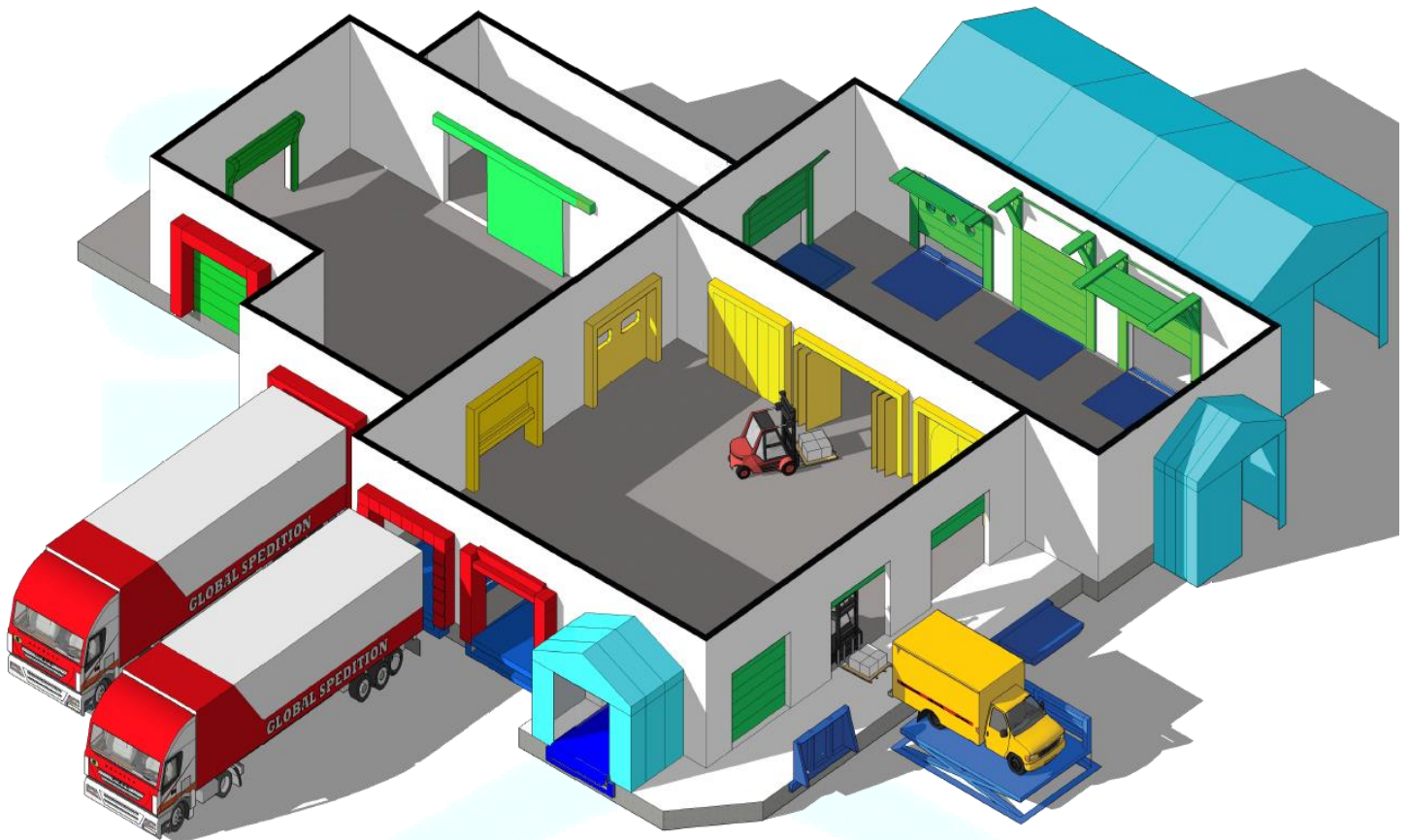


# INDUSTRIAL LOADING BAY PLANNING MANUAL



MdP-2017

First and immediate notions for the correct  
Industrial Loading bay planning



# INDUSTRIAL LOADING BAY PLANNING MANUAL



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## INTRODUCTION

To identify what are the vehicles which will occupy, for the most of the time, the loading and unloading area, is the first thing to do in order to correctly design the loading bay as well as the manoeuvring area of the truck.

Even if trivial, not all the trucks are alike, and we do not only speak about their length and width, but also the height of the bed trailer and consequently the loading room which establishes the total height of the truck, when it is empty or full. A wrong evaluation of this point, could cause incorrect slopes of the service area where trucks manoeuvre, with waste of time for the final operator but, above all, possible breaking of the loading equipment.

Thus, ARMO has designed its products in order to fit the various loading situations to which we can reply by developing ranges and lateral oscillations suitable to follow the bed trailer during the standard working cycle.

We will deepen first the vehicles topic and then check if the Layout of the loading area is suitable or how to act for making it so. Finally, we will supply a short recommendation about the dimensions of the products.

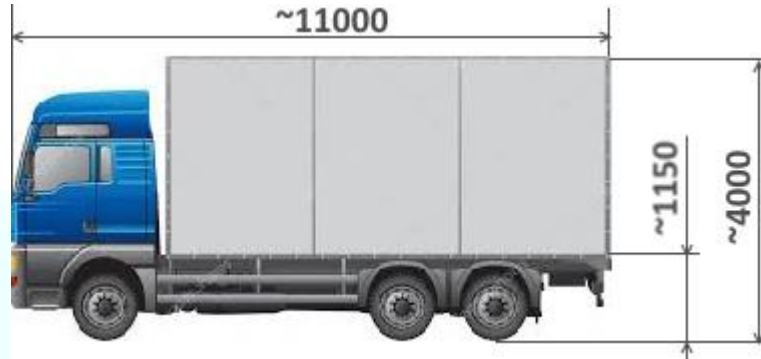


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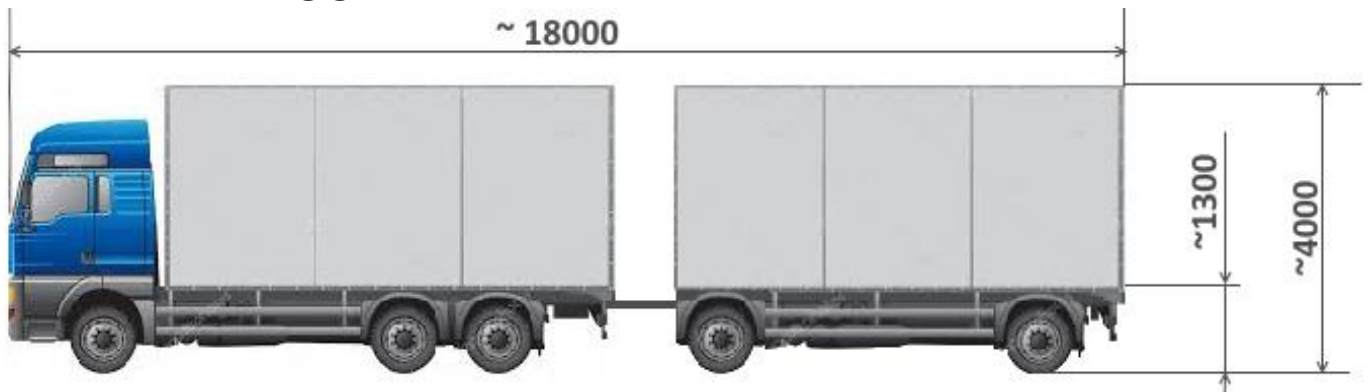


