



# CIP

Inter-American  
Committee on Ports

## Inter-American Committee on Ports CIP OAS.



### Risk analysis matrix for port facility protection officers

### User Manual.

With the collaboration of the company “Cuervo Consultores” from Mexico.



## Risk Level Matrix Draft CIP OAS for port facility protection officers

		Modelo de Analisis de Riesgos CIP-OEA para OPIP				
MODELO DE EVALUACIÓN DE AMENAZAS						
Nivel de Riesgo: <span style="color:red">■</span> CRÍTICO <span style="color:maroon">■</span> IMPORTANTE <span style="color:yellow">■</span> APROXIMABLE <span style="color:green">■</span> BAJO						
ANTAGONISMOS/AMENAZAS	IMPACTO	PROBABILIDAD	NIVEL DE RIESGO SIN VULNERABILIDADES NI SALVAGUARDAS	VULNERABILIDADES	SALVAGUARDAS	NIVEL DE RIESGO FINAL
ROBO HORMIGA DE MERCANCIA CONTENARIZADA	BAJO	PROBABLE	12	REGULARES	SUFICIENTES	9
POLIZONES AL INTERIOR DEL PUERTO	BAJO	PROBABLE	12	REGULARES	SUFICIENTES	10.2
BLOQUEO VIA TERRESTRE AL ACCESO PRINCIPAL DEL RECINTO PORTUARIO	ALTO	PROBABLE	300	REGULARES	SUFICIENTES	375
ACCIDENTE POR MALA MANIOBRA CON UN CONTENEDOR	MEDIO	POSIBLE	30	REGULARES	REGULARES	30
SOBREVUELO DE DRON NO AUTORIZADO AL INTERIOR DEL PUERTO	ALTO	PROBABLE	300	REGULARES	SUFICIENTES	420
EXPLOSION EN UN BUQUE DURANTE LA MANIOBRA DE CARGA-DESCARGA DE MATERIAL PELIGROSO A GRAN EL	MUY ALTO	PROBABLE	600	REGULARES	REGULARES	750
CORTE DE ENERGIA ELECTRICA TOTAL EN LAS INSTALACIONES PORTUARIAS	ALTO	POSIBLE	150	REGULARES	SUFICIENTES	112.5
SEMBRADO DE CARGA ILICITA EN EL CASCO DE UN BUQUE DURANTE SU ESTADIA EN EL PUERTO	ALTO	POSIBLE	150	REGULARES	SUFICIENTES	187.5
HUELGA DE LOS TRABAJADORES ENCARGADOS DE LA CARGA EN EL PUERTO	MEDIO	POCO PROBABLE	20	REGULARES	SUFICIENTES	12
BLOQUEO AL ACCESO INTERIOR DEL PUERTO POR PARTE DE PESCADORES LOCALES	MUY ALTO	PROBABLE	600	REGULARES	REGULARES	900

The MATRIX FOR RISK ANALYSIS MODEL presented was created and written by Dr. Noe Cuervo Vásquez from consulting and training company “Dr. Cuervo Consultores”. The Secretariat of the Inter-American Committee on Ports currently holds the rights for the use and dissemination of the MATRIX FOR RISK ANALYSIS.

The Matrix is a tool created in order to make quantitative assessments of possible risks presented during port operations. Solutions can be implemented to improve port safety and security based on the evaluations performed with the metrics it gives.

It is important to note that the cells in the spreadsheet possess the corresponding mathematical formula needed to calculate the risk levels. Therefore, it is advised not to modify them.

### Executive summary.

The risk evaluation matrix presents the threat levels schematically: Red: **Critical**; Maroon: **Important**; Yellow: **Significant** and Green: **Low**.

- The **first** column provides potential risk events that PFSOs may encounter at ports.
- The **second** column demonstrates the impact level that can be caused by the events described in the **first** column.
- The **third** column approximates the likelihood of such events.
- The **fourth** column shows a numerical calculation of the potential damage incurred in a hypothetical scenario where there are no safety precautions.
- The **fifth** column shows vulnerabilities at distinct levels of each of the hypothetical events in the **first** column.
- The **sixth** column demonstrates an analysis of the resources available to safeguard against each of the hypothetical events in the **first** column.
- In the last column shows the overall threat level when adjusting for existing safeguards.

