PLANES DE INTERVENCIÓN ACÚSTICA

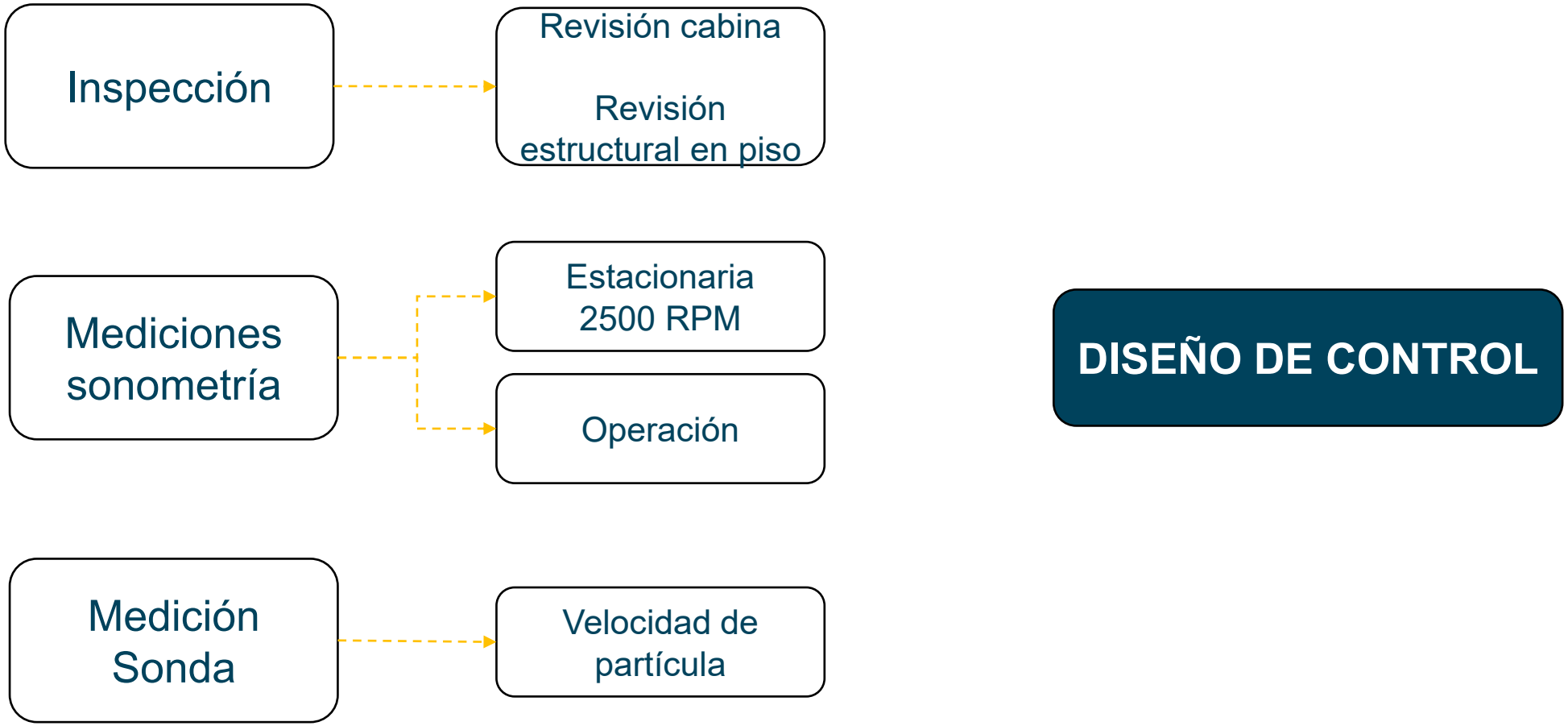
CONTROL DE RUIDO

Cerrejón
Minería responsable

Conhintec

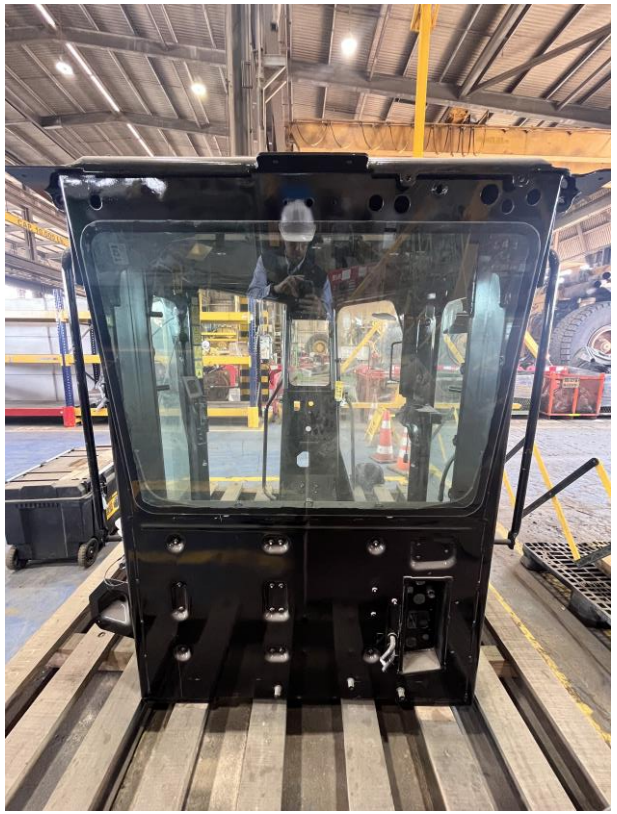
Tranquilidad en tu organización,
bienestar para el mundo