# INDUSTRIAL LOADING BAY PLANNING MANUAL

- DRIVING TRUCK



- TRAILER TRUCK



- SEMITRAILER/ARTICULATED LORRY

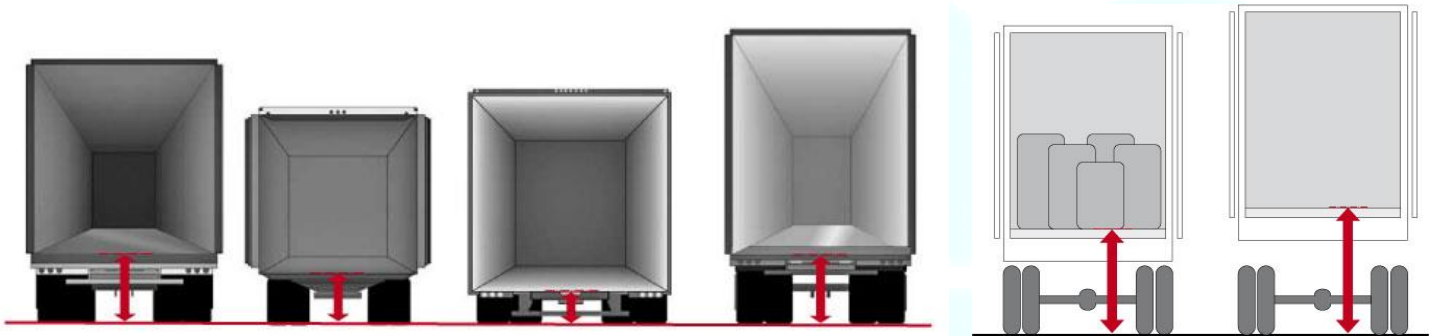


- CONTAINER

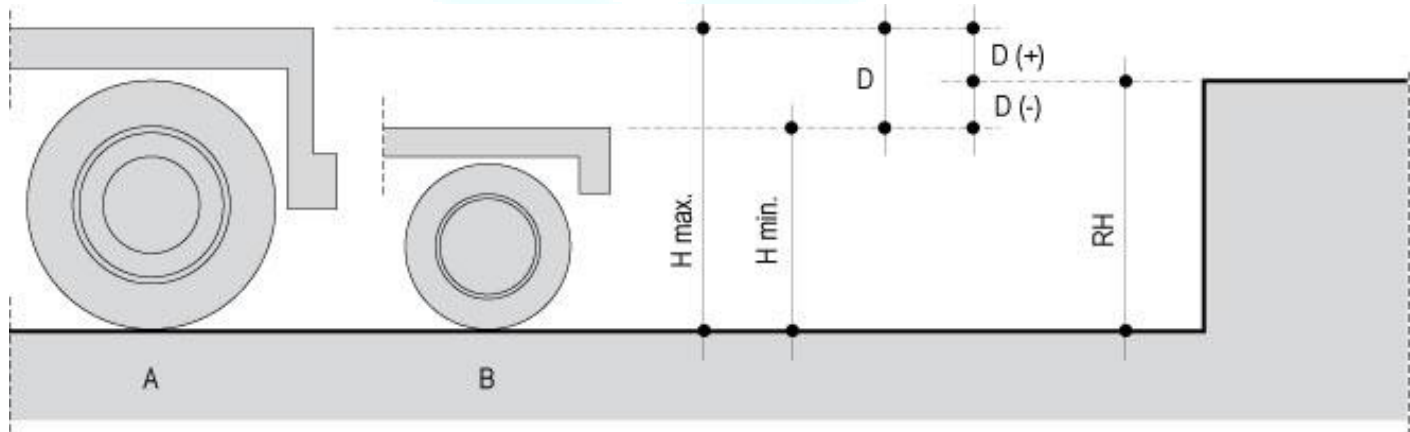


## LOADING BAY HEIGHT

As said before, the first topic to discuss is the bed trailer height according to the loading bay.



Thus, it is important to consider the value of the D quote edited hereinafter. A correct planning of the bay at a suitable quote ( $RH \approx 1200$  mm) permits to use a standard dock leveller.



- RH = bay height
- H max. = trailer height when empty
- H min. = trailer height when loaded
- D = Total difference
- D (+) = Dock leveller positive range
- D (-) = Dock leveller negative range

## SERVICE AREA DIMENSIONS

The service area dimension is for sure the most thorny part of the loading bay designing; but not only. Here, you have to face problems due to mere logistics about the vehicles motion, as for instance

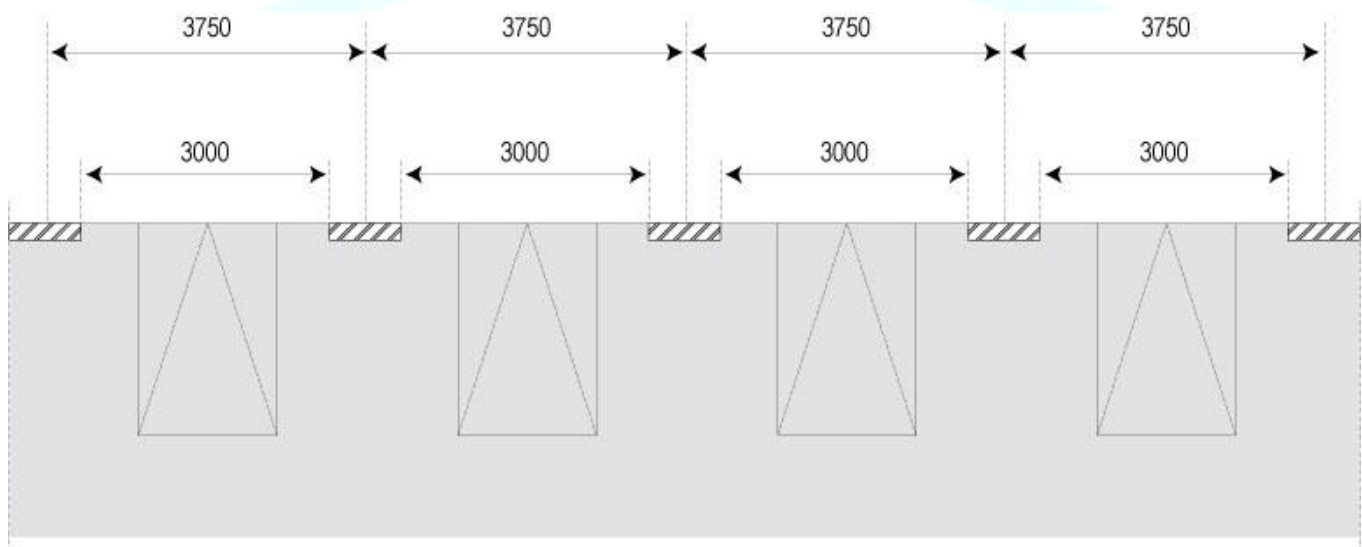
- Vehicles are all alike, thus all bays will be sized suitably and evenly in the Lay-out
- Vehicles are not all alike: at this point, we will try to share the loading bays according to the various dimensions of the trailers
- Vehicles can be different but the depth of the service area is not enough for the manoeuvring room

Each of these situations, and they are not the only ones, has to be faced differently, but hereinafter we will see a generic line to follow for choosing correctly the better solution and how to organize the final lay-out.

Against what seen in previous chapters, we are able to determine the minimum wheelbase which is required between a loading dock and another. Keep since now on in mind that, lower will be that dimension, higher has to be the service area depth in order to make the loading and unloading operations easier.