**Nomenclature.**

**Risk:** The severity of an incident, the threat of the likelihood of its occurrence and the vulnerability incurred.

**RISK: SEVERITY OF AN INCIDENT x THREAT LEVEL x VULNERABILITY.**

**Severity:** Consequences of an incident. Measured in personal injury, cost to human life, financial damage or/and environmental damage.

**Threat:** Possibility of a protection incident occurring.

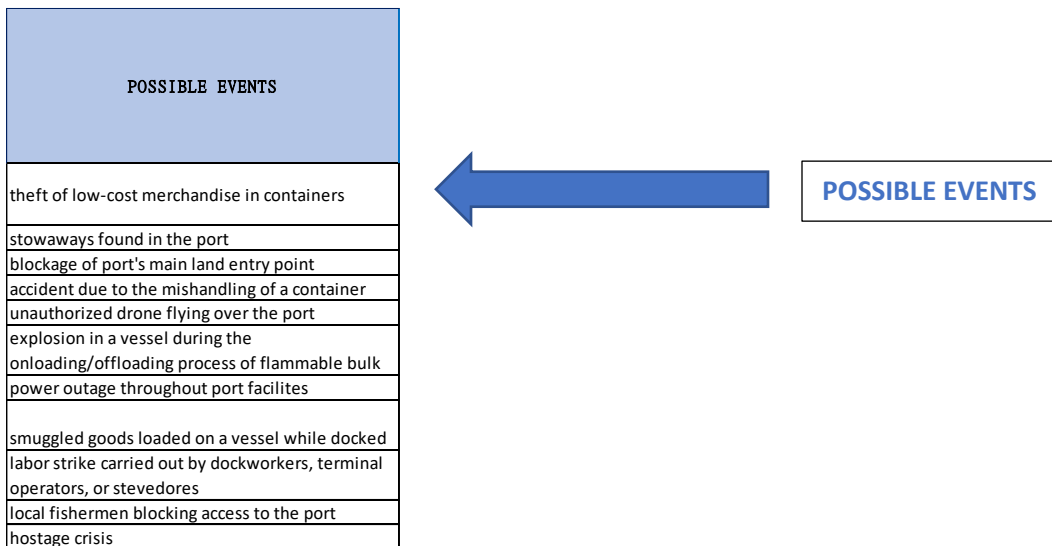
**Vulnerability:** Predisposition or susceptibility that an element has to be affected by an incident without prior safeguarding.