Diagnóstico

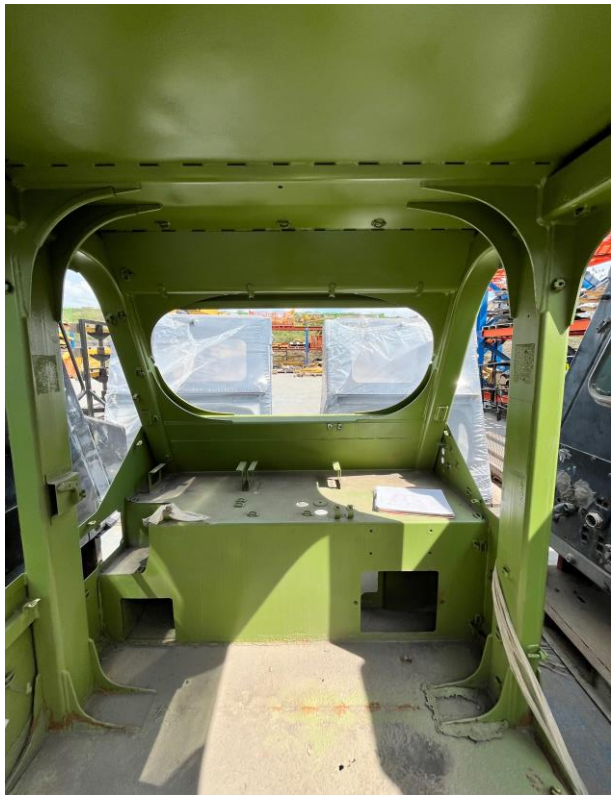


Revisión cabina estructural en piso

Motoniveladora 16M3

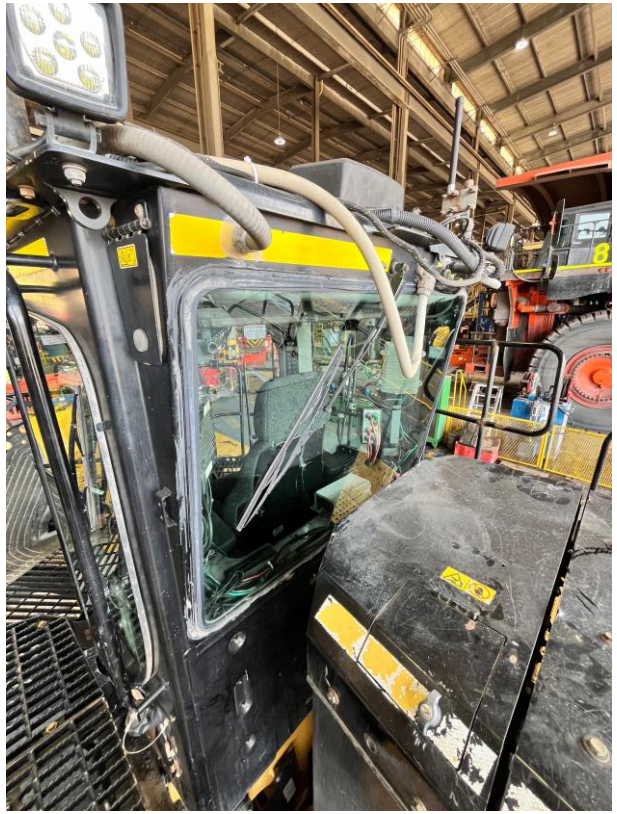


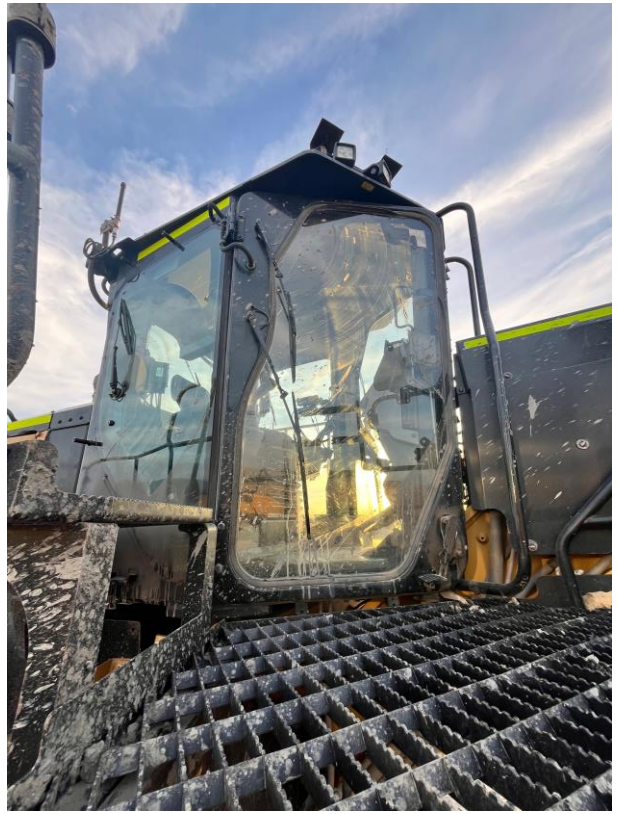
Tanquero 777F



Revisión cabina

Motoniveladora 16M3

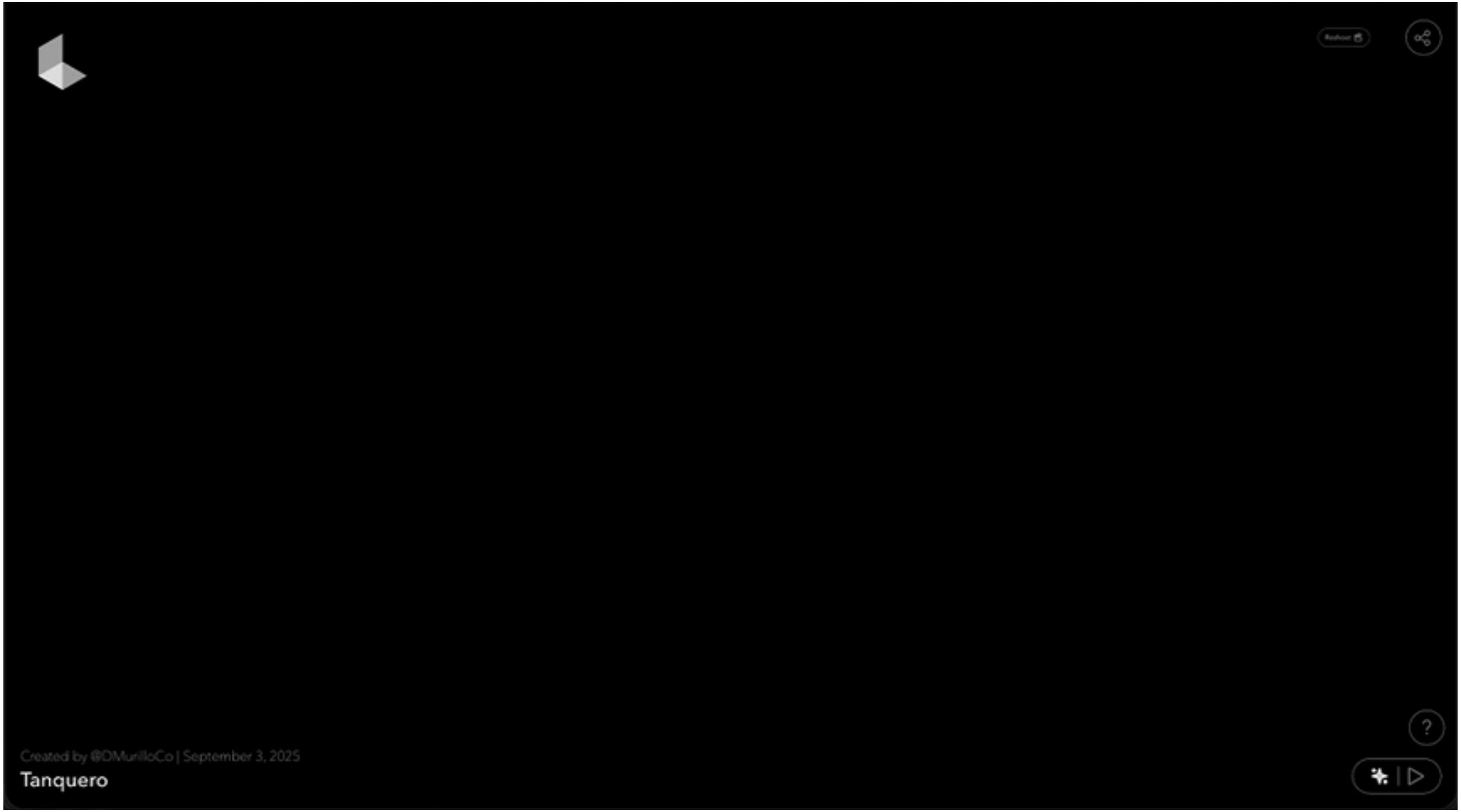




Tanquero 777F

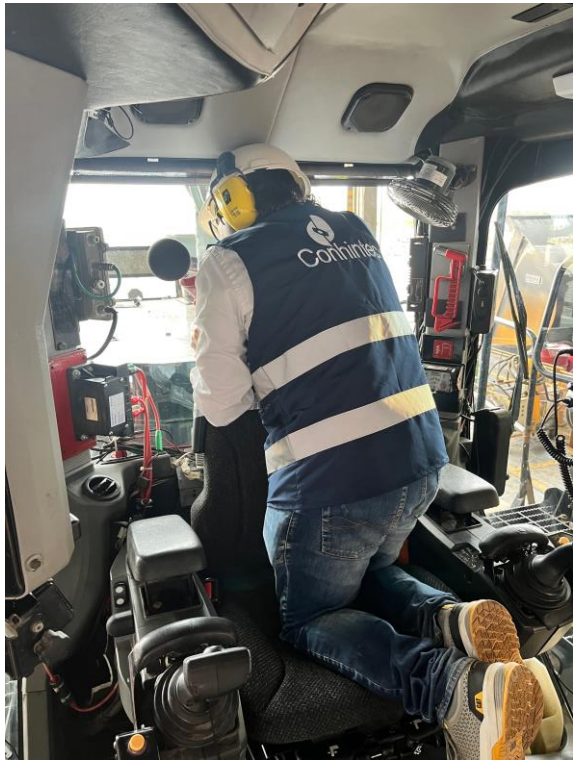
Motoniveladora 16M3

Tanquero 777F



Estacionaria 2500 RPM

Motoniveladora 16M3

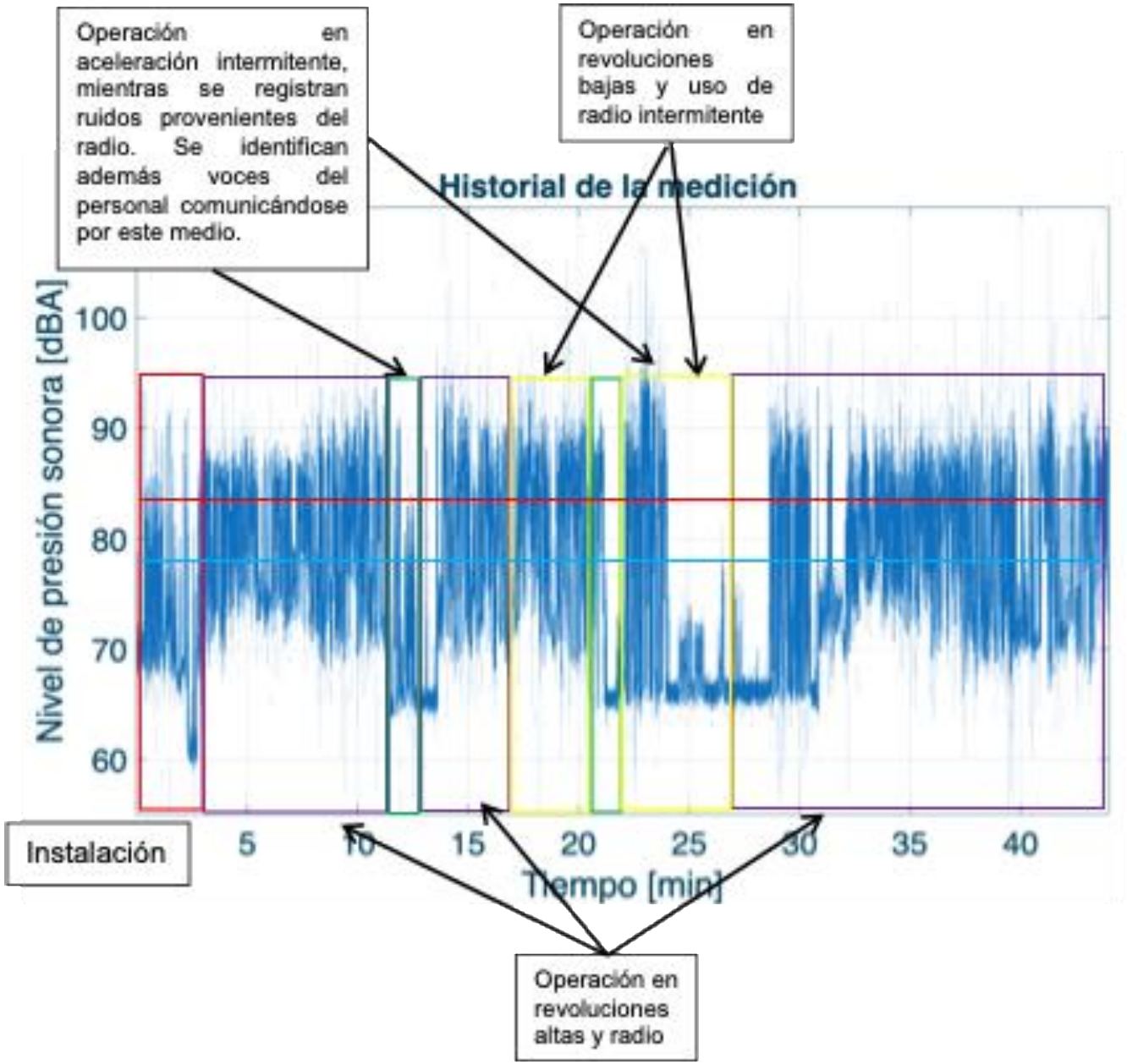


- Con proceso de vida media es de LAeq **72.7 dBA**
- Sin proceso de vida media es de LAeq **77.5 dBA**