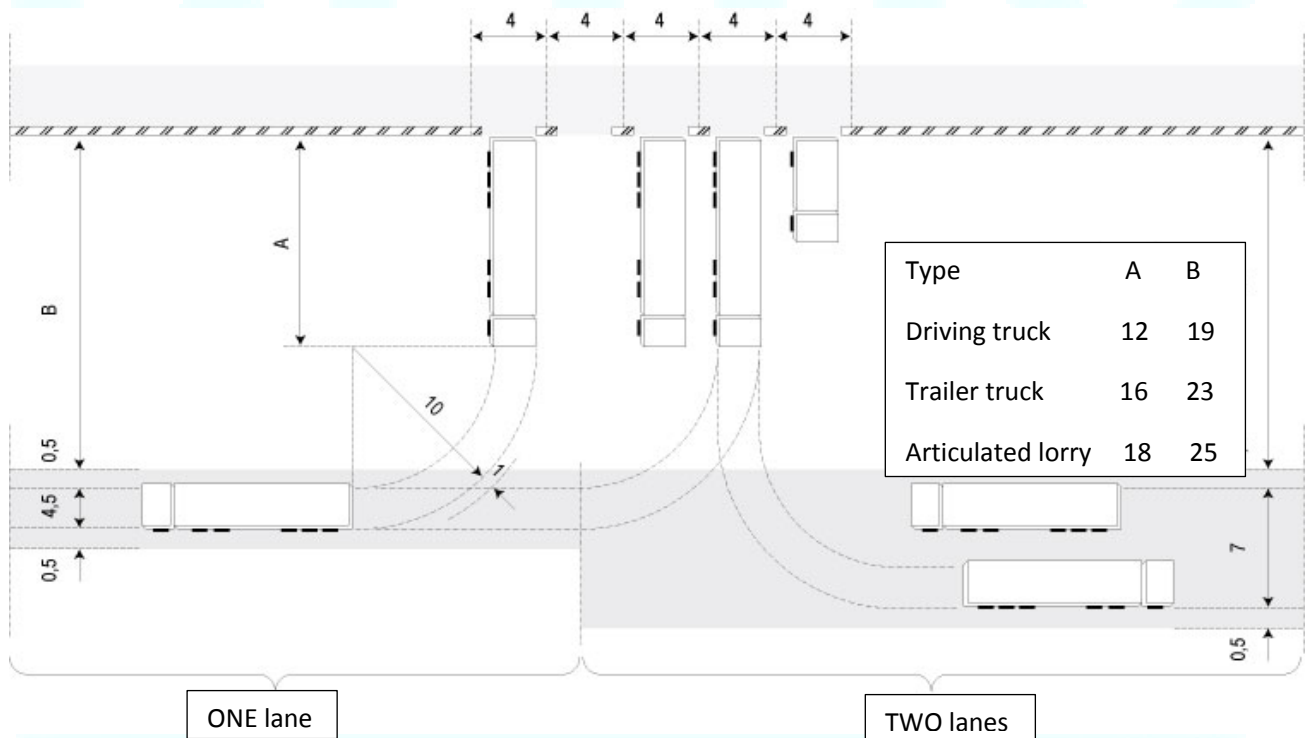
Consider now the most heavy case, but surely the most frequent: the semitrailer case.

The minimum suggested wheelbase is between 3,50 m and 4,00 m at least; in extremes cases, it is possible to reduce the passage up to 3,30 m, practicable, but at the expenses of the shelters, for instance, which have to be smaller.



With littler vehicles, the needs are considerably different, not so much for the wheelbase of the loading bays, but because of the service area depth.

Is saying that in a promiscuity situation, where there are various type of vehicles, long and short, we will try, where possible, to group the loading bays for long trucks all on a same side, maybe the one which has more space for the manoeuvres, while on the other side, we can place the levellers for the shortest trucks. If you have an only side, it is possible to share the levellers, by employing this same concept and dividing the short vehicles from the longer.



Another way to exploit a service area which is not particularly big, is to alternate the position berthing of the long and short vehicles ( ex. Driving trucks and semitrailers), so that to contain the manoeuvres spaces even if the dock leveller are nearer among them.

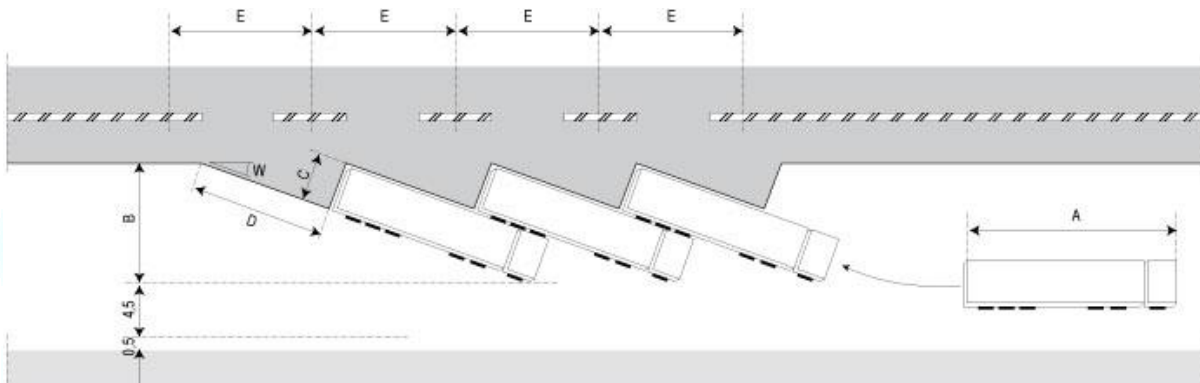
If the loading bay has not the suitable requirements for the manoeuvre, because of a lack of space, we can proceed by designing **inclined** loading docks, which aim is to make up such a lack space.



# INDUSTRIAL LOADING BAY PLANNING MANUAL

Always with reference to the depth, the bay slope will be sized considering, as much as possible, construction standards, namely angles of  $30^\circ - 45^\circ - 60^\circ$

This solution requires to realize “sliced” docks, with different angles according to the conditions of the service area and the needs.



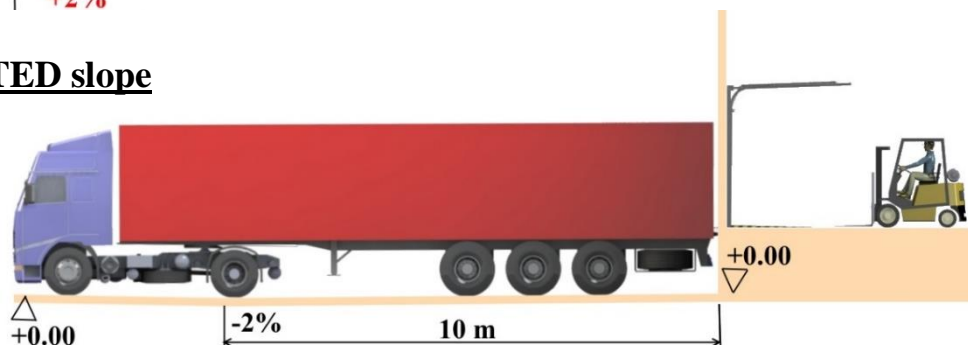
Particular attention should be given to the slopes employed to realize the service area, in order to improve the approaching phase as well as the final inclination on which the truck lifts will pass for loading or unloading the goods, to preserve the integrity of the equipment and the building, in the end to avoid that rain or drain waters fall into the warehouse.

Thus, it is suggested, for instance for the semitrailers, to realize a negative slope from the warehouse edge to the centre of the service area of at least a 2% on 10 m of the length and then level again at the original starting quote.

