



## **CJA Marine Services - Singapore & Thailand**

Singapore Tel : (65) 62811986 / 7    Thailand Tel: (66) 02 6811793-5  
Singapore Fax : (65) 62811966    Thailand Fax : (66) 02 6811796  
Mobile : +65 96815992    Mobile : +66 860088022  
E-mail: [survey@cjamarine.com](mailto:survey@cjamarine.com)  
[www.cjamarine.com](http://www.cjamarine.com)

---

# **GUIDE TO CARGO TRANSPORTATION BY ROAD**

## **1.0 INTRODUCTION**

How difficult can it be to transport a truck full of project cargoes or heavy equipments? What could possibly happen on the road when it is a simple task of driving from one point to another?

More often than not, most people are quite ignorant of the importance of proper and adequate securement of cargo. Sadly, many do not give much thought or emphasis on proper cargo securement and some are not even aware of the vast number of local laws and international rules to adhere to, manuals and publications in respect to cargo securement and packaging.

Whether transportation is via land, sea or air, cargo placed on a cargo transportable unit (CTU), be it, on a truck, rail, vessel, barge or aircraft without adequate, proper and/or sufficient securement of cargo provide very forceful magnets to dire consequences such as partial or complete loss of cargo, delays, accidents resulting to damage to third party property, environmental pollution, and other consequential losses.

Apart from sheer ignorance, complacency is another force of ill attractions. We have heard statements such as "I've been driving for many years and nothing like that has ever happened before." Well, luck does not always appear on the best side every occasion and the purpose of this short guide is to minimise or rather, dispel the dependency on the unreliable element of luck by providing some useful suggestions and direction to minimise and reduce the risk of uneventful occurrences during land conveyance.

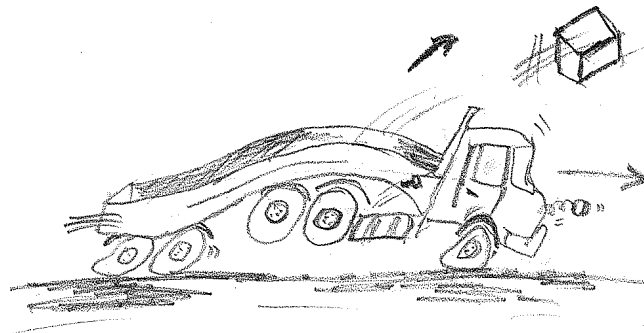
In any action we take in our daily lives, in fact, carries with it all varieties and forms of risks. By no means should this be taken as tutelage that all risks in respect to cargo transportation can be eliminated altogether but that the reader should view this as a starting point to take positive actions to improve the manner of transportation of the cargo, thereby taking risk management into their own hands.

## 2.0 THE FORCES IN MOTION

During land conveyance, a short-term longitudinal force may be imposed on the cargo and the CTU. These may also cause vibrations which can vary significantly depending on the following factors: -

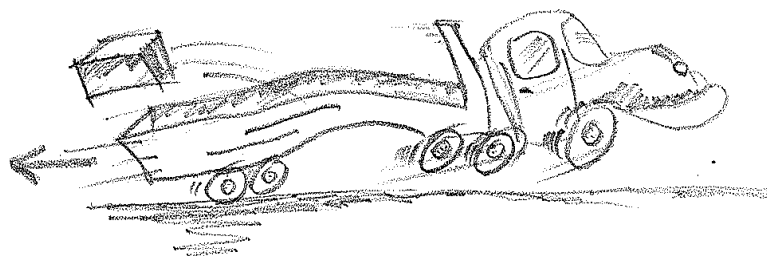
1. CTU's suspension system or condition of CTU
2. Different road surface condition
3. Different driving habits

There are several forces that may cause the cargo shift or move. These are illustrated as follows: -



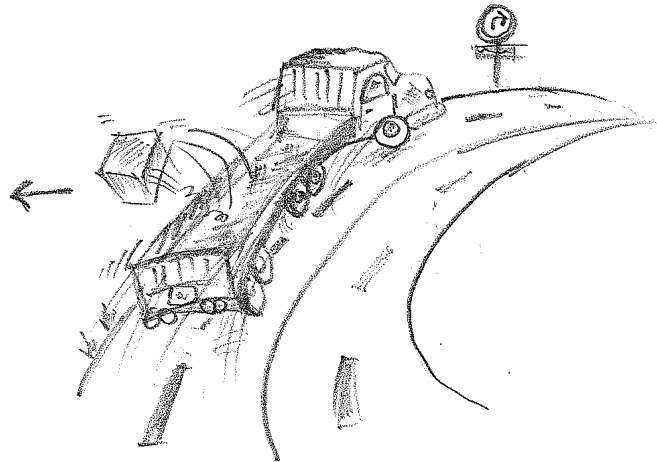
**Figure 2.01 Forward force**

Sudden or hard braking of a CTU will cause a forward centrifugal force and the force imposed could possibly equal to the weight of cargo.



**Figure 2.02 Backward force**

Backward force can happen when the CTU picks up speed after slowing down or stopping. In addition, backward force is also imposed when a CTU is travelling up slope.



**Figure 2.03 Transverse force**

When a CTU negotiates a turn, a transverse force is generated on the cargo.