**Step 1:**

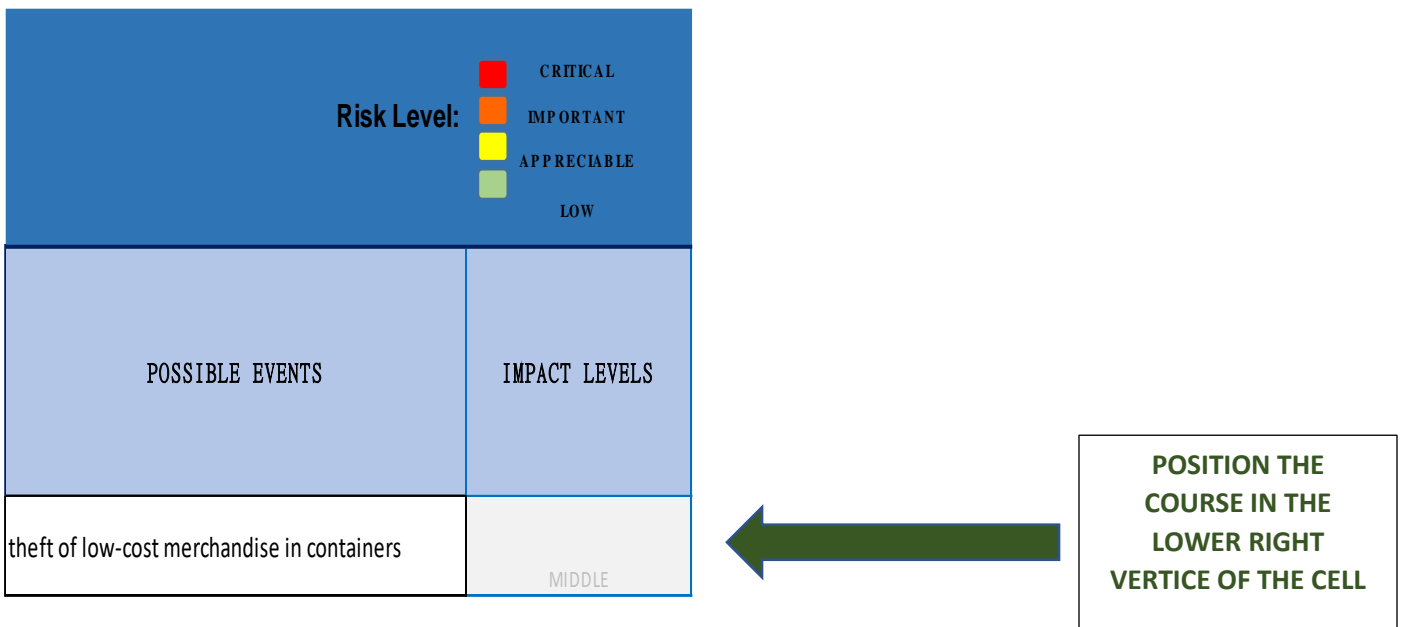
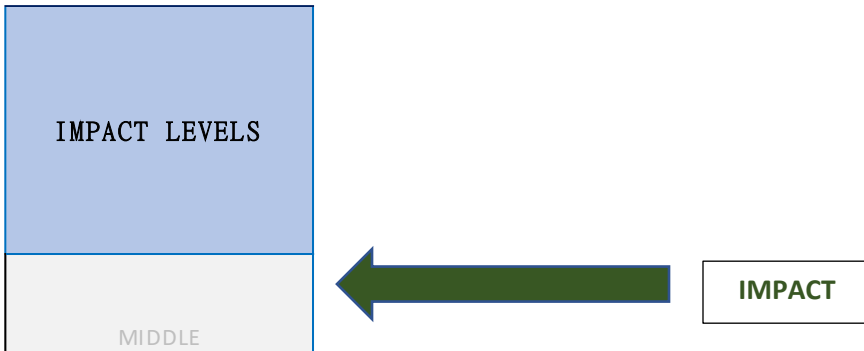
**Possible events**

On this field, the PFSO, or the person in charge, should write down the threats they consider most relevant as the first step to perform a risk assessment.



**Step 2:**

**Impact:**



The **IMPACT LEVELS** column demonstrates the approximate level of damage that an event described in the previous column would have. The PFSO can choose between the following, which are:

**Very high**

**High**

**Medium**

**Low**

**Very low**

When the **IMPACT LEVEL** is selected according to the above scale, the color and numerical grade assigned in the columns that indicate **“RISK LEVEL WITHOUT VULNERABILITIES OR SAFEGUARD”** and **“TOTAL RISK LEVEL”** change depending on the level of impact considered.

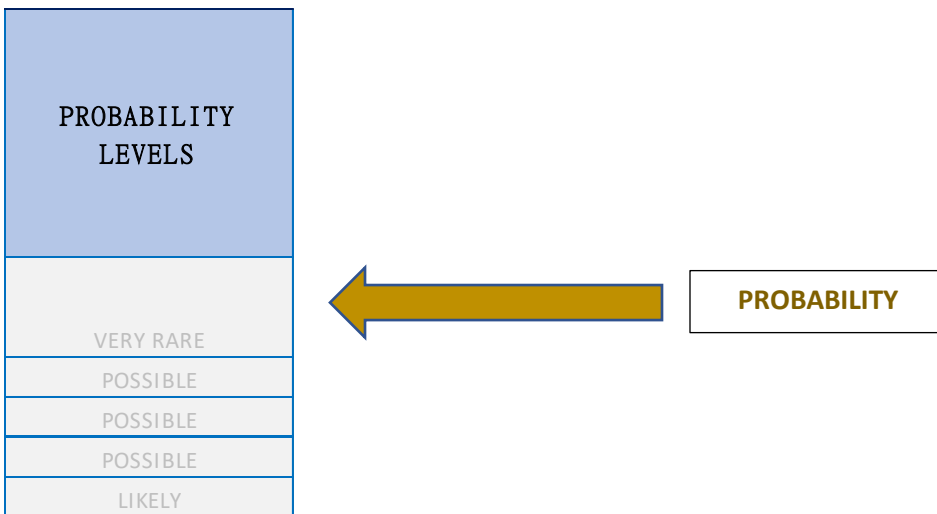
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	MIDDLE	VERY RARE	10 REGULAR	REGULAR	NULL	10