## WRONG slope

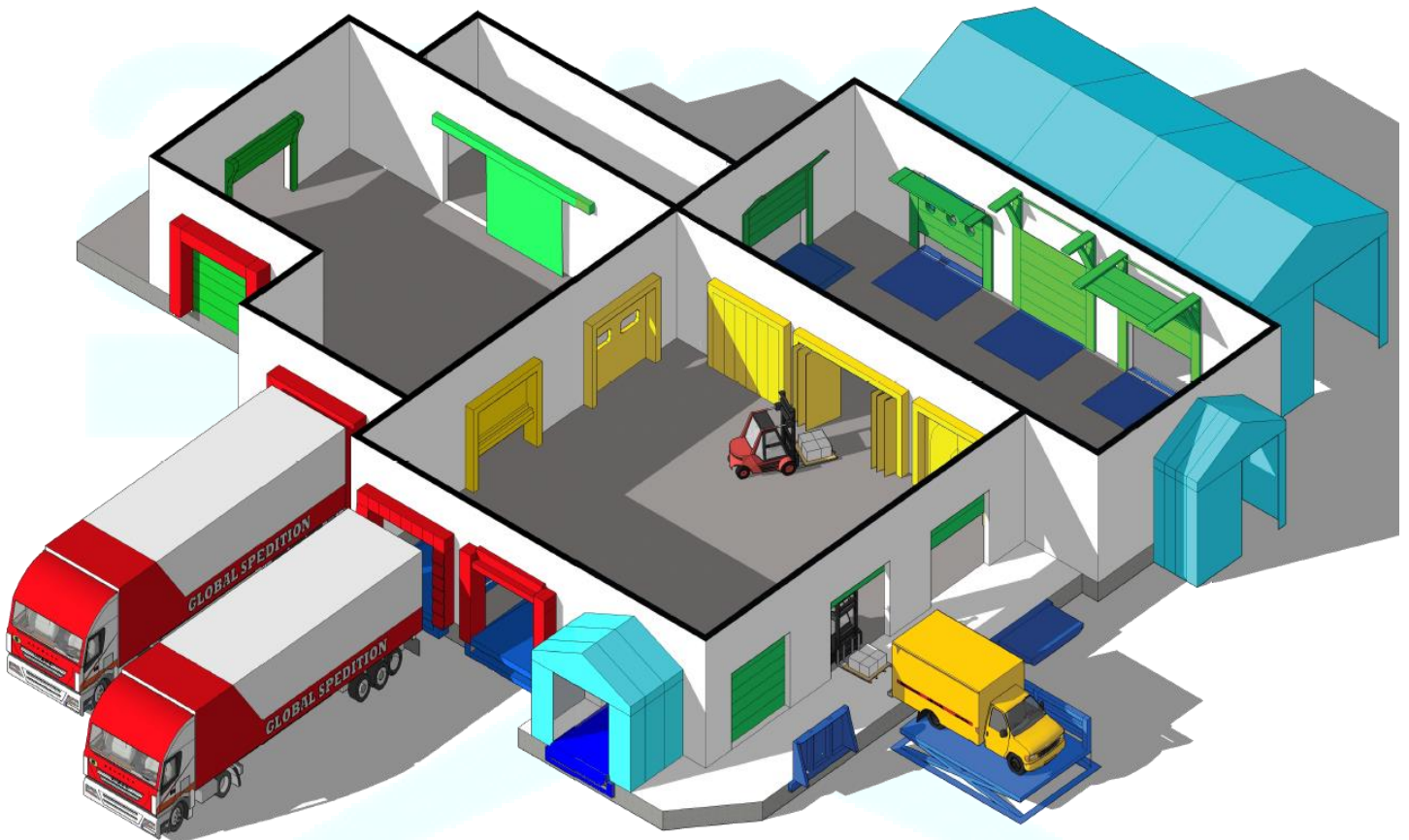


## SUGGESTED slope



## EQUIPMENT CHOICE

Hereinafter, we present ARMO main solutions; studied to pander the various design situations, among which you can choose the most suitable.



### PUNTI DI CARICO



RAMPE DI CARICO

SIGILLANTI

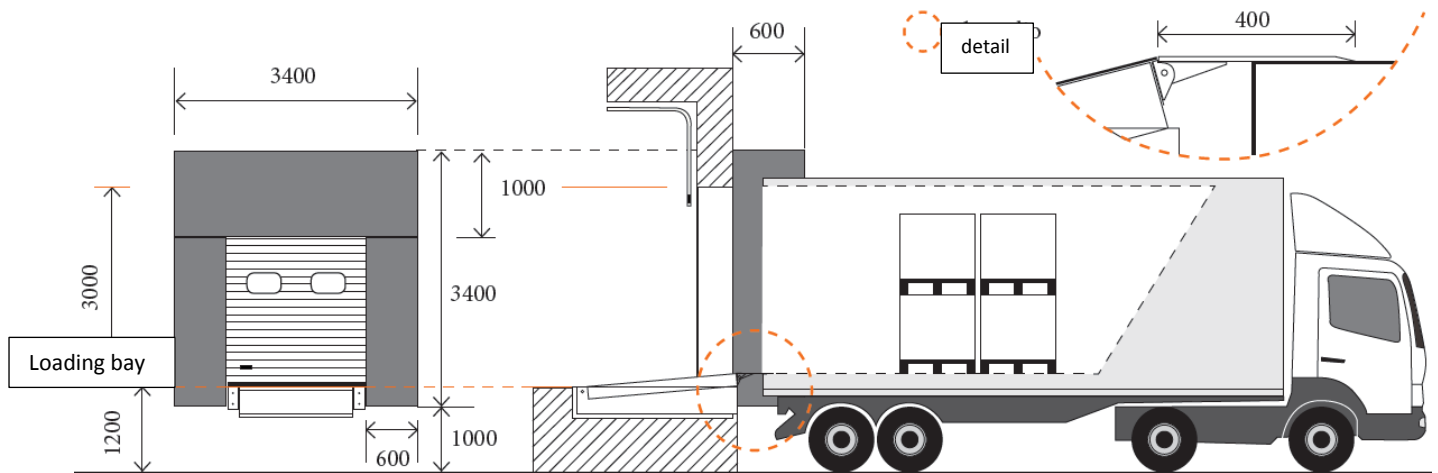
PORTONI SEZIONALI

PIATTAFORME

# INDUSTRIAL LOADING BAY PLANNING MANUAL



Industrial loading bay is usually conceived by using basic systems for its correct employment; starting from the choice of the dock leveller, going on with the sectional door and the dock shelter to perfectly isolate the working area, both the inside and outside of the warehouse, up to the rubber buffers on which the vehicles reversing during the loading/unloading operations.



Heavy duty **dock shelter** with black rubber frontal, having different rigidity.

Opening/closing device thanks to retractable structure. Truck, when getting back, collide against the structure without causing damages.

Self-supporting frame in tubular and PVC sheets with signposting for centring the vehicle. Extruded corner edge in natural aluminium.

**Sectional door** permits an easy access to the loading surface. Together with the dock shelter and dock leveller, contributes to have an only surrounding between the frame and the warehouse.

**Rubber or iron buffers** are positioned on either side of the dock leveller and provide a safe “stop” for the reversing vehicle, they also provide protection to both the leveller and the building façade.

**Dock leveller** is a device employed to overtake a difference between a loading bay and the bed of a trailer, compensating all disparities.

## HYDRAULIC DOCK LEVELLERS DIMENSIONS

EN 1398 European rule establishes the maximum dock leveller range, both in positive and negative equals to 12,5% of its length (corresponding to an angle of 7°).

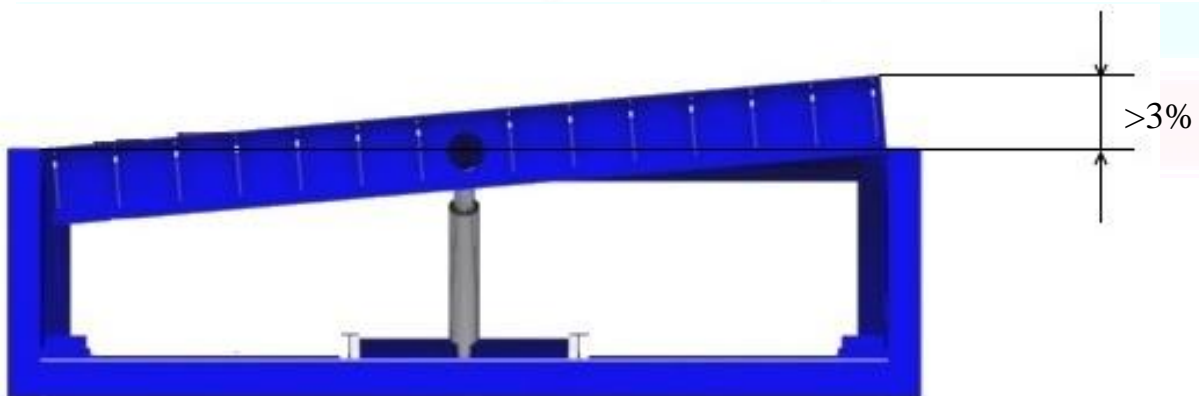
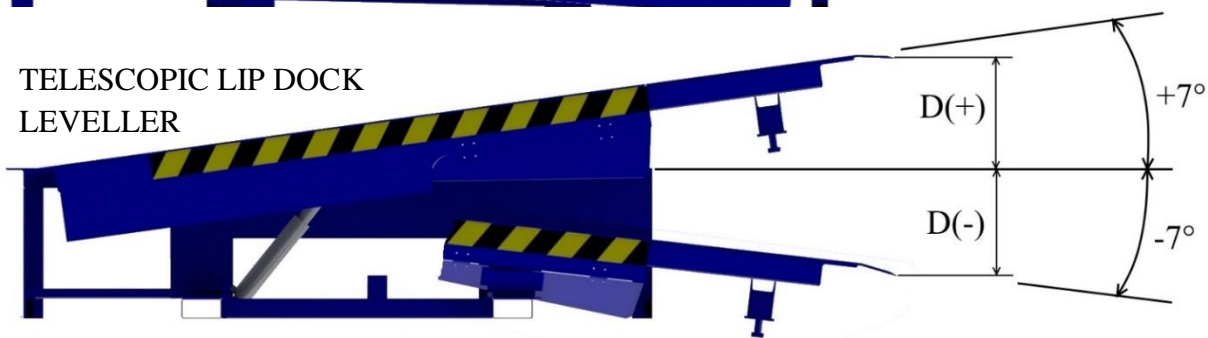
This quote has been evaluate so that also trucks of old generations can easily overtake such a slopes, while the most modern vehicles can overtake even higher slopes. In any case, there would always be the risk to compromise the right alignment of the rotating or telescopic lip with the bed trailer, causing dishevels like steps or subsidences normalized by the European Rule; problem which reduced further the use of manual truck lifts, where it is already suggested a limited slope at 4-5% .