Tanquero 777F

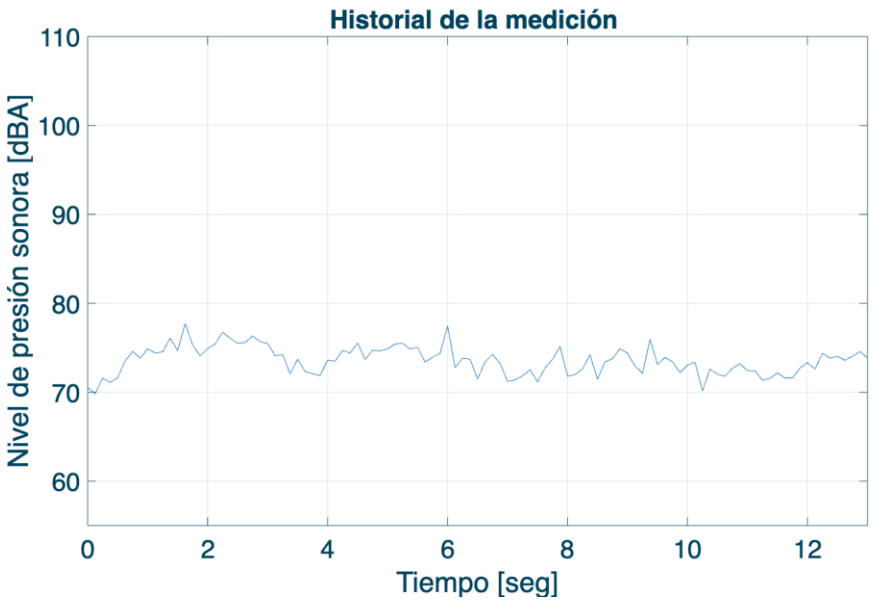
- LAeq **73.7 dBA**

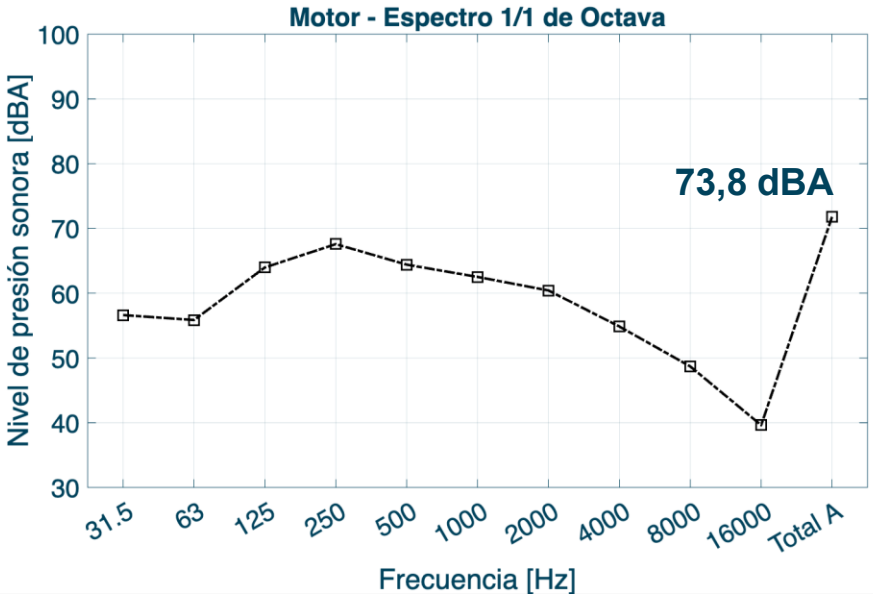
Operación



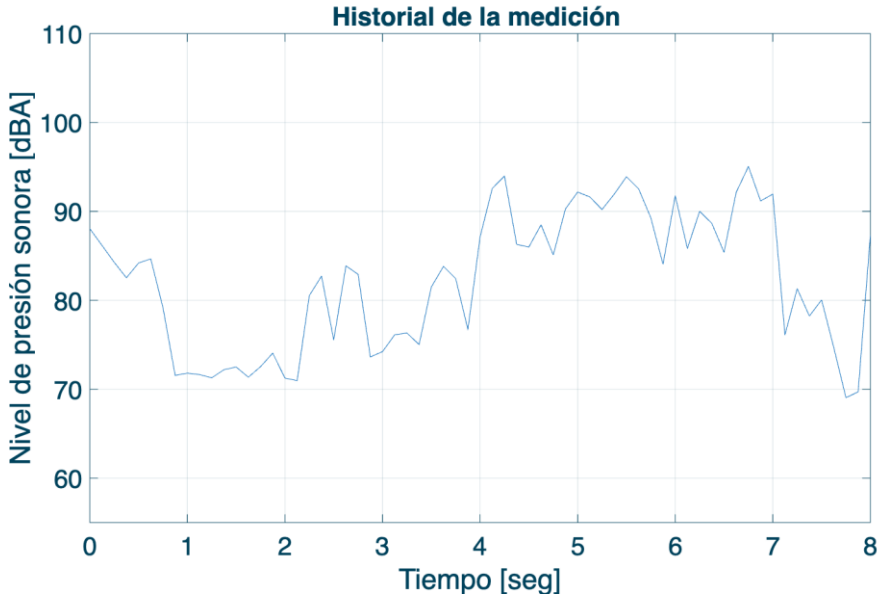
Tanquero 777F

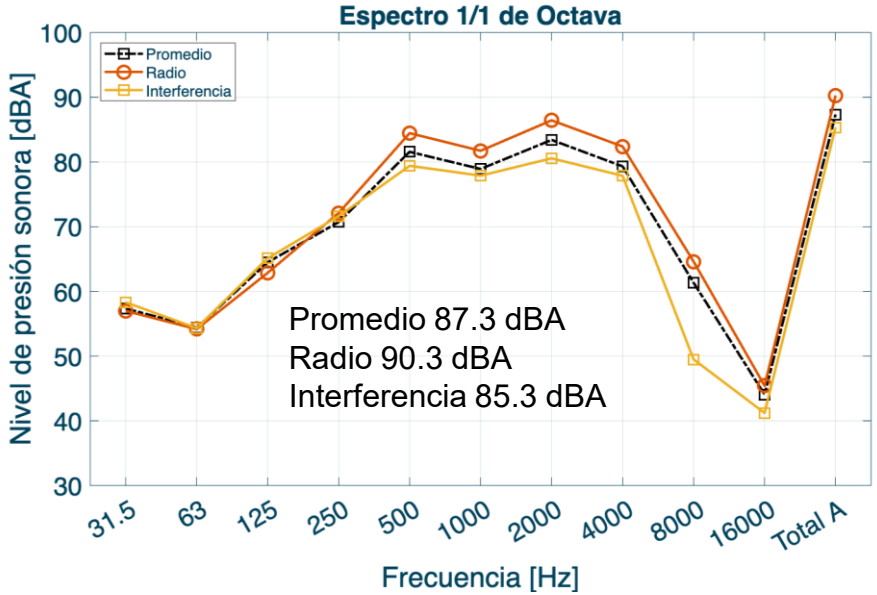
Operación Tanquero 777F - Motor



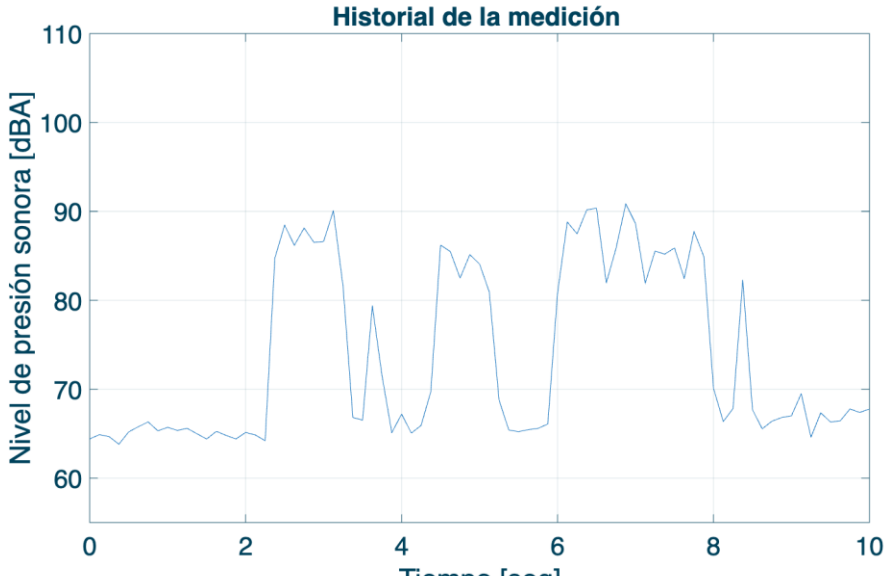


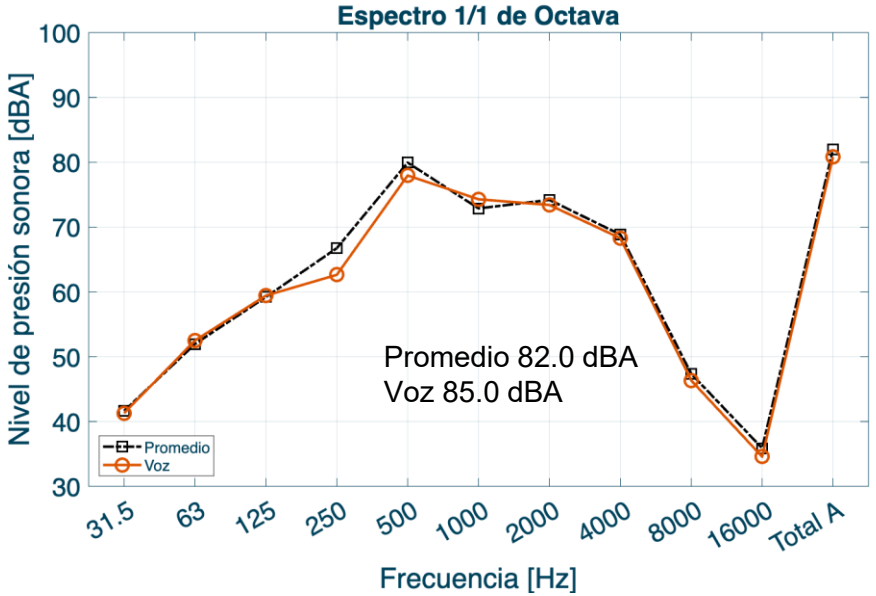
Operación Tanquero 777F - Radio



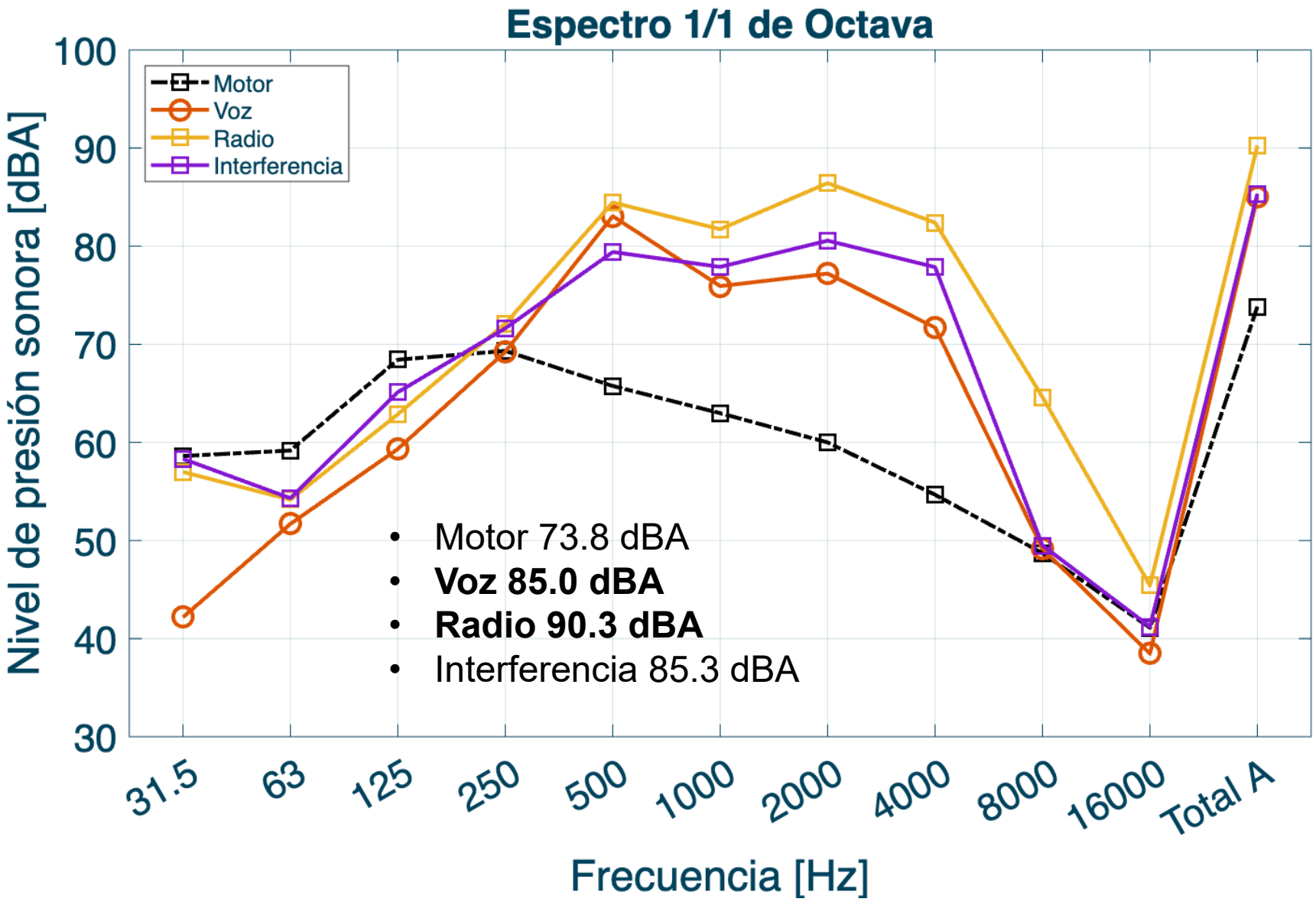


Operación Tanquero 777F - Voz

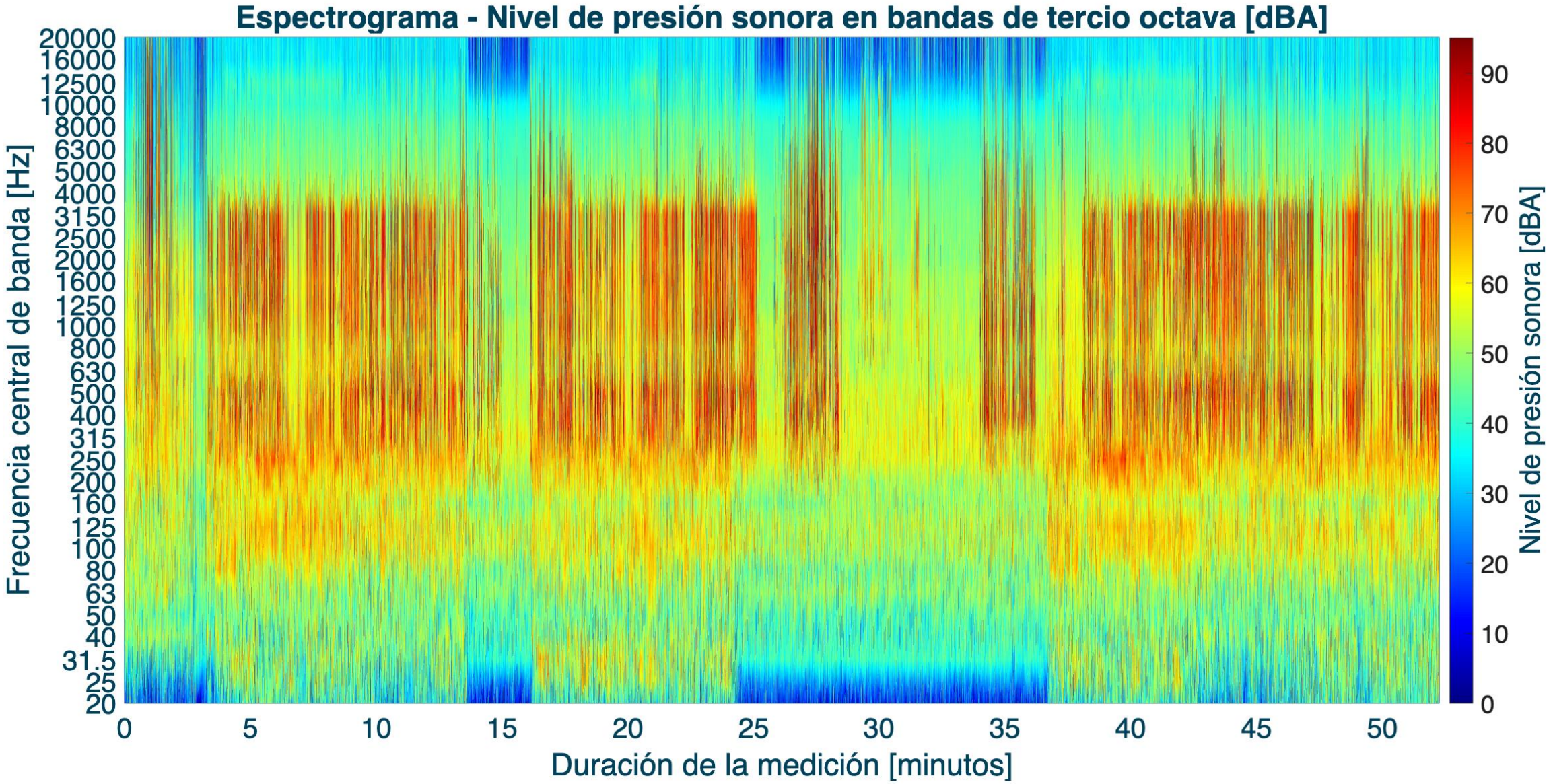




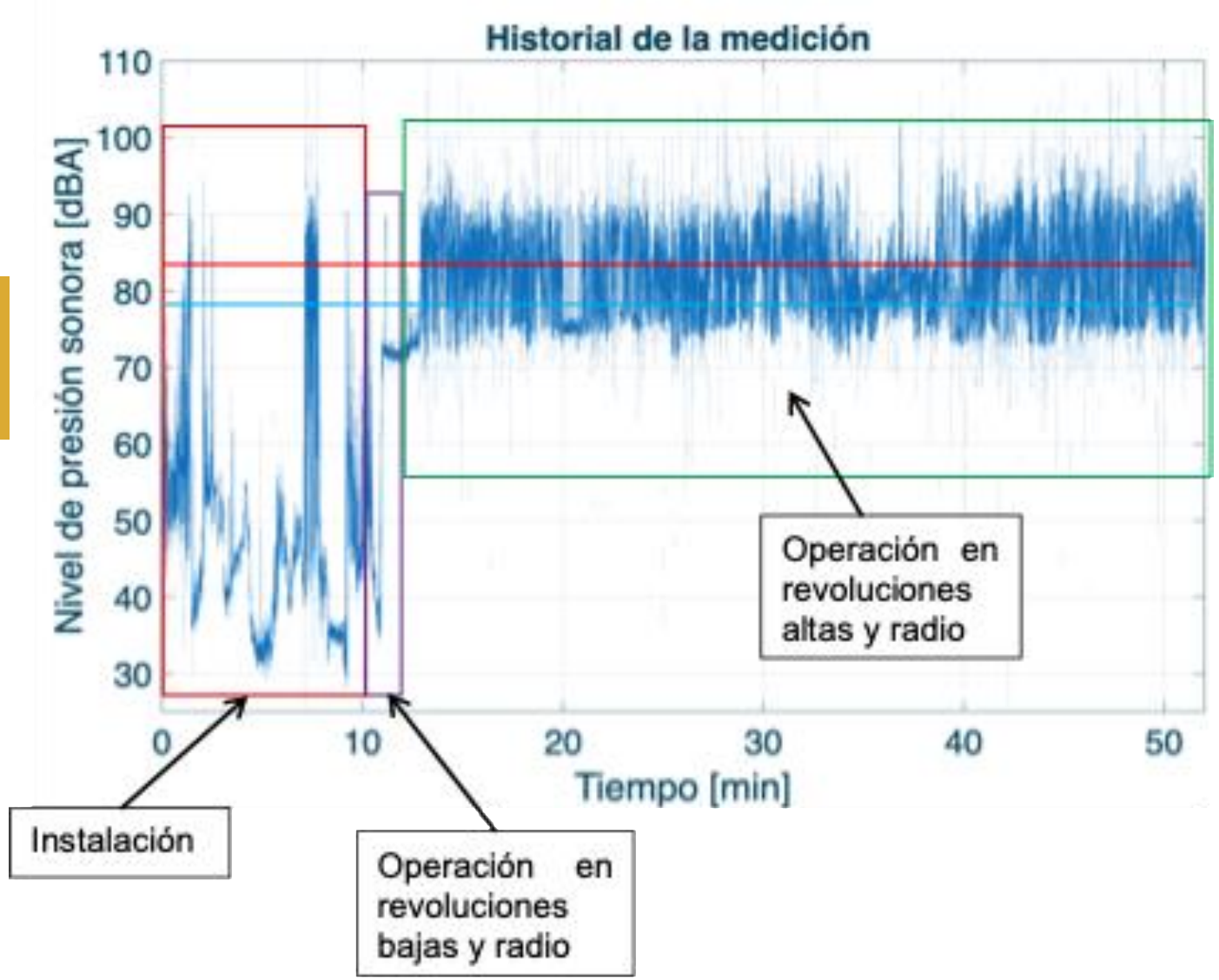
Operación Tanquero 777F



Espectrograma Operación Tanquero 777F

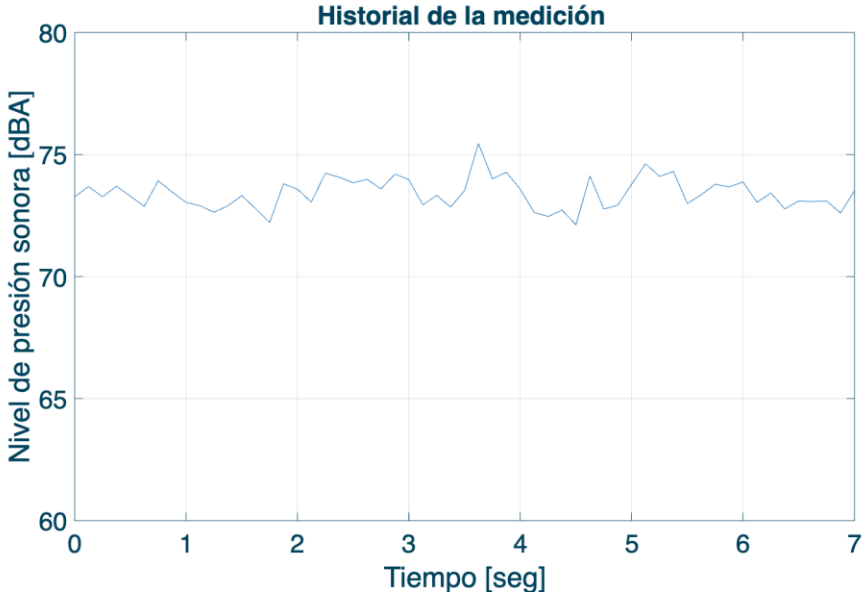


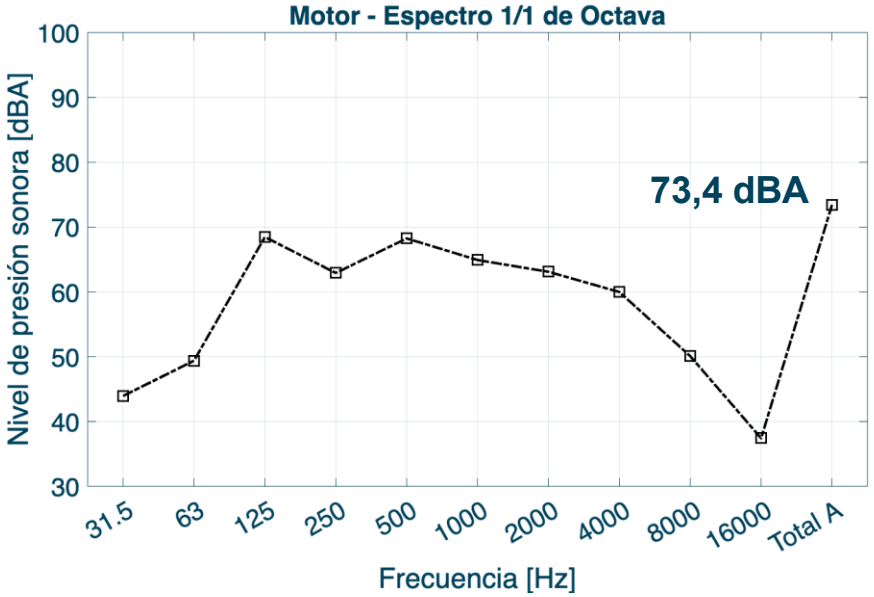
Operación



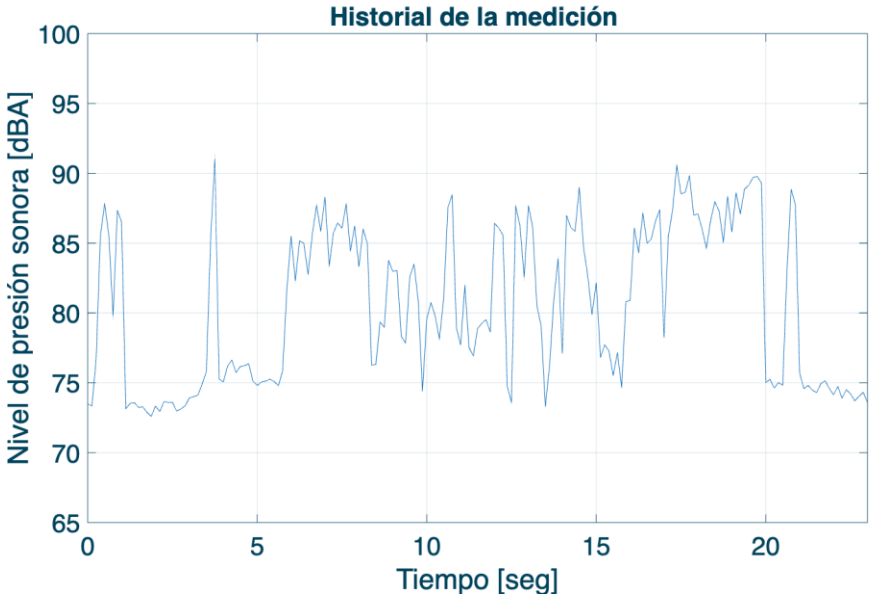
Motoniveladora 16M3

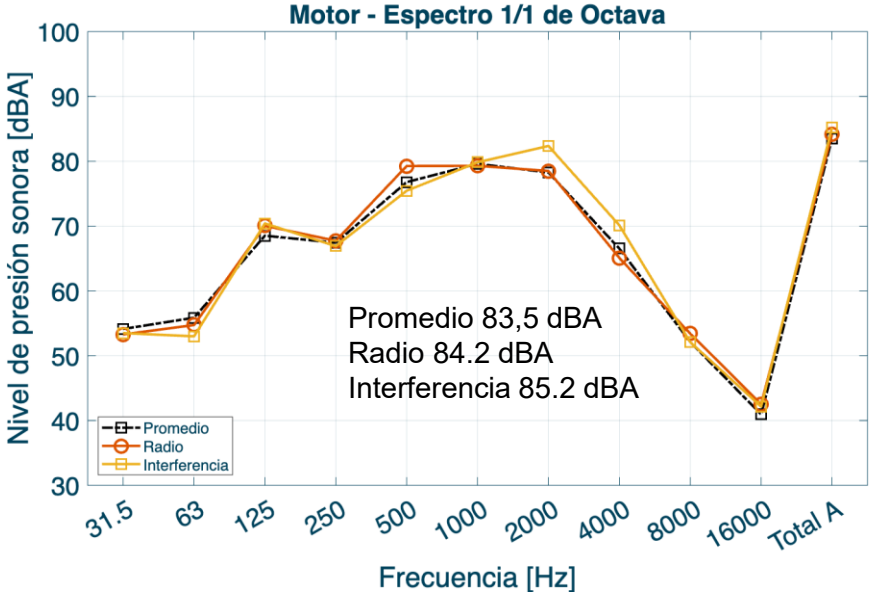
Operación Motoniveladora 16M3 - Motor



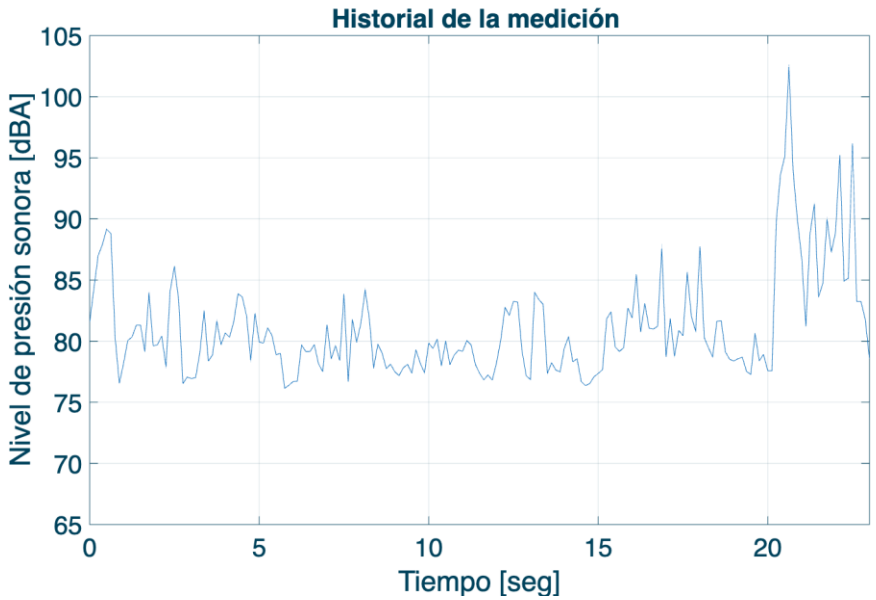


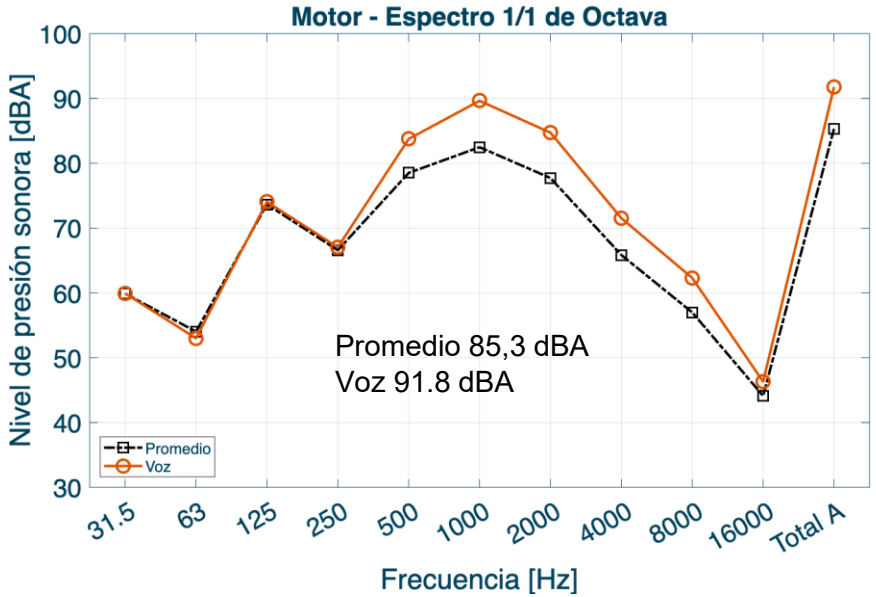
Operación Motoniveladora 16M3 - Radio



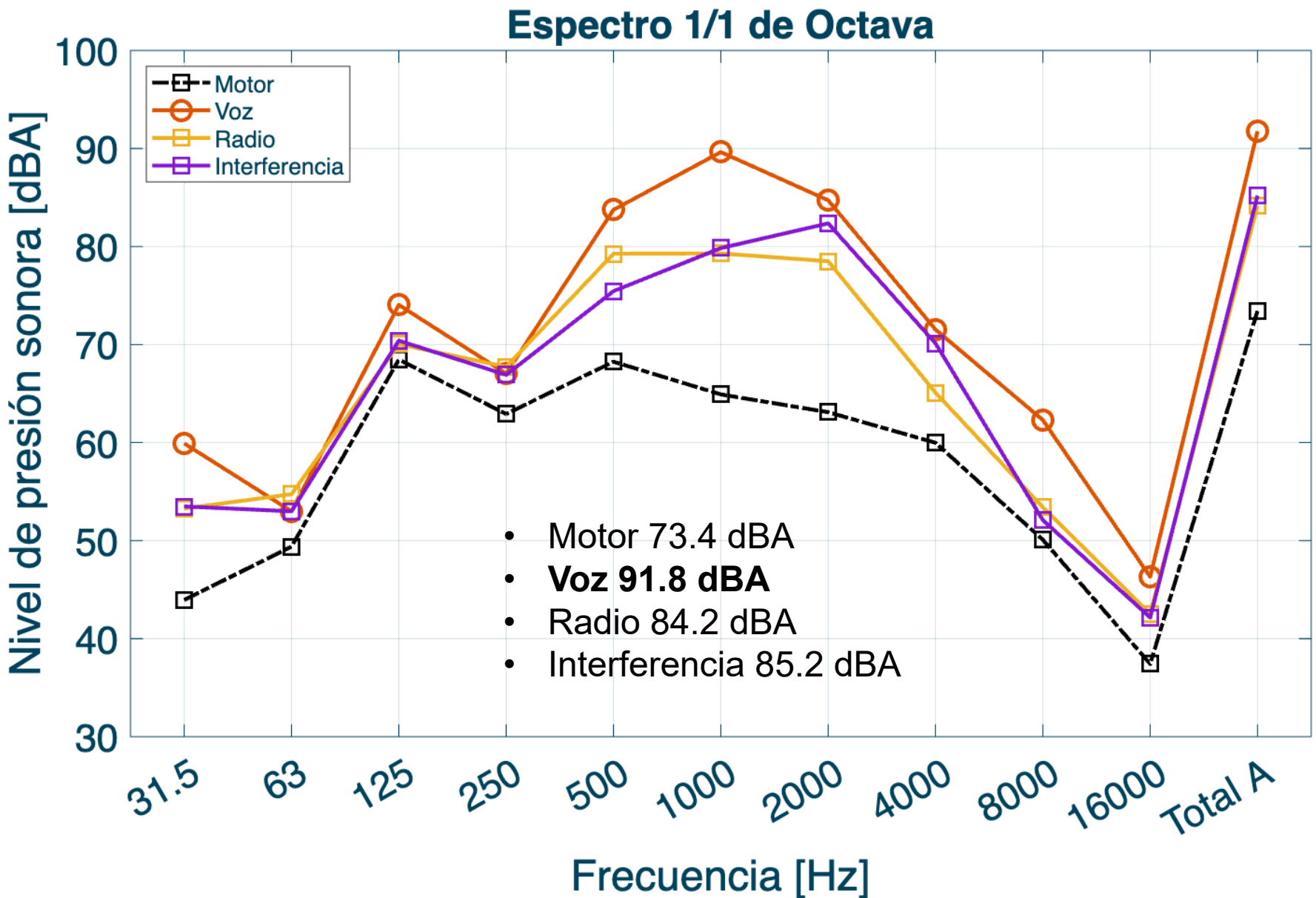


Operación Motoniveladora 16M3 - Voz

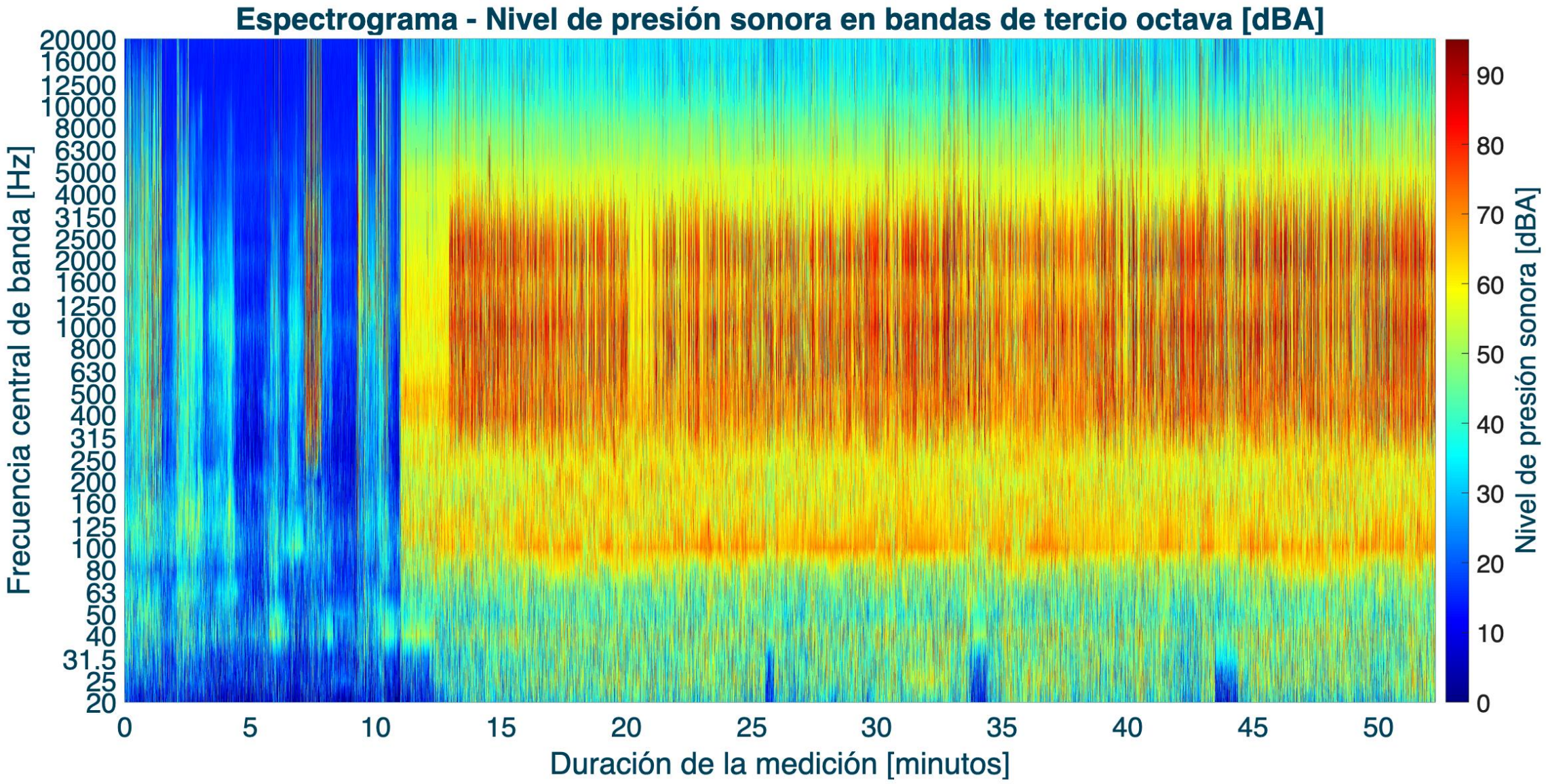




Operación Motoniveladora 16M3