The following are example of the various accelerations express in *gs* which may arise during land transportation.

- Forward force: Between 0.8g and 1.0g
- Backward force: 0.5g
- Transverse force: 0.5g

For simple tabulation of the force involved, multiply the above factor to the weight of the cargo laden on the CTU. The cargo securement system must be able to withstand the above forces.

### **3.0 INSPECTION OF CTU & DRIVER'S DUTY**

The following details simple and logical actions to be taken on the part of the driver which, ordinarily can be overlooked, resulting in expensive, if not, dire consequences:

- (1) Inspect the vehicle to confirm that the vehicle's tailgate, tailboard, doors, tarpaulins, spare tire and other equipment used in its operation, are secured;
- (2) Ensure that the cargo does not interfere with the driver's ability to drive the vehicle safely and that the cargo does not interfere with the free exit of a person from the cab or driver's compartment of the vehicle;
- (3) Inspect the securement system of the cargo laden on the vehicle and make necessary adjustments, if necessary, prior to departure;
- (4) Exercise proper transport incident preventive measures such as ensuring that he has sufficient rest prior to deployment. Journey planning and change of duty should be encouraged if the journey exceeds 240 Kilometers or 6 hours.
- (5) Possesses appropriate driving qualifications or licence;
- (6) Not under the influence of any medication or substances that may cause drowsiness and impair his ability to concentrate and drive; and

(7) Ensure compliance with the rules and regulation of the traffic act laid out by the state of that country.

It would be ideal if the CTU speed travelled is maintained at 40Km/hr but should not exceed 80Km/hr depending on the cargo carried and type of CTU used.

**4.0 CARGO INFORMATION**

Sufficient information about the cargo should be provided in order for one to properly plan the handling, stowage, securement and transportation of a particular heavy cargo. The information should at least include (but is not limited) to the following: -

- Gross weight;
- Overall dimensions with drawings if possible;
- The location of the centre of gravity;
- Bedding areas and particular bedding precautions if applicable;
- Lifting points or slinging position; and
- Securing points, where provided, including details of their strength.

**5.0 DISTRIBUTION OF WEIGHT**

The weight of the cargo stowed on the truck or trailer chassis should, as far as possible, be evenly distributed with the use of appropriate dunnage / timbers in order to avoid undue stress on the CTU structure.

**6.0 CARGO SECUREMENT**

One should not assume that because the cargo is heavy, it will not move during transportation.

When a cargo is placed on the surface of a CTU having a movement force, the friction force is dependant on the type of surface. Different materials have different friction coefficients. The higher the friction coefficient factors, the lower the risk of cargo moving. Example of the materials static friction are as follows; -

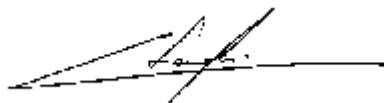
<b>Materials</b>	<b>Dry</b>	<b>Wet</b>	<b>Oily / greasy</b>
Steel to steel contact	0.15	Varies	0.1
Steel to wood contact	0.5 to 0.6	0.3 to 0.4	0.1 to 0.2
Wood to wood contact	0.65	0.5	Varies
Rubber to metal contact	0.7	0.6	Varies
Rubber to wood contact	0.8	0.7	Varies

Ideally, proper securement constitutes the following:

- a) To avoid sliding of cargo, the cargo should be blocked and/or secure at all sides. Void spaces should be chocked /filled with appropriate blocking material.
- b) Cargo must be firmly contained, immobilised and secured within the CTU of sufficient strength, blocking, bracing, chocking, shoring, dunnage, tiedowns or a combination of these in accordance with the international rule and regulations.
- c) Lashings applied to secure cargo to a CTU should be designed, constructed and maintained so that the driver of the vehicle can tighten it if necessary. The driver must ensure that lashings remained taut at all times. The lashings applied on the cargo must be in a manner that prevents it from slipping, loosening, unfastening, opening or releasing while the vehicle is on the road.
- d) Lashings must be fastened to the designated lashing fittings of the CTU and not any other parts / structure.
- e) The lashing and/or any associated connector or mechanism used should be of satisfactory and serviceable condition. The minimum SWL or WLL should not be less than the sum of **100%** of the cargo loaded.
- f) Lashings with associated tensioners or mechanism must be marked with their respective SWL or WLL by the manufacturer. Lashings without markings should not be utilised without load test certificates.
- g) Plywood or timbers used as dunnage, chocks, cradles or blocking should be made of durable quality and not easily fracture, dislodge or crushed by the cargo or the lashings used.

### 7.0 RECOVERY PLAN

Accidents can happen when you least expect it although all the above actions were carried out. As such a recovery team equipped with adequate facilities should be on continuous standby. The driver should have contact details of a recovery team and he should contact them immediately should a mishap happen. In addition, the Cargo Underwriter should be notified as soon as possible.

A handwritten signature in black ink, appearing to read 'C Rajesh', written over a horizontal line.

**C Rajesh**  
**For and On Behalf Of**  
**CJA Marine Services (Thailand) Co. Ltd**

*Note:-The above is prepared as a guideline and CJA Marine Services shall have no liability for errors or omissions or for any damage resulting from this.*