If the level of impact changes, the score and color of the risk levels will change alongside it.

POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	VERY HIGH	VERY RARE	100 REGULAR	REGULAR	NULL	100

**STEP 3:**

**Probability**



Risk Level: <span style="color: red;">■</span> CRITICAL <span style="color: orange;">■</span> IMPORTANT <span style="color: yellow;">■</span> APPRECIABLE <span style="color: lightgreen;">■</span> LOW		
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS
theft of low-cost merchandise in containers	MIDDLE	VERY RARE
stowaways found in the port	LOW	POSSIBLE
blockage of port's main land entry point	MIDDLE	POSSIBLE
accident due to the mishandling of a container	MIDDLE	POSSIBLE
unauthorized drone flying over the port	HIGH	LIKELY

**POSITION THE COURSE IN THE LOWER RIGHT VERTICE OF THE CELL**

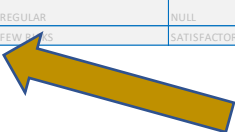


Clicking on the **PROBABILITY** icon, the likelihood that the threats may occur at the ports are displayed. The option will allow the PFSO to select the ones deployed, that are:

- Practically Safe
- Likely
- Possible
- Uncertain
- Rare

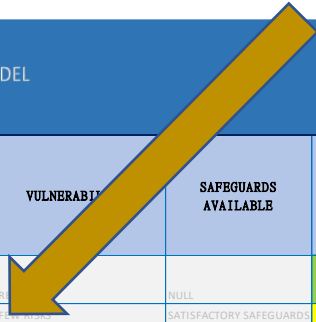
The color and numerical grade assigned in the columns that indicate **"RISK LEVEL WITHOUT VULNERABILITIES OR SAFEGUARDS"** and **"TOTAL RISK LEVEL"** change depending on the level of impact considered.

THREAT ASSESSMENT MODEL						
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	MIDDLE	VERY RARE	0	REGULAR	NULL	4.5
stowaways found in the port	LOW	POSSIBLE	6	FEW RISKS	SATISFACTORY SAFEGUARDS	4.5



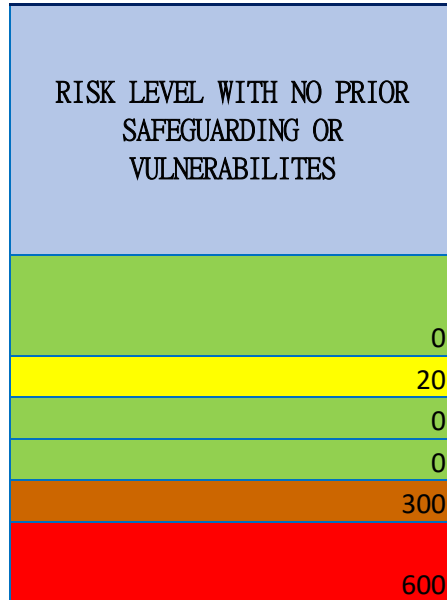
If the probability level is changed, the score and/or color of the risk levels will automatically change.