Espectrograma Operación Tanquero 777F

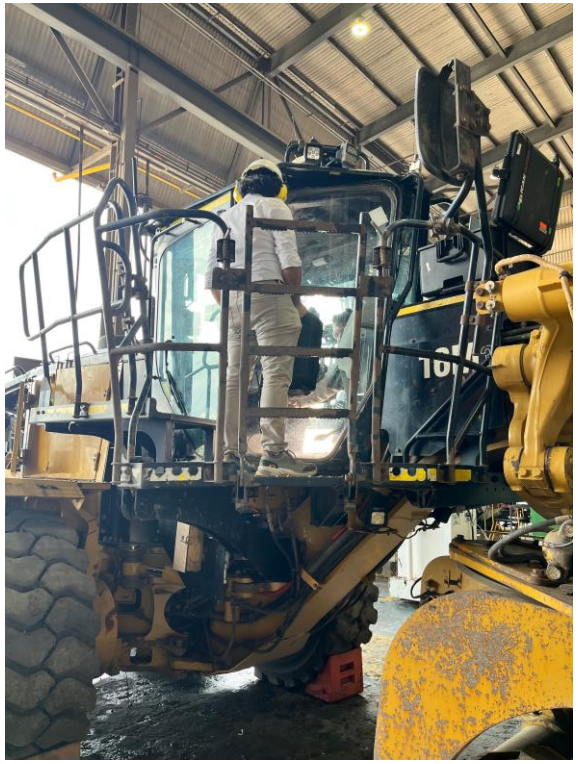


Equipo	Número	Condición	LAeq	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
Motoniveladora	50-074	Motor	**73.4**	43.9	49.4	68.5	62.9	68.3	64.9	63.1	60.0	50.1	37.4
Motoniveladora	50-074	Voz	**91.8**	59.9	53.0	74.0	67.0	**83.7**	**89.6**	**84.7**	71.5	62.3	46.3
Motoniveladora	50-074	Radio	**84.2**	53.3	54.7	70.0	67.7	**79.3**	**79.3**	**78.5**	65.1	53.4	42.5
Motoniveladora	50-074	Interferencia	**85.2**	53.5	53.0	70.4	66.9	**75.5**	**79.8**	**82.4**	70.1	52.1	42.2
Tanquero	55	Motor	**73.8**	58.6	59.2	68.4	69.3	65.8	63.0	60.0	54.7	48.7	41.1
Tanquero	55	Voz	**85.0**	42.2	51.7	59.3	69.2	**83.1**	**75.9**	**77.2**	71.7	49.1	38.5
Tanquero	55	Radio	**90.3**	57.0	54.2	62.9	72.1	**84.5**	**81.7**	**86.4**	**82.4**	64.6	45.4
Tanquero	55	Interferencia	**85.3**	58.3	54.3	65.1	71.6	**79.4**	**77.9**	**80.6**	**77.9**	49.5	41.2
Motoniveladora	50-084	2500 RPM	**77.5**	41.1	49.4	73.0	66.4	71.1	70.5	67.3	63.4	54.5	40.1
Motoniveladora	50-074	2500 RPM	**72.1**	39.0	46.8	68.9	60.5	66.3	62.6	59.1	53.1	44.5	31.9