Usually the most employed length is 2500 mm. With the lip, the upper frame reaches a total length of ~2900 mm with following positive and negative higher than 300 mm.

ROTATING LIP DOCK  
LEVELLER



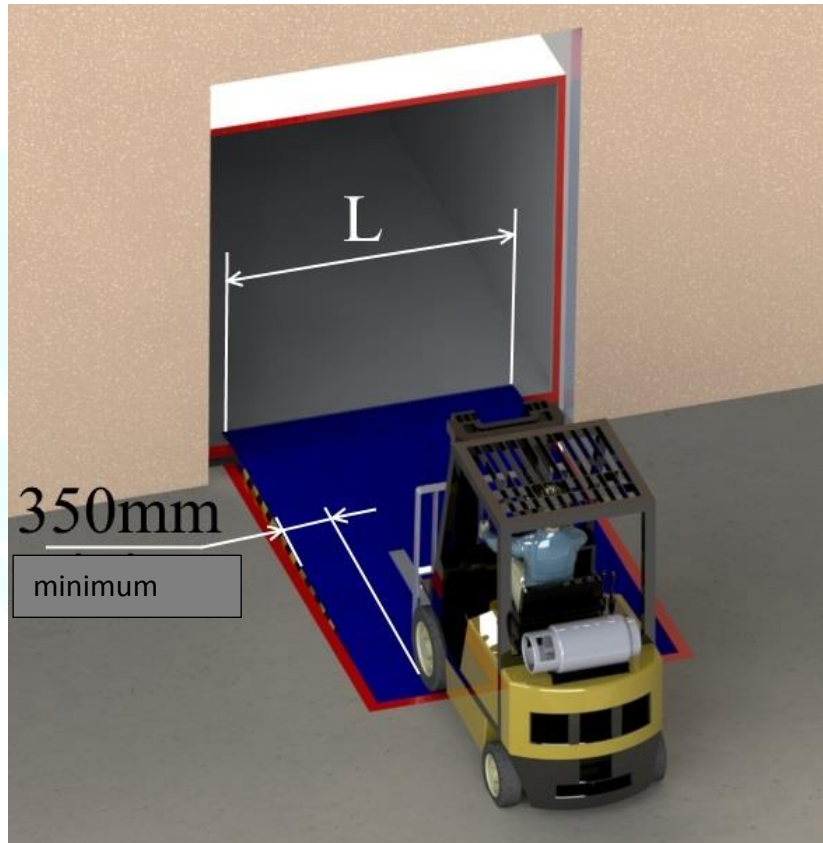
TELESCOPIC LIP DOCK  
LEVELLER



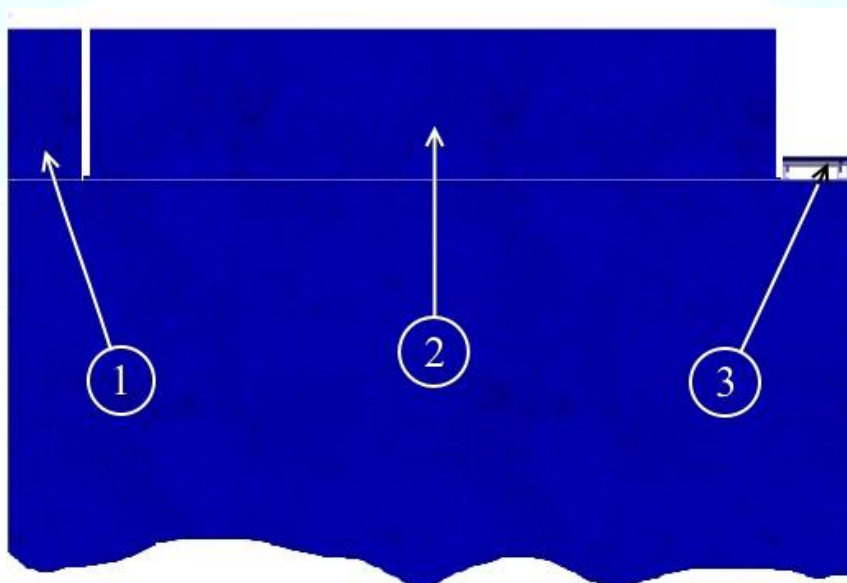
# INDUSTRIAL LOADING BAY PLANNING MANUAL



Suggested width “L” is 2000 mm. the alternative has width 2200 mm, standard version on the market.



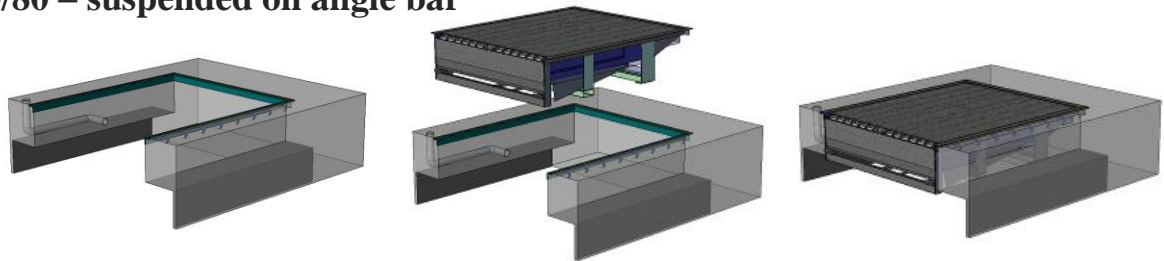
Levellers can be equipped with a lip shared in three sections, in order to increase the versatility of the leveller to the various vehicles.



## DOCK LEVELLERS

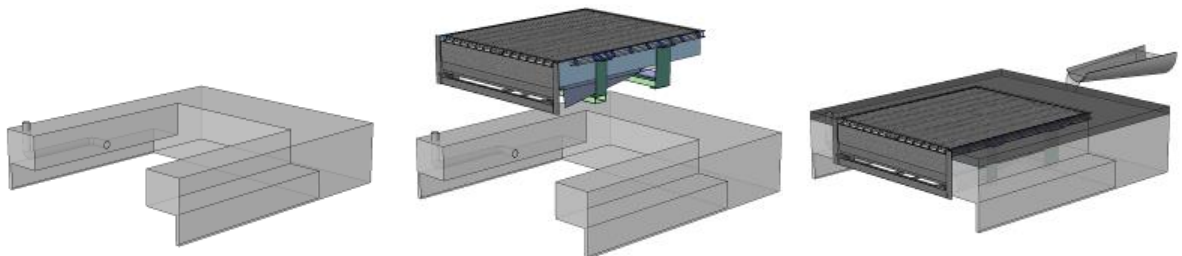
Armo is able to offer dock levellers with various ways of pit fixing. This last, are designed with the aim to satisfy all customer's needs, following also requests that come from all over the World ( and each having his particularity). For instance, **Method 70/80** is the standard suspended structure that has to be welded, but it is also the most employed, modern and safer system on the market. **Universal method 50** is the evolution of an historical system, which see a suspended dock leveller plunged into the concrete. **Method SF** is the best solution for whom has a pit and do not want to make particular civil works, ideal specifically for who has to change old levellers, even if not produced by Armo. In the end, **Method Box** has been studied for those who do not want to realize the pit before. For further details, refer to the booklet Pit fixing Armo 2017.