THREAT ASSESSMENT MODEL						
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	MIDDLE	VERY RARE	0	REGULAR	NULL	4.5
stowaways found in the port	LOW	PRACTICALLY SAFE	20	FEW RISKS	SATISFACTORY SAFEGUARDS	15



**STEP 4:**

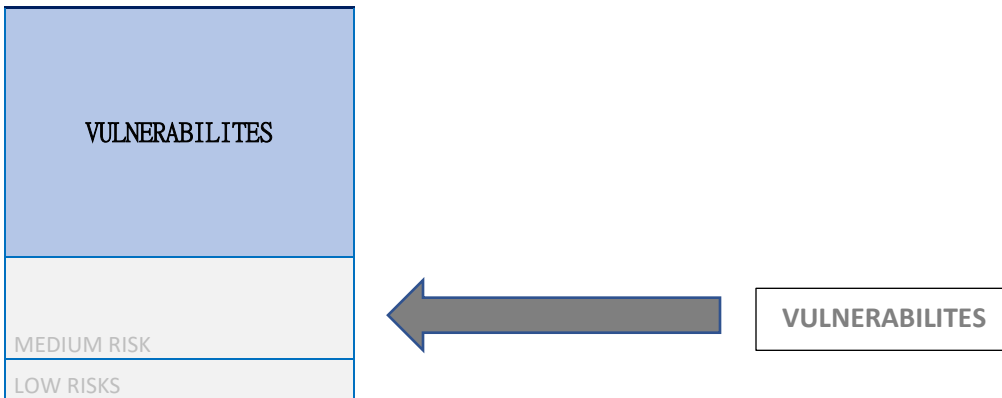
**Risk level without vulnerabilities or safeguards.**



Here, the PFSO can visualize the level or risk in case of a damaging incident occurring without prior safeguarding or assessment of vulnerabilities. The PFSO can also assign a numerical grade and color according to the risk/impact level in case the aforementioned situation was to occur.

**Step 5:**

**Vulnerability**



THREAT ASSESSMENT MODEL				
Risk Level: <span style="color: red;">■</span> CRITICAL <span style="color: orange;">■</span> IMPORTANT <span style="color: yellow;">■</span> APPRECIABLE <span style="color: lightgreen;">■</span> LOW				
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES
theft of low-cost merchandise in containers	MIDDLE	VERY RARE	0	MEDIUM RISK
stowaways found in the port	LOW	PRACTICALLY SAFE	20	LOW RISKS
blockage of port's main land entry point	HIGH	POSSIBLE	150	MEDIUM RISK

POSITION THE COURSE IN THE LOWER RIGHT VERTICE OF THE CELL



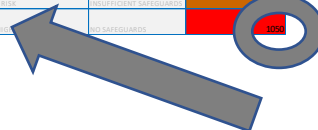
The **VULNERABILITY** icon classifies the threats according to the insecurity a port has in response to a threat. The PFSO can choose between the following:

Note: If the port is more sensitive to a particular risk, the scale increases, and vice-versa.

- Very high risk.**
- High risk.**
- Medium risk.**
- Low risks.**
- Very low risk.**

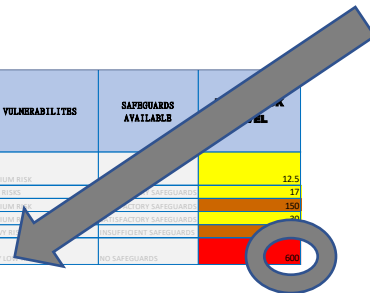
The color and numerical grade assigned in the columns that indicate **“RISK LEVEL WITHOUT VULNERABILITIES OR SAFEGUARDS”** and **“TOTAL RISK LEVEL”** change depending on the level of vulnerability.

POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	MEDIUM	RARE	10	MEDIUM RISK	NO SAFEGUARDS	12.5
stowaways found in the port	LOW	PRACTICALLY SAFE	20	LOW RISKS	VERY FACTORY SAFEGUARDS	17
blockage of port's main land entry point	HIGH	POSSIBLE	150	MEDIUM RISK	VERY FACTORY SAFEGUARDS	190
accident due to the mishandling of a container	MEDIUM	POSSIBLE	30	MEDIUM RISK	INSUFFICIENT SAFEGUARDS	30
unauthorized drone flying over the port	HIGH	LIKELY	300	VERY RISK	INSUFFICIENT SAFEGUARDS	300
explosion in a vessel during the unloading/offloading process of flammable bulk	VERY HIGH	LIKELY	600	VERY RISK	NO SAFEGUARDS	600



If the Vulnerability level is changed, the score and/or color of the risk levels will automatically change.