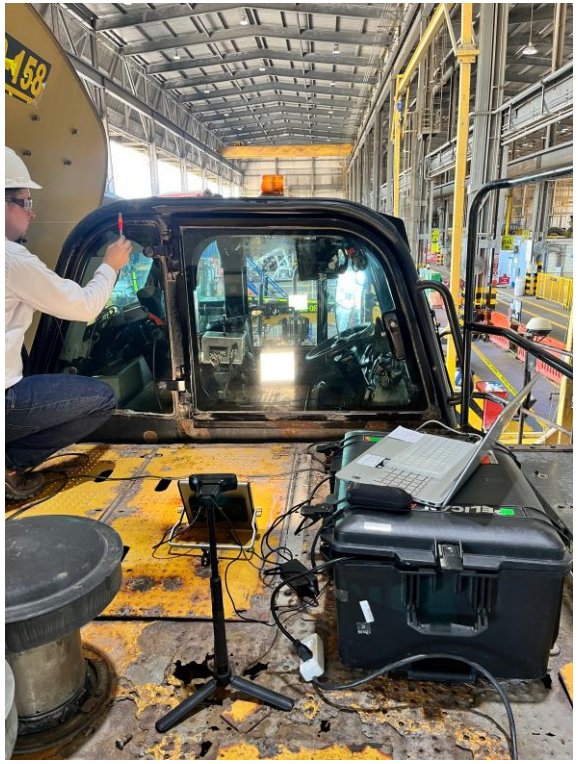
Equipo	Número	Descripción	LAeq	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	16 kHz
Motoniveladora	50-074	Sin Radio – RPM Altas	**76.0**	57.1	58.0	66.7	69.5	72.2	66.3	68.5	63.6	48.6	40.6
Motoniveladora	50-074	Sin Radio – RPM Bajas	**65.8**	42.4	51.6	58.0	60.3	60.3	57.8	55.8	52.4	47.2	35.8
Motoniveladora	**50-074**	**Uso de Radio - RPM Altas**	**83.0**	56.5	55.9	64.7	70.4	**78.9**	**75.6**	**77.4**	72.6	53.2	40.8
Motoniveladora	50-074	Uso de Radio - RPM Bajas	**81.4**	42.7	51.7	57.7	64.6	76.8	76.6	74.8	70.4	53.1	36.6
Tanquero	55	Sin Radio - RPM Altas	**77.9**	55.0	55.3	71.5	67.2	72.9	75.3	75.0	64.3	52.1	40.5
Tanquero	55	Sin Radio – RPM Bajas	**72.3**	47.3	51.0	65.9	62.3	68.4	64.1	62.7	60.0	51.6	39.8
Tanquero	55	Uso de Radio - RPM Altas	**85.9**	54.8	55.7	71.5	68.0	**78.4**	**82.2**	**80.3**	67.9	53.2	41.8
Tanquero	55	Uso de Radio - RPM Altas	**76.0**	57.1	58.0	66.7	69.5	72.2	66.3	68.5	63.6	48.6	40.6
Motoniveladora	50-084	2500 RPM	**77.5**	41.1	49.4	73.0	66.4	71.1	70.5	67.3	63.4	54.5	40.1
Motoniveladora	50-074	2500 RPM	**72.1**	39.0	46.8	68.9	60.5	66.3	62.6	59.1	53.1	44.5	31.9