### Fixing 70/80 – suspended on angle bar



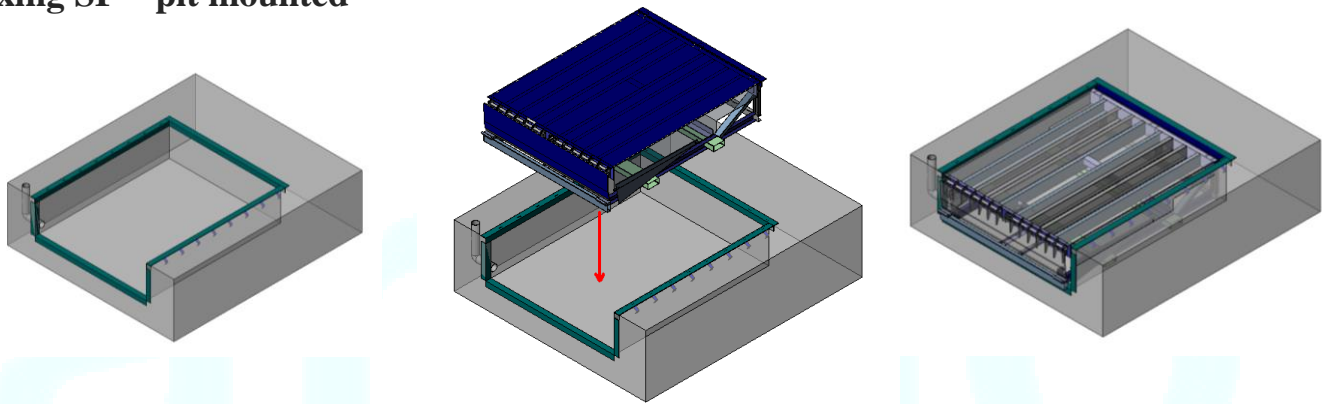
**The leveller realized with fixing 70/80** is a self-supporting structure, without any necessity to lay to the pit bottom. The specific lateral structure incorporated with the leveller, permits to anchor the bloc on the three angle bars of the pit, which are plunged into the concrete before the delivery of the leveller. You do not need a lower support, but it is possible to create easily a room for the hydraulic truck tailboard under the leveller (when required). Fixing 70/80 is the most sprawled throughout the Europe, for the advantages given to building companies, installers and final users.

### Fixing 50 (Universal) – Suspended at wall



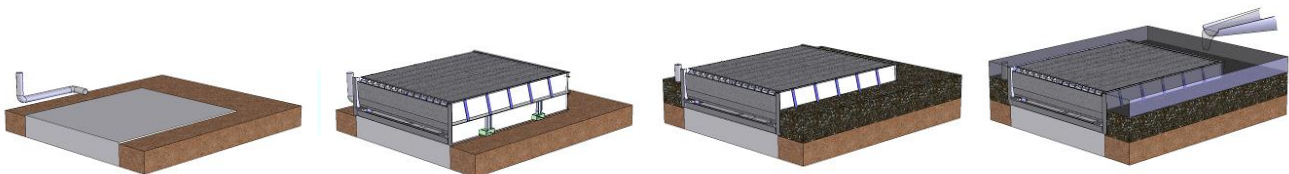
**Leveller with fixing 50 (Universal)** is a self-supporting structure, without requiring to rest to the pit bottom. The lateral sides, incorporated with the leveller, permit to install the same without any requirements of plunged profiles into the concrete: the leveller is welded to the metallic web while the final concrete casting will block the leveller in position. Special profiles avoid to the concrete to fall conspicuously into the pit during the casting. In this case, it is also possible to realize the room for the hydraulic truck tailboard under the leveller (when required).

## Fixing SF – pit mounted



**Leveller with fixing SF** is the standard method employed when you have already prepared the pit. This last must have smooth walls as well as perfectly squared. Particularly suitable for changing old levellers, even if from our concurrence. Ideal for being carried by container.

## Fixing 40 (BOX) – Suspended at wall



**Leveller with fixing 40 (BOX)** is the best solution to supply a leveller, without any need to prepare a pit or outside structure.

Leveller is, in this case, a mono-bloc structure, assembled and tried, ready for the final checks. Thanks to heavy sheeted-walls, there are not deformations of the frame during the casting phases.

Levellers can be protected from possible spurts of concrete with cartons on the upper frame and lip ( optional by request).

Considering, in the end, the need or not to realize a lower room in order to permit to the tailboard of the truck to enter under the leveller.



**Example of a front bay  
WITHOUT the lower  
room for tailboard**



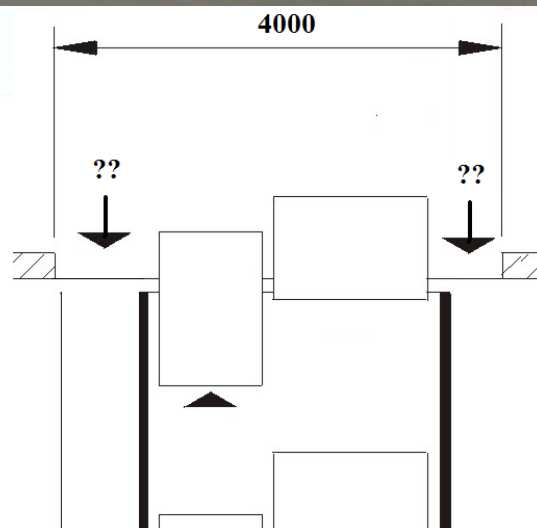
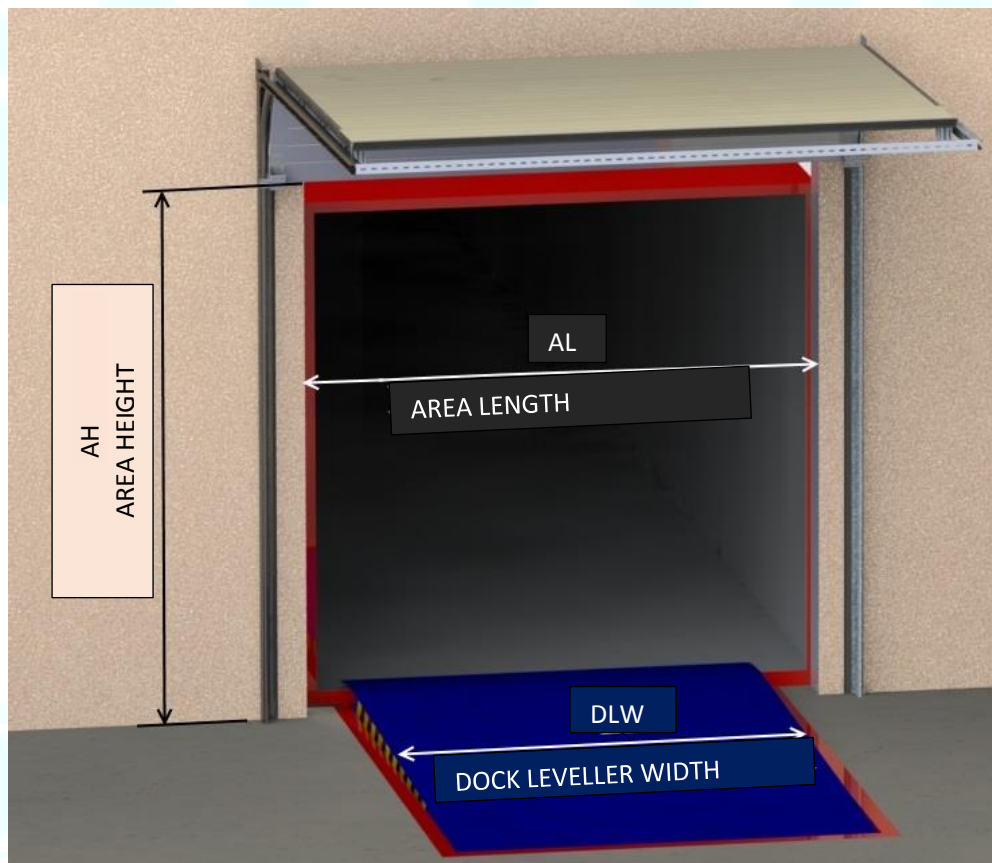
**Example of a front bay  
WITH room for lower  
tailboard**