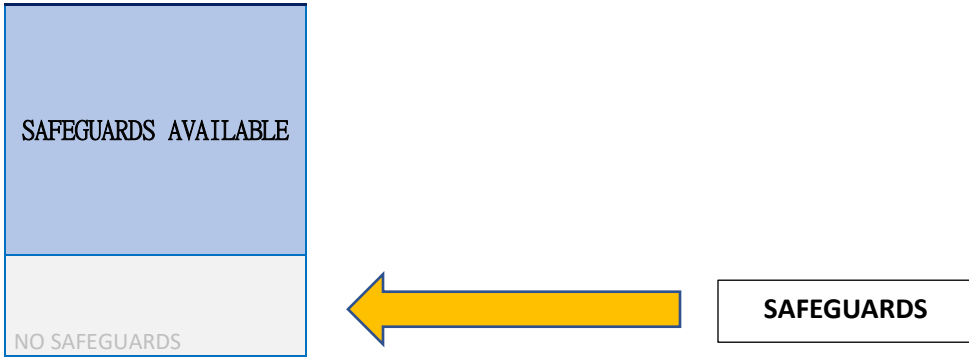
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	MEDIUM	RARE	10	MEDIUM RISK	NO SAFEGUARDS	12.5
stowaways found in the port	LOW	PRACTICALLY SAFE	20	LOW RISKS	VERY FACTORY SAFEGUARDS	17
blockage of port's main land entry point	HIGH	POSSIBLE	150	MEDIUM RISK	VERY FACTORY SAFEGUARDS	150
accident due to the mishandling of a container	MEDIUM	POSSIBLE	30	MEDIUM RISK	INSUFFICIENT SAFEGUARDS	30
unauthorized drone flying over the port	HIGH	LIKELY	300	VERY RISK	INSUFFICIENT SAFEGUARDS	300
explosion in a vessel during the unloading/offloading process of flammable bulk	VERY HIGH	LIKELY	600	VERY RISK	NO SAFEGUARDS	600





**Step 6:**

**Safeguards:**



<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="font-size: small;"> <b>Risk Level:</b>  <span style="color: red;">■</span> CRITICAL  <span style="color: orange;">■</span> IMPORTANT  <span style="color: yellow;">■</span> APPRECIABLE  <span style="color: lightgreen;">■</span> LOW                 </div> <div style="text-align: center;"> <b>THREAT ASSESSMENT MODEL</b> </div> </div>						
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	MEDIUM	RARE	10	MEDIUM RISK	NO SAFEGUARDS	12.5
stowaways found in the port	LOW	PRACTICALLY SAFE	20	LOW RISKS	SATISFACTORY SAFEGUARDS	17
blockage of port's main land entry point	HIGH	POSSIBLE	150	MEDIUM RISK	SATISFACTORY SAFEGUARDS	150

**POSITION THE COURSE IN THE LOWER RIGHT VERTICE OF THE CELL**

The PFSO can classify the safeguards available in the port for each hypothetical threat. The PFSO can choose between the following:

- Many Safeguards**
- Sufficient Safeguards**
- Satisfactory Safeguards**
- Insufficient Safeguards**
- No Safeguards**

The color and numerical grade assigned in the columns that indicate **“RISK LEVEL WITHOUT VULNERABILITIES OR SAFEGUARDS”** and **“TOTAL RISK LEVEL”** change depending on the safeguards available.

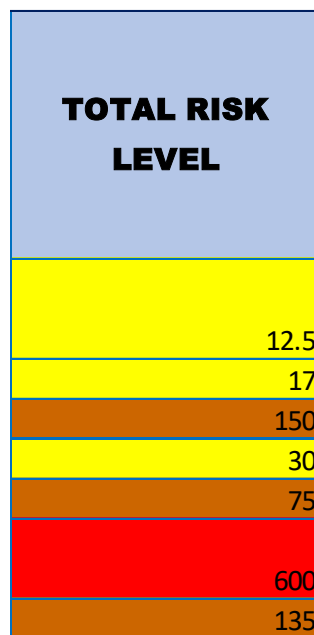
THREAT ASSESSMENT MODEL						
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	MEDIUM	RARE	10	MEDIUM RISK	NO SAFEGUARDS	12.5
stowaways found in the port	LOW	PRACTICALLY SAFE	20	LOW RISKS	SATISFACTORY SAFEGUARDS	17
blockage of port's main land entry point	HIGH	POSSIBLE	150	MEDIUM RISK	SATISFACTORY SAFEGUARDS	150
accident due to the mishandling of a container	MEDIUM	POSSIBLE	30	MEDIUM RISK	SATISFACTORY SAFEGUARDS	30
unauthorized drone flying over the port	HIGH	LIKELY	300	HEAVY RISK	INSUFFICIENT SAFEGUARDS	270