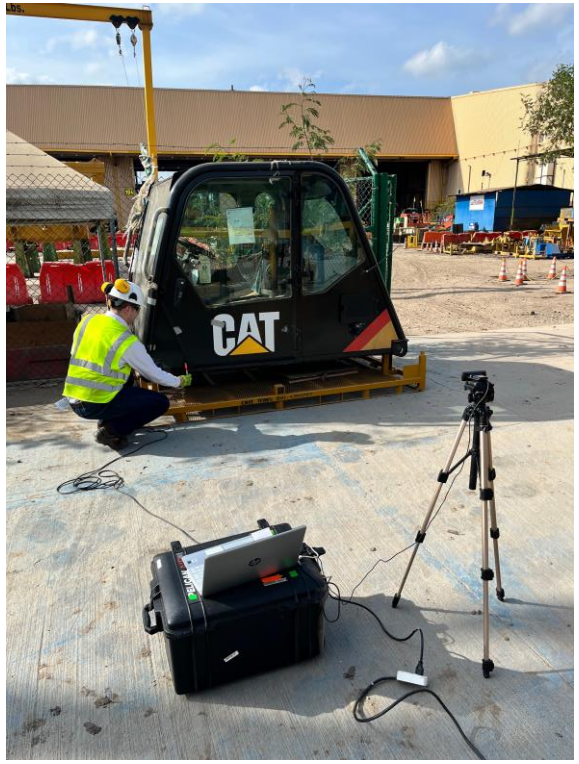
Holografía con sonda de intensidad

Motoniveladora 16M3

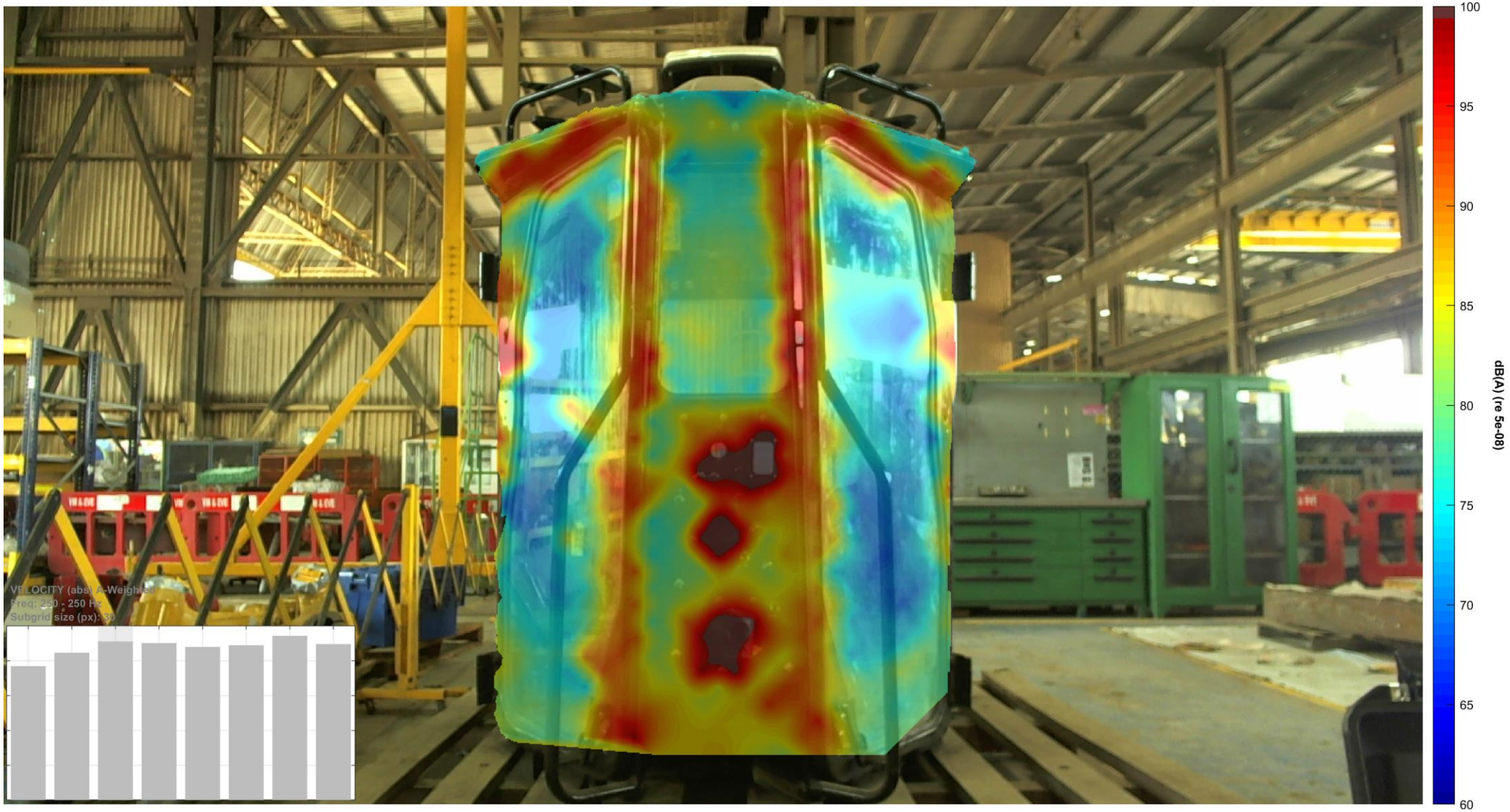


Tanquero 777F



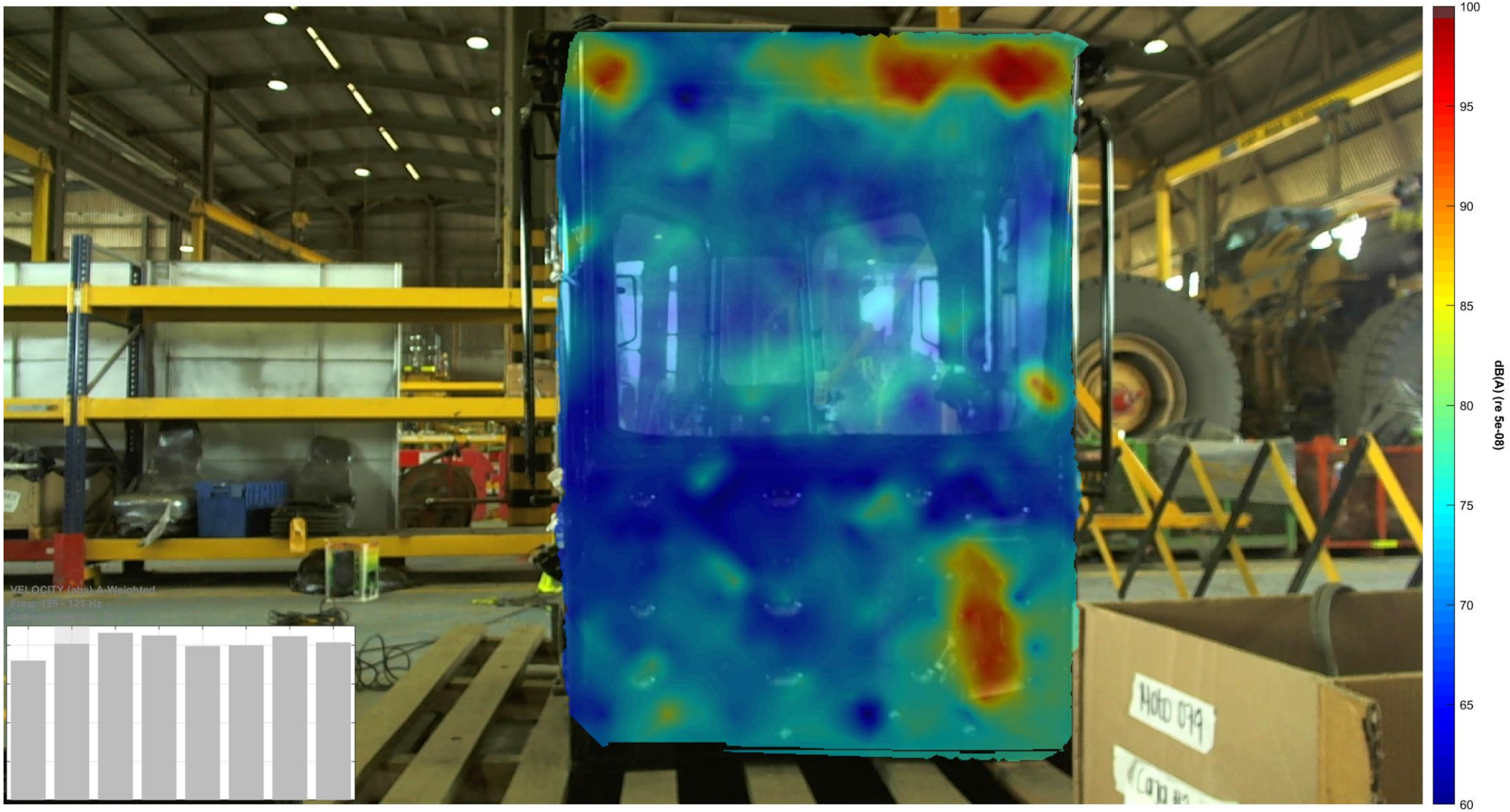


Holografía con sonda de intensidad

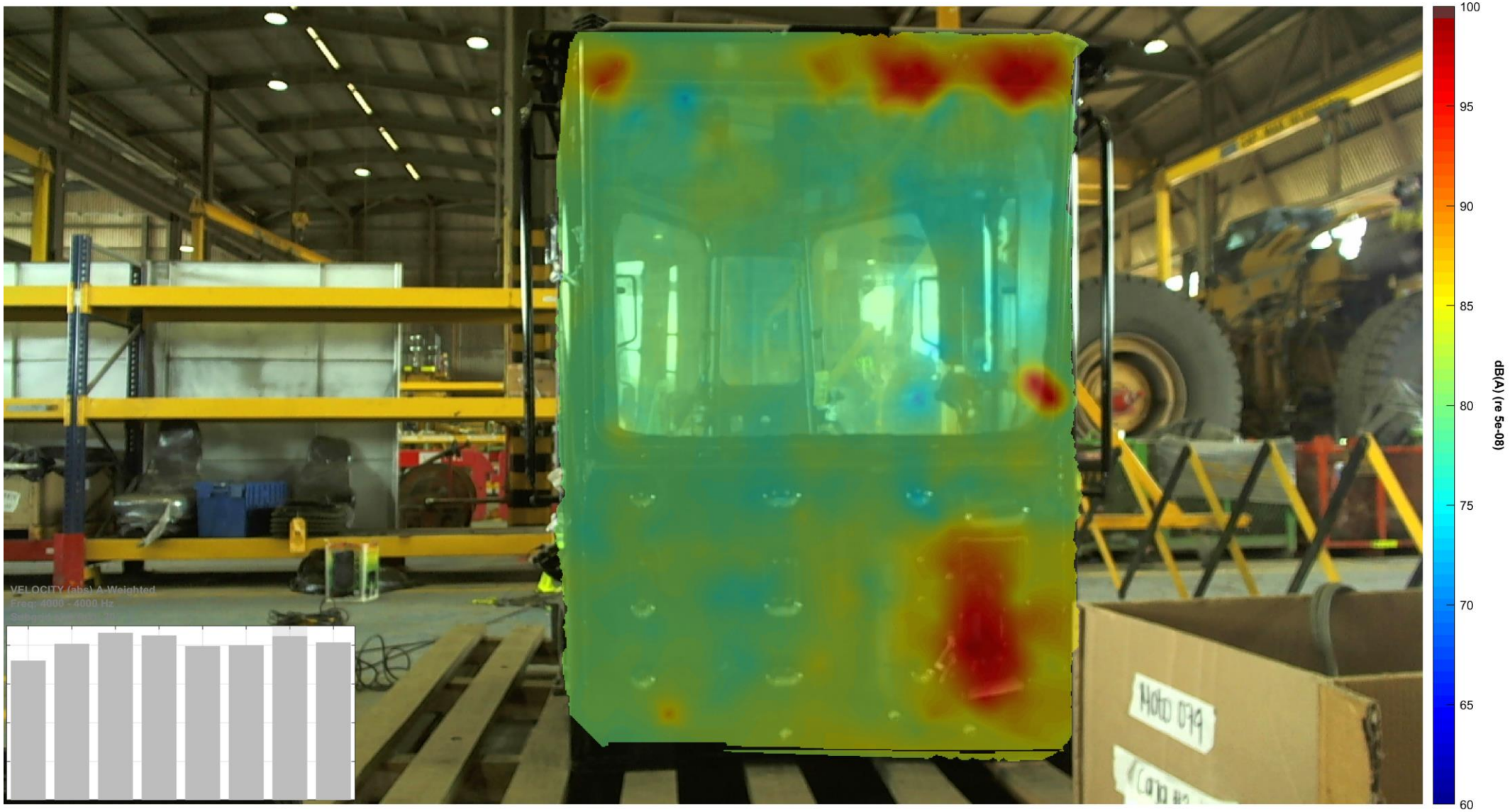


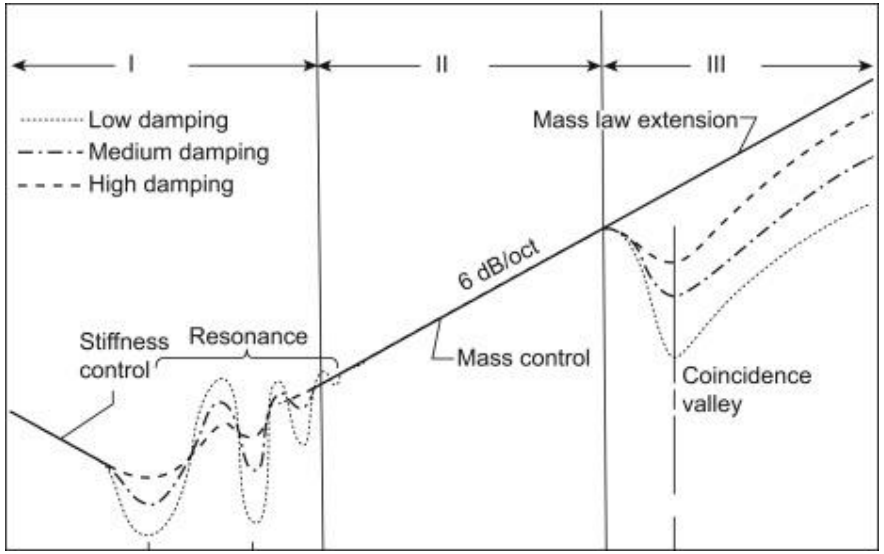
Holografía con sonda de intensidad

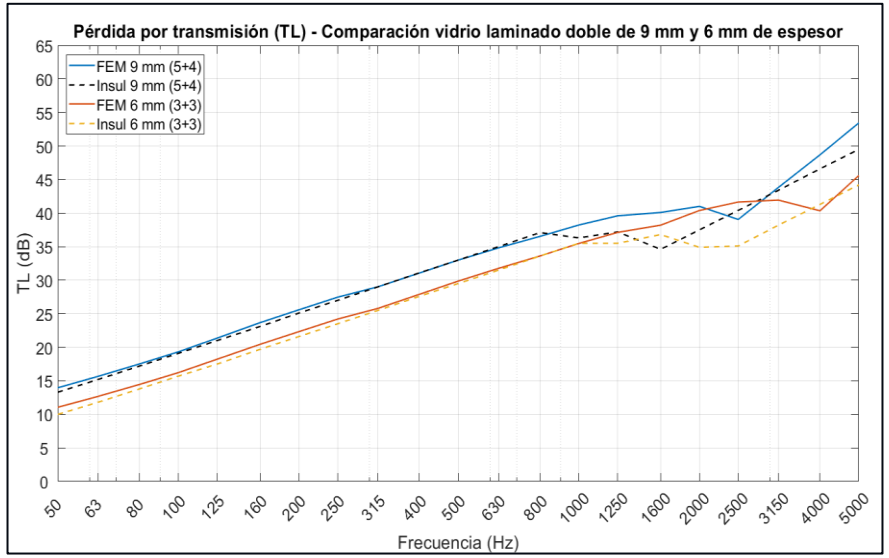
Holografía con sonda de intensidad

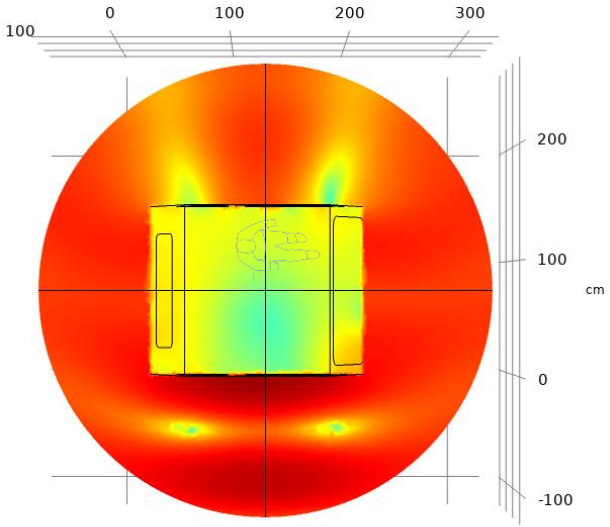


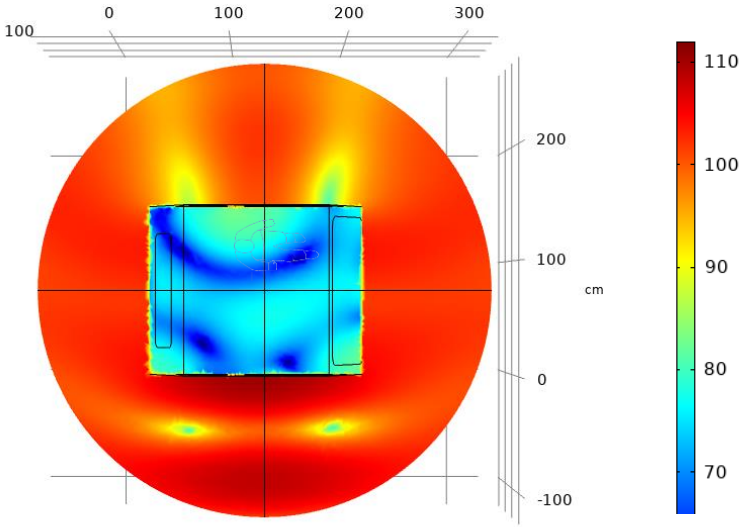
Holografía con sonda de intensidad

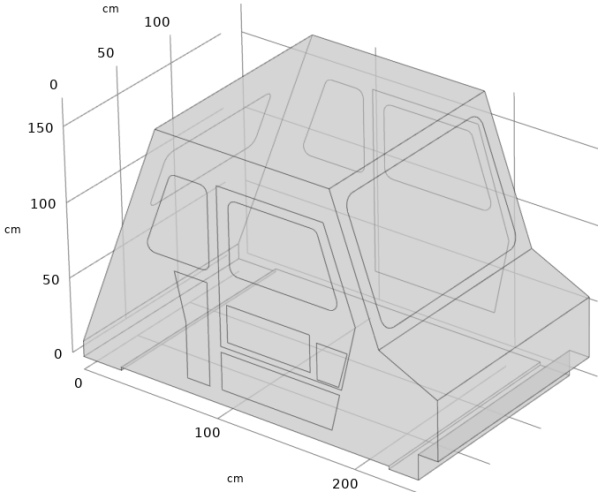






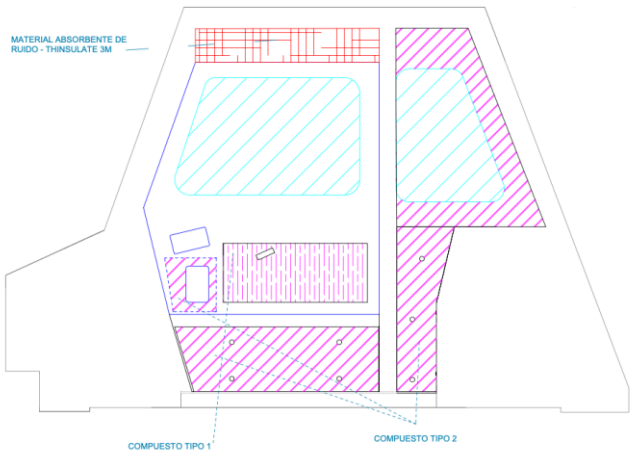




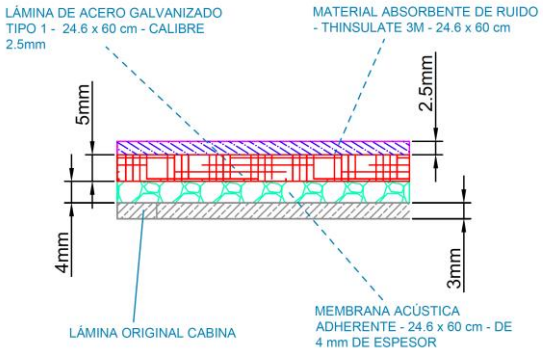


Sellamientos y acoples - Materialidad y ventanas - Silenciador pasivo

VISTA INTERNA LATERAL DERECHA



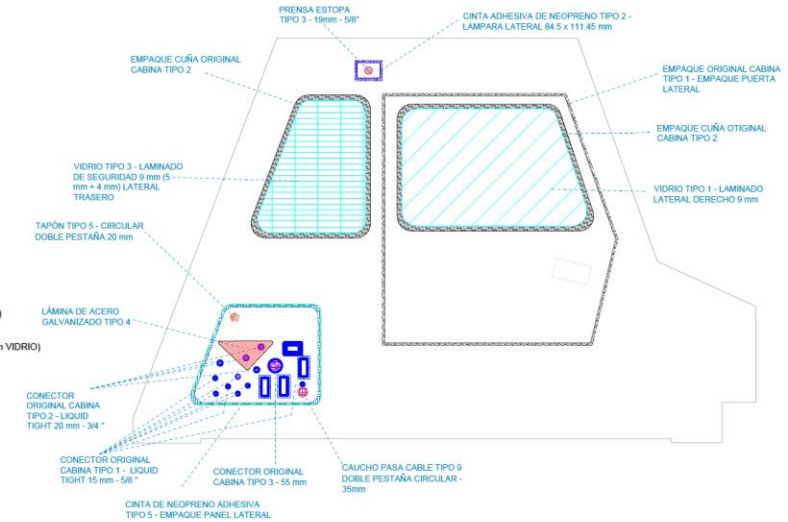
DETALLES COMPUESTO TIPO 1



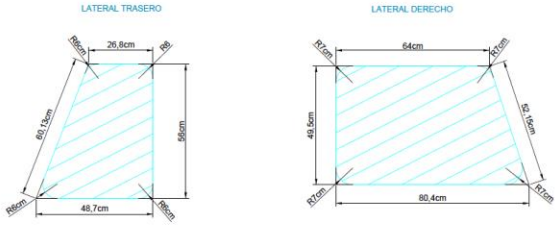
VISTA LATERAL DERECHA

CONVENCIONES

- CONECTOR ORIGINAL CABINA TIPO 1 - 15 mm - 5/8 "
- CONECTOR ORIGINAL CABINA TIPO 2 - CORAZA AMERICANA LIQUID TIGHT 20 mm - 3/4"
- CONECTOR ORIGINAL CABINA TIPO 3 - 55 mm
- CINTA DE NEOPRENO ADHESIVA TIPO 2- 19 mm DE ANCHO x 6 mm DE ESPESOR
- CINTA DE NEOPRENO ADHESIVA TIPO 5 - 19 mm DE ANCHO x 6 mm DE ESPESOR
- EMPAQUE ORIGINAL CABINA TIPO 1 - PUERTAS LATERALES
- EMPAQUE CUÑA TIPO 2 - PARA VIDRIO DE 9 mm
- PRENSA ESTOPA TIPO 3 - 15.8 mm - 5/8 "
- VIDRIO TIPO 1 - LAMINADO DOBLE DE 9 mm (5 mm VIDRIO + 0.76 mm BUTIRAL DE POLIVINILO + 4 mm VIDRIO)
- VIDRIO TIPO 3 - LAMINADO DE SEGURIDAD DE 9 mm (5 mm VIDRIO + 0.76 mm BUTIRAL DE POLIVINILO + 4 mm VIDRIO)
- TAPON TIPO 5 - CIRCULAR DE DOBLE PESTAÑA - 20mm
- LÁMINA DE ACERO GALVANIZADO TIPO 4
- CAUCHO PASACABLE TIPO 9 - CIRCULAR DE DOBLE PESTAÑA - 35 mm



DETALLE DE VENTANAS



DETALLE PLATINA

Conhintec
Tranquilidad en tu organización, bienestar para el mundo

CONHINTEC S.A.S.