## SECTIONAL DOORS DIMENSIONS

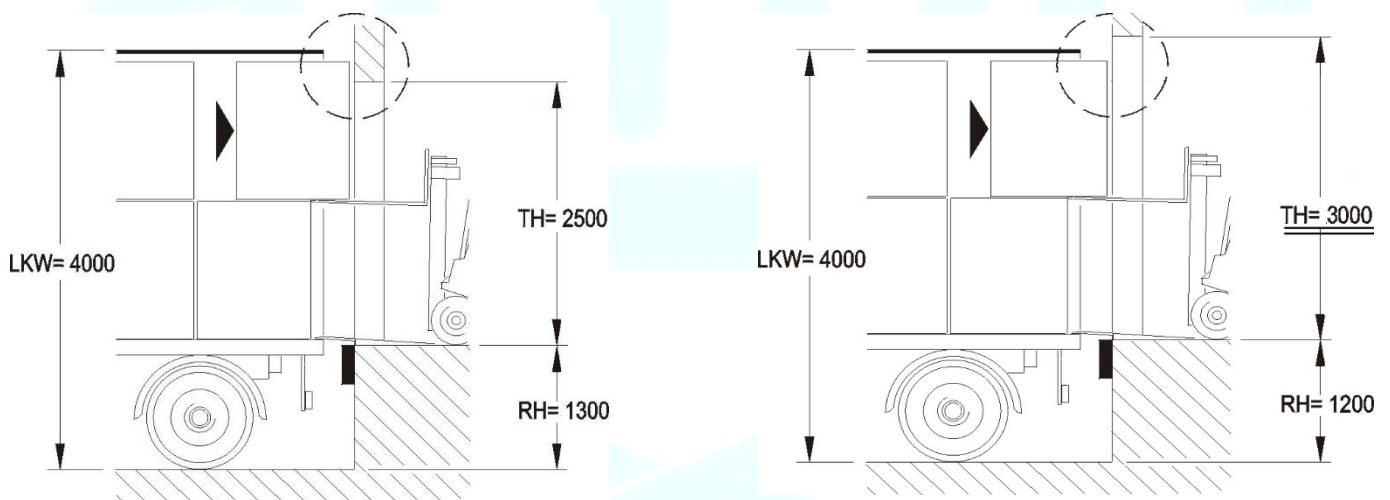
A consequence of the choice of a dock leveller width, is the dimension of the sectional door which shares and isolates the outside environment from the inside of the building; where the temperature has to be kept constant, for what possible, both, where required, for keeping the goods in good shape and also for a suitable working environment for the users.

The suggested width of the locals, if we consider a **standard** loading bay, is included between 2500 mm and 3000 mm. This reduced the possible expensive thermal scattering.



More attention has to be given to the height of the bed truck. In fact, once you identify the higher vehicle, we have to size the area so that the resulting room between the end of the hole and the truck is the lowest possible, always permitting the installation of an outsider shelter having the function to seal possible draught air caused by the different widths/heights of the trailers.

One cannot risk to stay too low compared to the truck, otherwise you cannot exploit the maximum height of the load with possible risk of collision against the lower panel of the sectional door.



The door is made of panels having different heights and lengths. These panels runs toward the top and, so making, they free the door opening. On each side of the door panels, there are sliding guides. Above the door panel there is a transmission shaft with balancing springs, drum of the cables and springs breaking devices. The door panel is suspended to steel cables which are wrapped all around the drums when the door get open.

The door, if there is not any door for men, is not employed as a pedestrian passage.



# INDUSTRIAL LOADING BAY PLANNING MANUAL



The balancing springs ensure that the door can keep all positions, after being opened, even with a manual action. The balancing springs reach their maximum tension when the door is closed.

The sliding type will be established according to the height of the building.

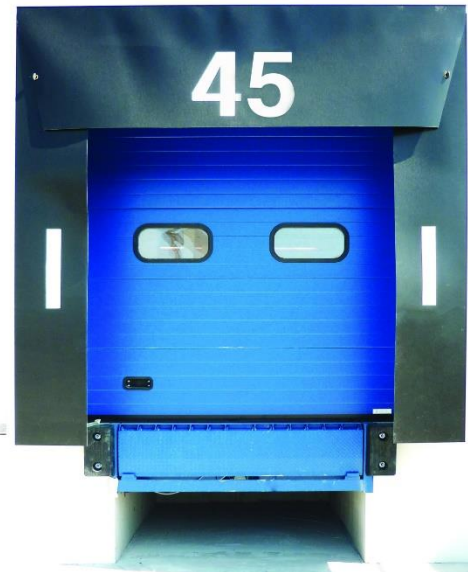
Armo sectional doors are adaptable to all sorts of locals, thanks to the various sliding possibilities proposed:

<p><b>HLS TYPE</b></p>	<p>Sectional door with <b>HORIZONTAL</b> sliding, is usually defined “standard” because it is adaptable to both fields, industrial and civil.</p>	
<p><b>HL TYPE</b></p>	<p>Sectional door with <b>PARTIALLY VERTICAL</b> sliding, also named <b>HIGH LIFT</b> (high lintel), exploits the total free room between the ground and the ceiling.</p>	
<p><b>VL TYPE</b></p>	<p>Sectional door with <b>TOTALLY VERTICAL</b> sliding, ideal for industrial construction, because, not occupying space in depth, it exploits the height of the locals and left instead room for other equipment like bridge crane and cranes.</p>	
<p><b>TIPO DDVL</b></p>	<p>Sectional door with <b>TOTALLY VERTICAL</b> sliding, which works following the same principles of VL model, but the springs group is positioned just above the main beam in order to make easier the assembling and the maintenance.</p>	

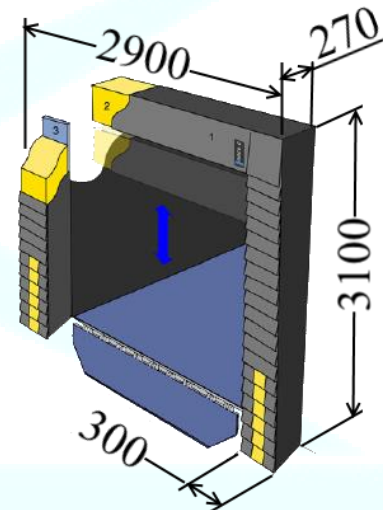
## DOCK SHELTERS

**Dock shelter** is employed to insulate the warehouse from the bad weather as well as to protect the staff and goods against unexpected change of temperature. To install ARMO dock shelters means an important saving of energy.

- Insulated portal with black rubber sheet with various rigidity.
- Opening/closing device thanks to oscillating arms. The truck, in case of impact, push the dock shelter structure without any damage.
- Self-supporting structure made by galvanized steel tubular.
- Frontal structure in extruded aluminium, light but resistant .



**Cushion seal dock shelters PAW-CUS** combined the simplicity of a mechanical shelter to the best insulation guaranteed by the expanded polyurethane cushions. The truck, by reversing, lays against the cushions in order to reduce considerably the space for air.



