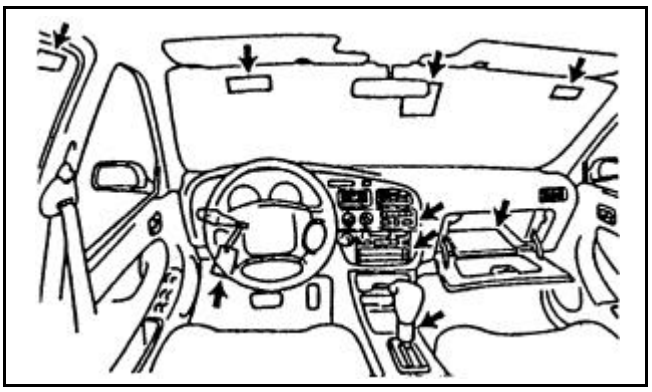


Front wheels must be straight ahead.



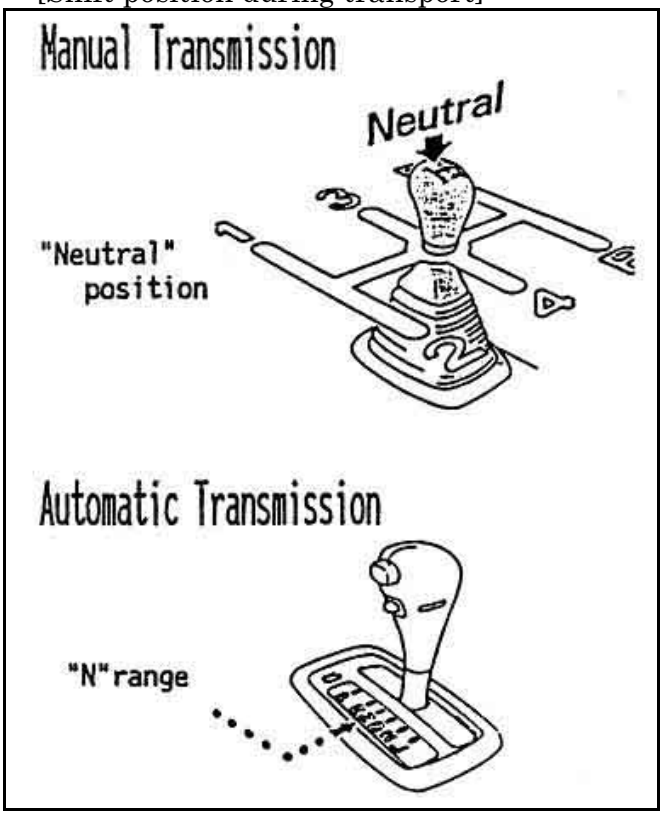
Fully apply parking brake for the safe transport.

Make sure all electrical switches are turned off.



Never remove printed interior items such as starting instructions, owner's manuals, vehicle labels and tapes etc., and put them in the original place.

[Shift position during transport]

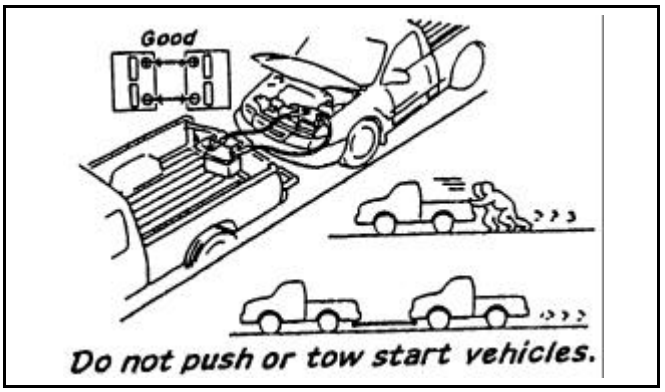


Manual transmission:

Shift lever must be shifted on “NEUTRAL” position during transport.

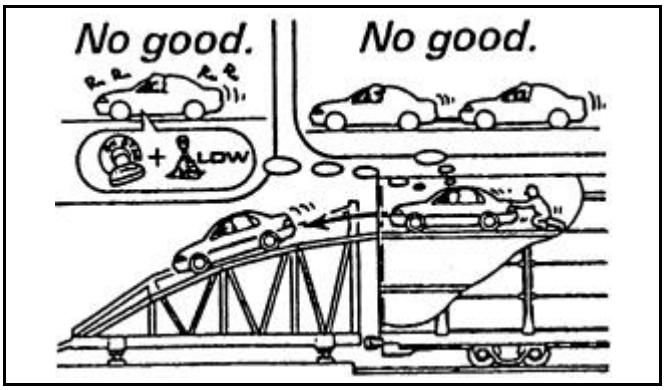
Automatic transmission:

Shift lever must be shifted “NEUTRAL” position during transport.



Do not push or tow to start the vehicle with flat battery.