PROYECTO

CONTROL DE RUIDO CABINAS CERREJÓN

REVISIÓN		
REV	MODIFICACIÓN	FECHA
0	Versión inicial	05/12/2019
1	Empaque cuña Tipo 2 - Dimensiones vidrios	16/12/2019
2	Detalles de sellamiento	19/12/2019

CONTIENE

Detalle de ventanas y sellamientos de la cabina del camión de 240 toneladas.

DISEÑO	DIEGO MURILLO Ph.D.
MATRÍCULA PROFESIONAL	25341198153CND
COLABORADORES	JOSE CANO
DIBUJO	ALEJANDRO ARDILA

UNIDAD	FECHA
mm - cm	05/12/2019
ARCHIVO	
PE3	

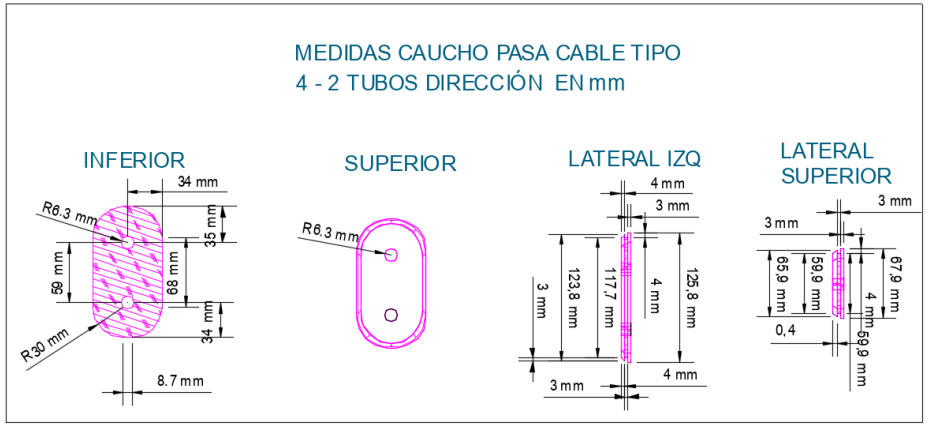
PLANO NO.

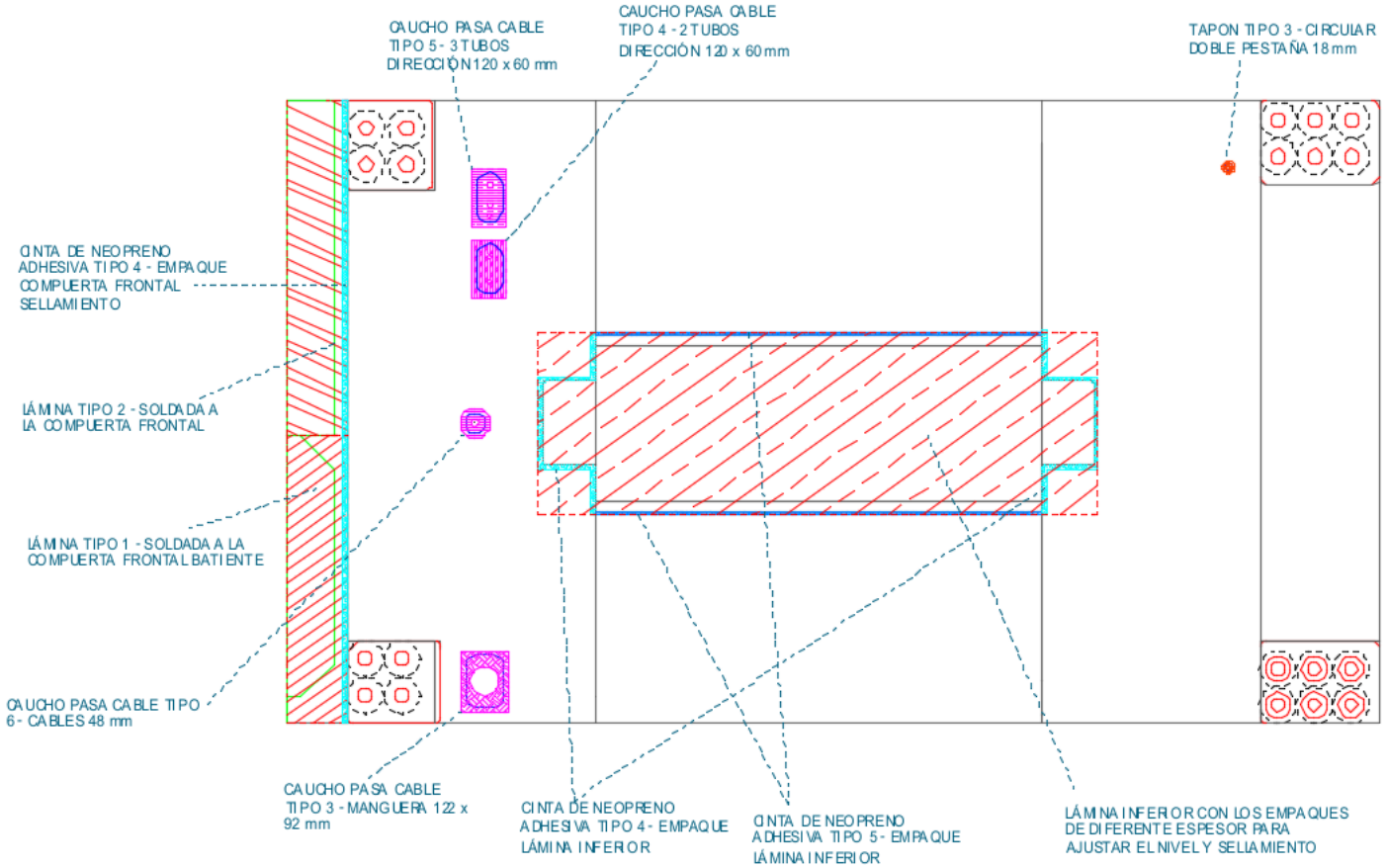
PE3-01

INGENIERÍA DE DETALLE

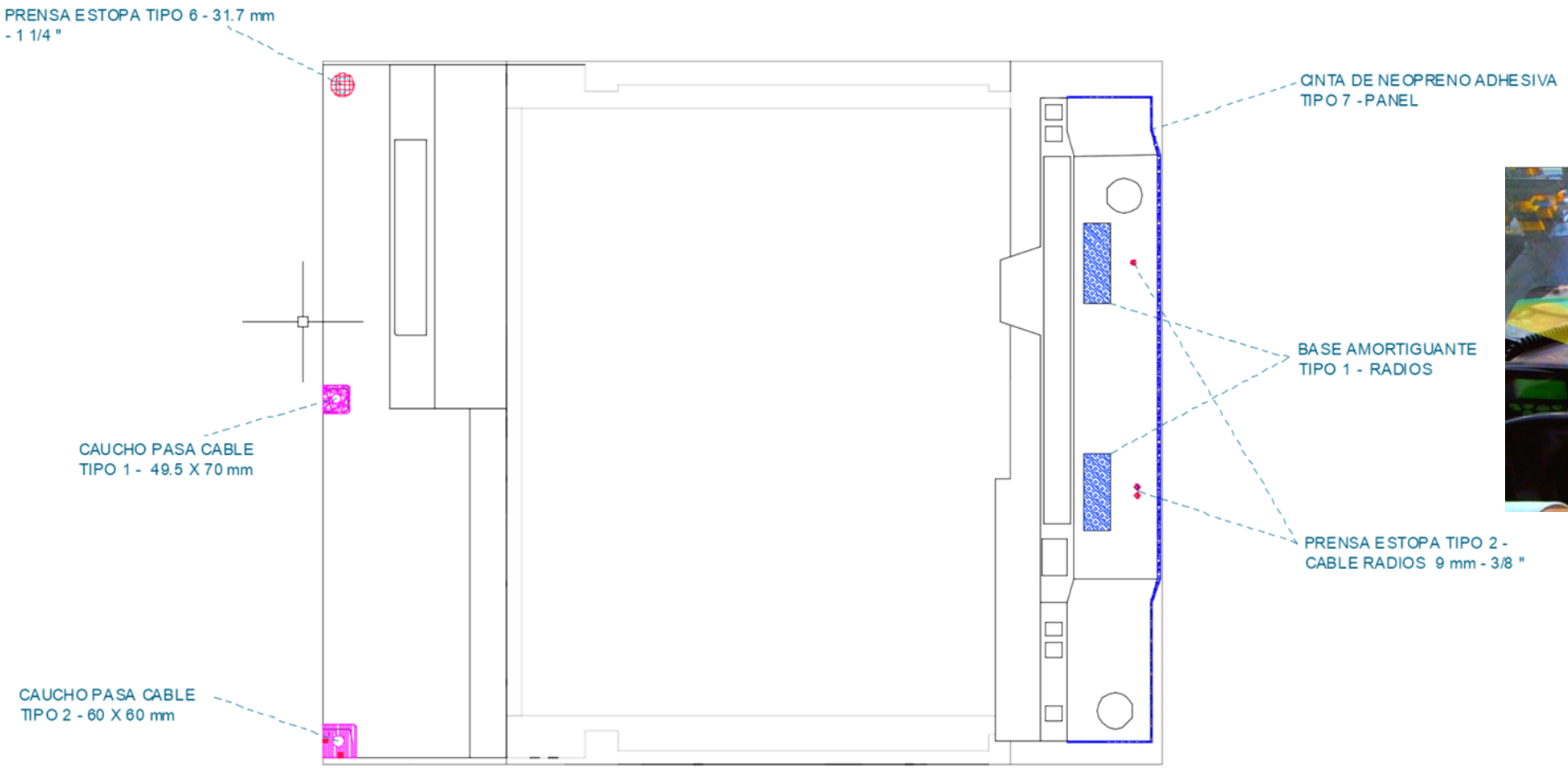
CONVENCIONES

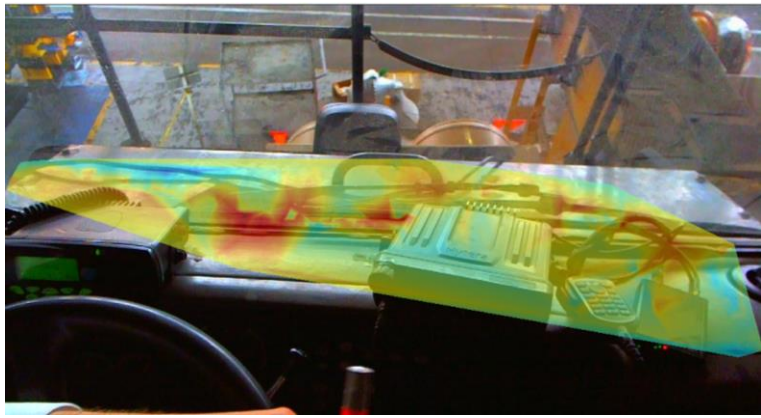
- CAUCHO PASA CABLE TIPO 3 - MANGUERA AIRE ACONDICIONADO 122 X 92 mm
- CAUCHO PASA CABLE TIPO 4 - 2 TUBOS DIRECCIÓN 120 x 60 mm
- CAUCHO PASA CABLE TIPO 5 - 3 TUBOS DIRECCIÓN 120 x 60 mm
- CAUCHO PASA CABLE TIPO 6 - CABLES 48 mm
- CINTA DE NEOPRENO ADHESIVA TIPO 4 - 12.7 mm DE ANCHO x 9.5 mm DE ESPESOR
- CINTA DE NEOPRENO ADHESIVA TIPO 5 - 25.4 mm DE ANCHO x 19 mm DE ESPESOR
- EMPAQUE DE CAUCHO TIPO 1 - PARA LÁMINA SOLDADA CALIBRE 2.5 mm
- LÁMINA TIPO 1 - SOLDADA A COMPUERTA DELANTERA BATIENTE
- LÁMINA TIPO 2 - SOLDADA A COMPUERTA DELANTERA
- LÁMINA TIPO 3 - INFERIOR ATORNILLADA
- TAPON TIPO 4 - CIRCULAR DOBLE PESTAÑA 25 mm