If the Safeguards level is changed, the score and/or color of the risk levels will automatically change.







THREAT ASSESSMENT MODEL						
POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
theft of low-cost merchandise in containers	MEDIUM	RARE	10	MEDIUM RISK	NO SAFEGUARDS	12.5
stowaways found in the port	LOW	PRACTICALLY SAFE	20	LOW RISKS	SATISFACTORY SAFEGUARDS	17
blockage of port's main land entry point	HIGH	POSSIBLE	150	MEDIUM RISK	SATISFACTORY SAFEGUARDS	150
accident due to the mishandling of a container	MEDIUM	POSSIBLE	30	MEDIUM RISK	SATISFACTORY SAFEGUARDS	30
unauthorized drone flying over the port	HIGH	LIKELY	300	HEAVY RISK	MAJORITY SAFEGUARDS	75

**Step 7:**

**The total risk level**



Event: theft of low-cost merchandise in containers

		<b>RISK LEVEL MATRIX DRAFT FOR PORT SECURITY OFFICERS</b>					
<b>Risk Level:</b>		<b>THREAT ASSESSMENT MODEL</b>					
 <b>CRITICAL</b>  <b>IMPORTANT</b>  <b>APPRECIABLE</b>  <b>LOW</b>	POSSIBLE EVENTS	IMPACT LEVELS	PROBABILITY LEVELS	RISK LEVEL WITH NO PRIOR SAFEGUARDING OR VULNERABILITES	VULNERABILITES	SAFEGUARDS AVAILABLE	TOTAL RISK LEVEL
	theft of low-cost merchandise in containers	MEDIUM	RARE	10	MEDIUM RISK	NO SAFEGUARDS	12.5
	stowaways found in the port	LOW	PRACTICALLY SAFE	20	LOW RISKS	SATISFACTORY SAFEGUARDS	17
	blockage of port's main land entry point	HIGH	POSSIBLE	150	MEDIUM RISK	SATISFACTORY SAFEGUARDS	150
	accident due to the mishandling of a container	MEDIUM	POSSIBLE	30	MEDIUM RISK	SATISFACTORY SAFEGUARDS	30
	unauthorized drone flying over the port	HIGH	LIKELY	300	HEAVY RISK	MANY SAFEGUARDS	75
	explosion in a vessel during the onloading/offloading process of flammable bulk	VERY HIGH	LIKELY	600	VERY LOW RISK	NO SAFEGUARDS	600
	power outage throughout port facilities	HIGH	POSSIBLE	150	REGULAR RISK	INSUFFICIENT SAFEGUARDS	135
	smuggled goods loaded on a vessel while docked	HIGH	POSSIBLE	150	HEAVY RISK	SATISFACTORY SAFEGUARDS	112.5

Here we present the final result achieved for each "ANTAGONISMS / THREATS" exposed at the discretion of Port Facility Protection Officers (PFSO) or the person who used or manipulated said model; finally obtaining in quantitative and measurable result in order to be analyzed in conjunction with the possible threats that could arise in a port, what impact of affectation if it happens, taking into account the statistics or possibility that these occur and know if with their defenses, training, training, human and material resources how much to counteract said threats.

For any questions or advice please contact Commander CG.DEM Almonacid Simancas Gerardo, Port Security Advisor, at the email [galmonacid@oas.org](mailto:galmonacid@oas.org) / to the telephone number +1 (202) 3705469 / mobile number +1 202 322 0285 or visit the Organization of American States 1889 F Street NW Suite 320-A, Washington D.C. 20006.