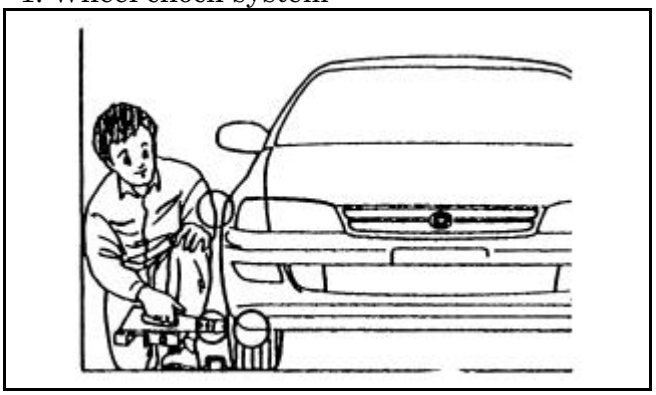
Use proper battery cables, taking care to battery polarity.



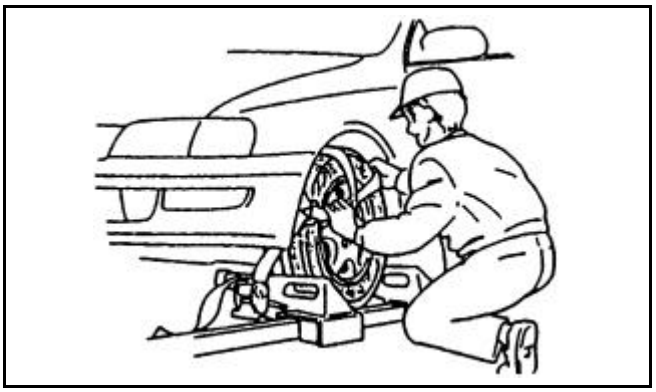
Vehicles that cannot be unloaded under their own power must be pushed by manpower.

(3) Requirements for tie down

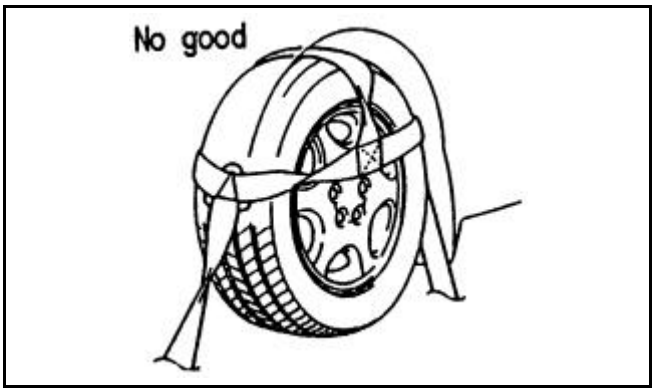
1. Wheel chock system



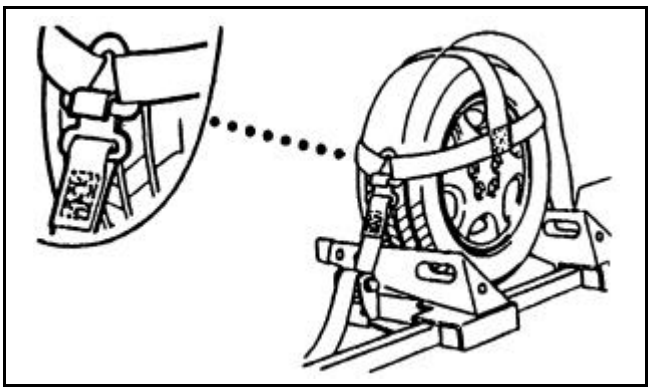
Do not damage paint surface when applying/removing wheel chock.



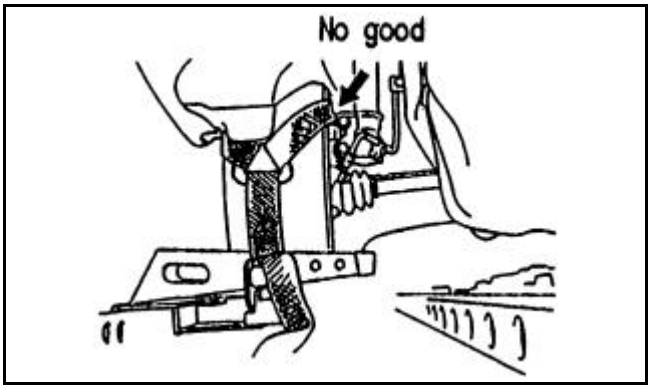
Do not damage paint surface when applying/removing the straps on/from the tire.



Make sure that the strap belt is not twisted.



The “J” hook of strap should be taken away from the tire surface to prevent damage to tire during transport.



The strap belt must not contact with brake tubes, pipes and hose.

VEHICLE LOGISTICS DIVISION
TOYOTA MOTOR CORPORATION

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