**The inflatable dock shelter PAW-INF** represents the final solution to reduce the temperature scattering. The upper and lateral cushions works like a real airbag: they get inflated thanks to a dedicated motor; so that they wrap the bed of the trailer and create a total protection between the inside of the warehouse and the outside

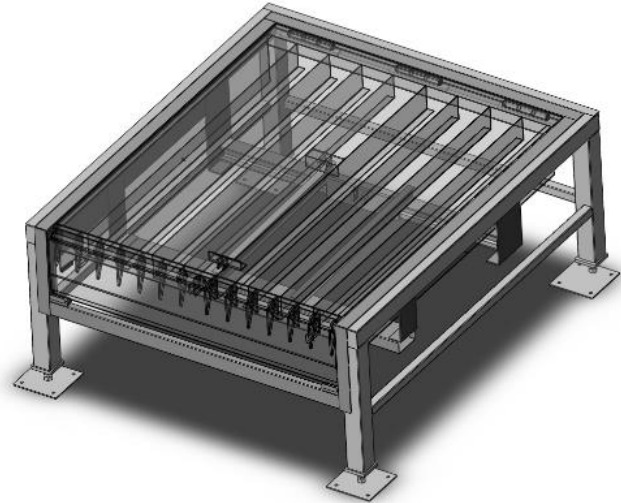


## SCAFFOLDS

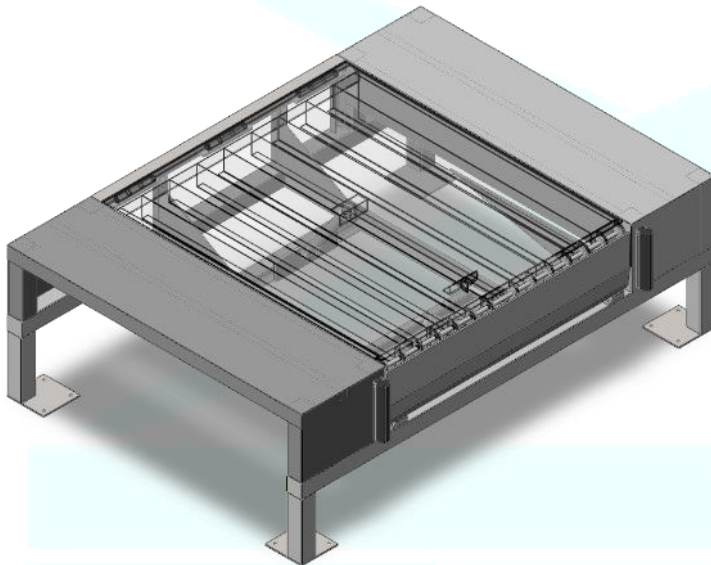
In case it is not necessary to realize building works inside the warehouse, there are different possibilities to realize scaffolds, for instance:

### Standard leveller on scaffold

This is simply a leveller with “standard” dimensions, modified in the supporting frame, to which we add 4 supporting screws. This leveller does not allow to load trucks with hydraulic rear tailboard. The leveller is delivered already assembled and in one piece; so in future it will be easier to remove. Rubber buffers are included.



### Leveller on scaffold with brackets



Levellers are supplied on scaffold with lateral brackets for final total width between 3000 up to 3400 mm. Even these structures will be **delivered already assembled**, for an easy installation and/or removal in the future. This version can foresee the room for the hydraulic tailboard of a trailer ( by request).

### Dock tunnel for scaffold with brackets

Fixed Tunnel with double frontal slope, covering sheet in self-extinguishing PVC class II, weight 800gr/mq packed. Outside colour to be confirmed. Frontal dock shelter included.



## DOCK HOUSE



Armo **DOCK HOUSE** is the suggested solution when one wants to use a specific area for loading/unloading operations, without occupy too much space inside the warehouse or, when there are particular requirements to keep the temperature. The Dock House is composed by a leveller (rotating or telescopic lip) on a metallic carpentry scaffold, on which top there are painted tubular elements, correctly sized, which aim is to support the lateral panels and the upper roof as well as the sectional door positioned in front of the dock House (when foreseen) and the outside dock shelter.

Outside dimensions: Width ~ 3500 mm, height ~ 3600 mm + bay height) – Depth from ~ 2500 mm.

Lateral panels: foamed insulated panels realized with galvanized sheet and painted in RAL 9010 or similar.

Roof: corrugated sheet or insulated panels. Load against snow suitable to the needs

**Frontal retractable Dock shelter PAW-L 3400 x 3400 x 600 mm**



Only demonstrative image

# INDUSTRIAL LOADING BAY PLANNING MANUAL



**For vans or small cruisers, it is also possible to employ connecting levellers of the light series category**



## ALUMINIUM FITTING LEVELLER

**Armo aluminium fitting levellers** permit to cover optimally the distance between the loading bay and the bed of the trailer, compensating for all differences in height. Armo has designed its product to guarantee the operator the maximum security during the loading/unloading phases as well as an easy maintenance. Armo aluminium fitting levellers are reliable and safe, built following high quality standards.



## MINI DOCK FOR LOADING BAY

Armo Mini Dock is a good solution when you have to balance out little differences. Armo supplies two different models, one outdoor and one for pit in order to employ the machine both, in an old or new establishments. The Mini Dock works easily and permits to fulfil the loading/unloading operations in a quick and simple way. The operator just move the dock, afterward the mini dock will follow the movements of the bed of the trailer automatically.



**Armo mini dock are:**

Rubber buffers included

Realized with high quality steel

Produced following the main safety standard of the EN 1398 rule

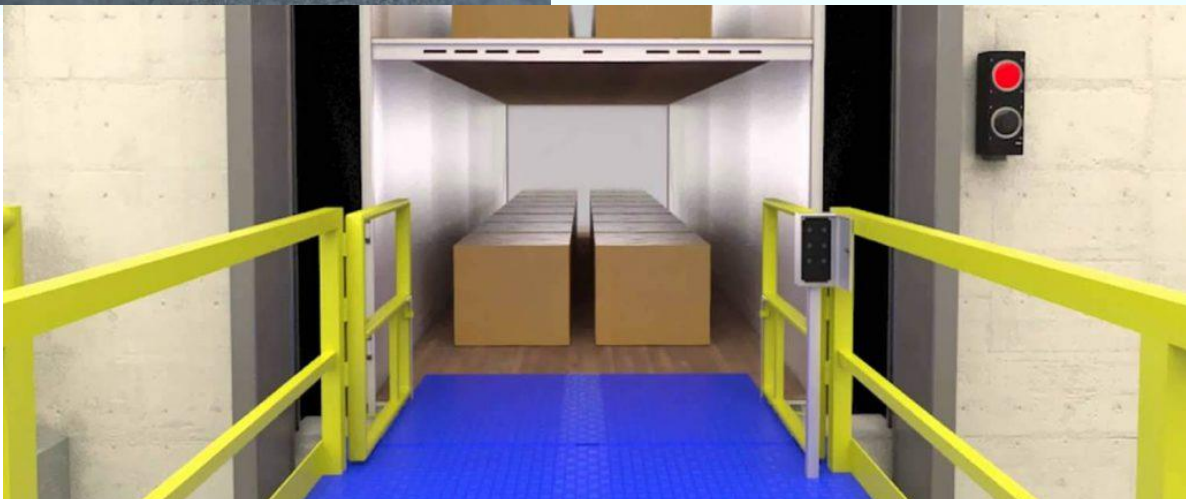


## LIFTING TABLES

To move the goods using a **lifting table**, with efficiency and safety, Armo has put a suitable joint lip on the short or long side of the **lorry loading lifting tables**; this feature, beyond being functional for loading and unloading operations, permits to the goods to pass through the upper frame of the table into the vehicle and vice versa seamlessly.

Lorry loading lifting tables offer many advantages:

- They are valid **replacement** of the dock levellers
- They are **customizable** according to the needs
- They offer **many options** (supplementary push control panels, gates, railings, complementary protections)



## SUPPLEMENTARY OPTIONS



**Standard buffer**  
Stiff rubber 85x80 h400



**Jumbo buffer**  
Stiff rubber 250x100 h450



**Frontal plate**  
Galvanised steel for  
Jumbo buffer



**Rear plate**  
Steel for Jumbo buffer



**ARMOSTOP**  
Oscillating buffer



**Wedge**  
With limit switch



**Semaphore with 2 Lights**  
24 V CC LED



**TOTEM light**  
A doubled-telescopic arm  
with LED light



**Sensors**  
Truck approaching for  
equipment approval



**Armo SHIELD**  
Guide protections for  
doors



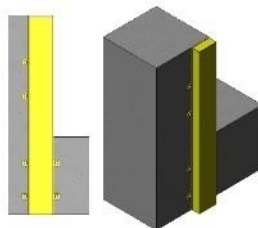
**Wheel guide**  
To center the truck



**Outside numbering**  
FOREX panel with sticker



**Side-seal**  
Seal at the edge of the  
leveller



**Iron buffers**  
Bay H x L=170 x P=80mm  
- BLACK



**Limit switch**  
Leveller-Door



**Semaphore system**  
Wedge+2 light and 1 box  
with sound alert