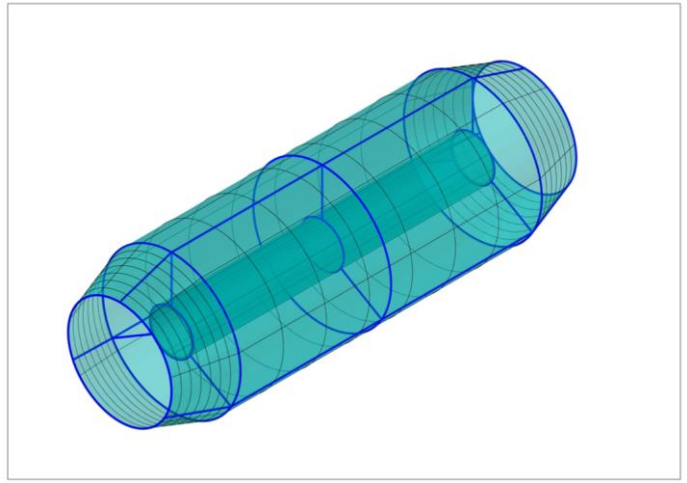


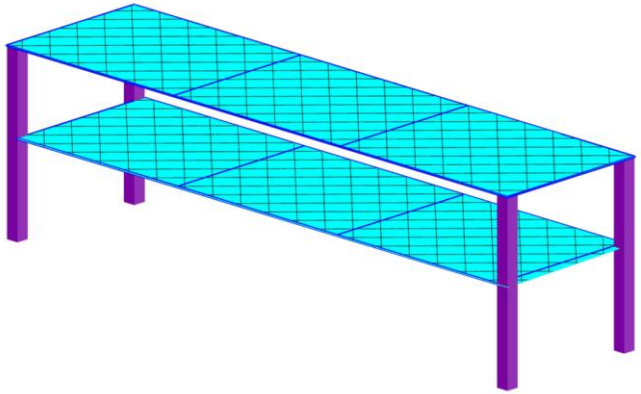
INGENIERÍA DE DETALLE



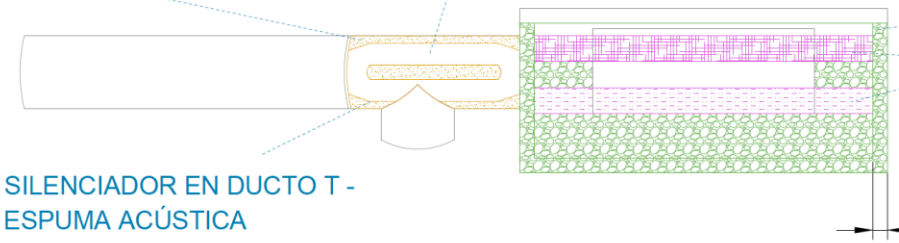


INGENIERÍA DE DETALLE

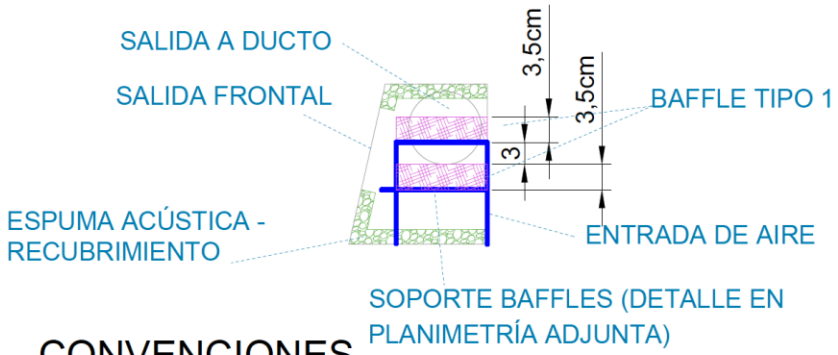




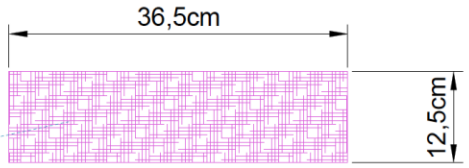
VISTA FRONTAL DEL DUCTO AA



VISTA LATERAL COMPARTIMIENTO



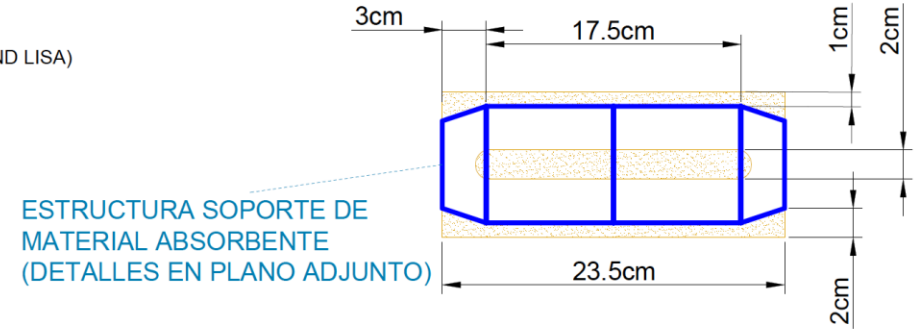
DETALLE BAFFLES PARALELOS



CONVENCIONES

- SILENCIADOR - ESPUMA ACÚSTICA (LOWSOUND LISA)
- RECUBRIMIENTO DEL COMPARTIMIENTO AA - ESPUMA ACÚSTICA (LOWSOUND LISA)
- BAFFLE ABSORBENTE TIPO 1 - ESPUMA ACÚSTICA (LOWSOUND LISA)
- BAFFLE ABSORBENTE TIPO 2 - ESPUMA ACÚSTICA (LOWSOUND LISA)

CORTE DEL SILENCIADOR INSTALADO EN DUCTO T



Conhintec
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CONHINTEC S.A.S.

PROYECTO

CONTROL DE RUIDO CABINAS CERREJÓN

REVISIÓN		
REV	MODIFICACIÓN	FECHA
0	Versión inicial	12/12/2019
1	Detalles silenciador	14/02/2019
2		

CONTIENE

Detalle de silenciador de Aire Acondicionado del camión de 240 toneladas.

DISEÑO
DIEGO MURILLO Ph.D.
MATRÍCULA PROFESIONAL
25341198153CND
COLABORADORES
JOSE CANO
DIBUJO
ALEJANDRO ARDILA

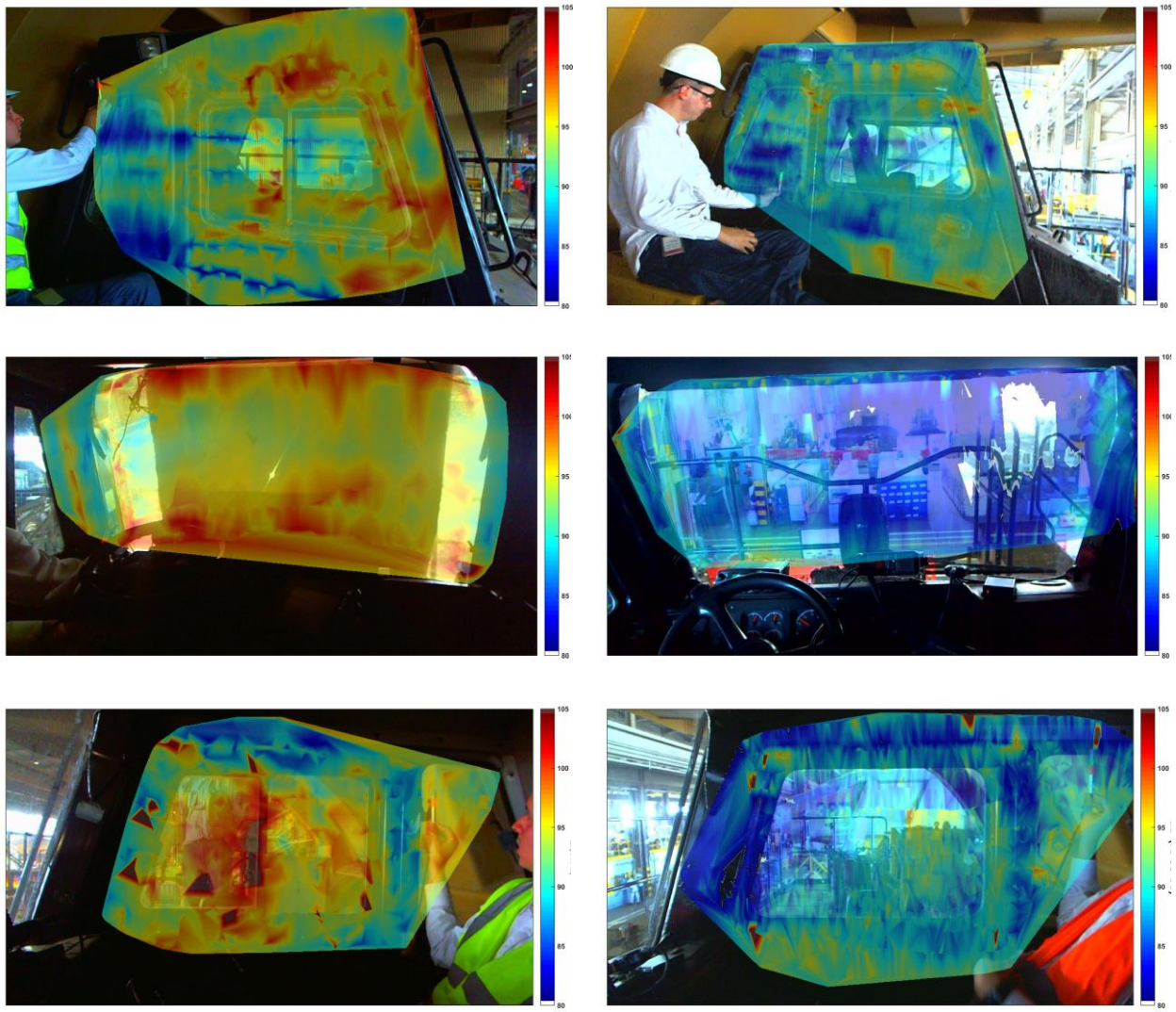
UNIDAD	FECHA
cm	12/12/2019
ARCHIVO	
PE5	

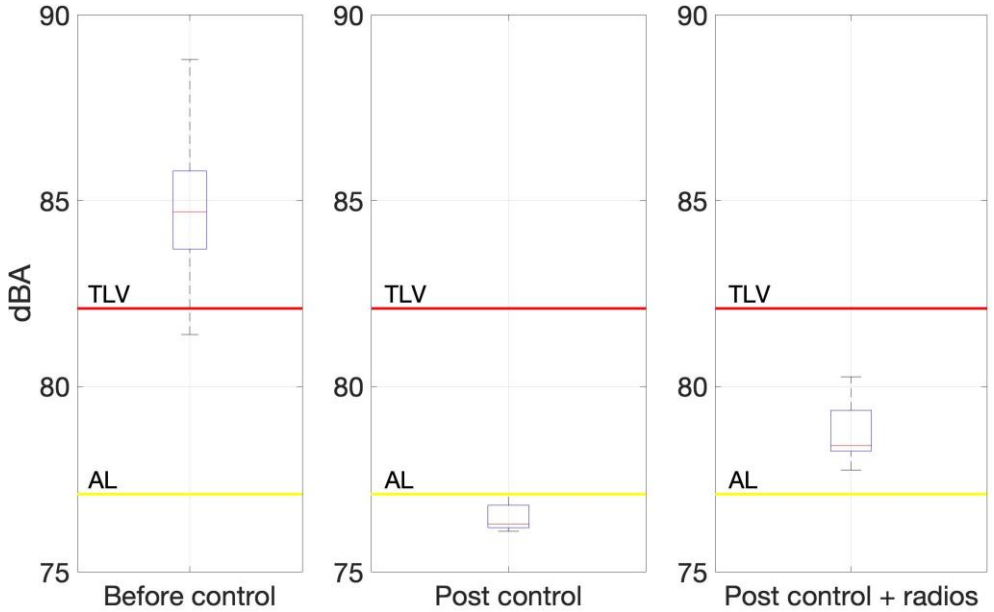
PLANO NO.
PE5-01

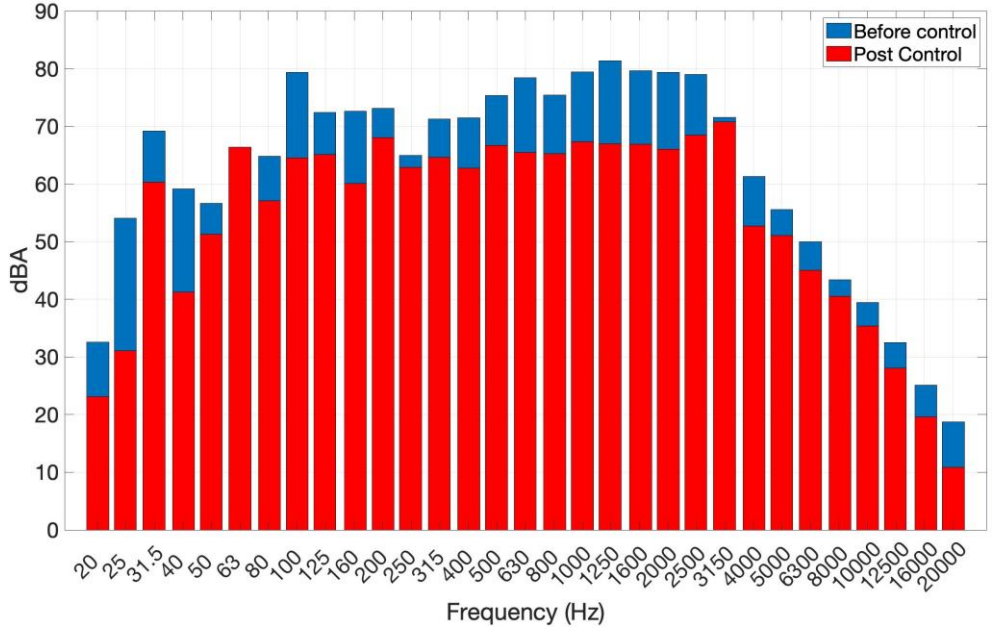
IMPLEMENTACIÓN

danosa
danosa
AFEX

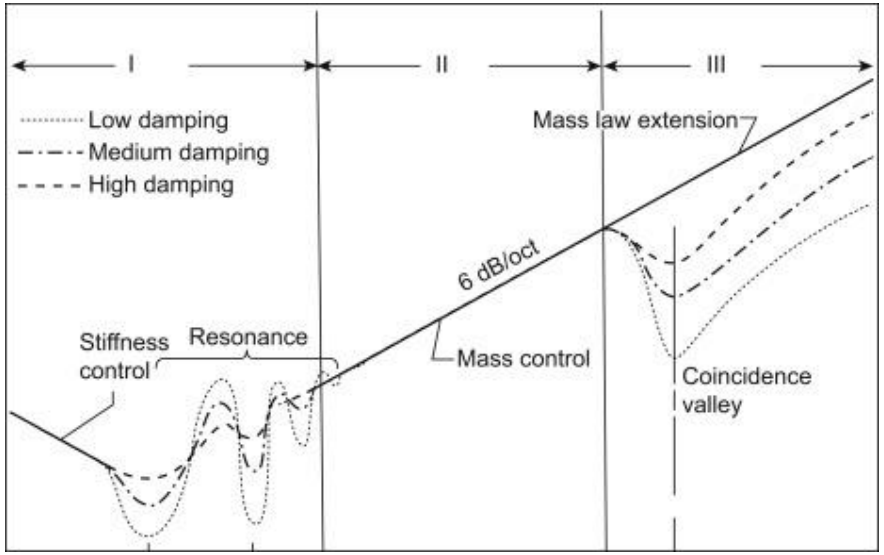
RESULTADOS

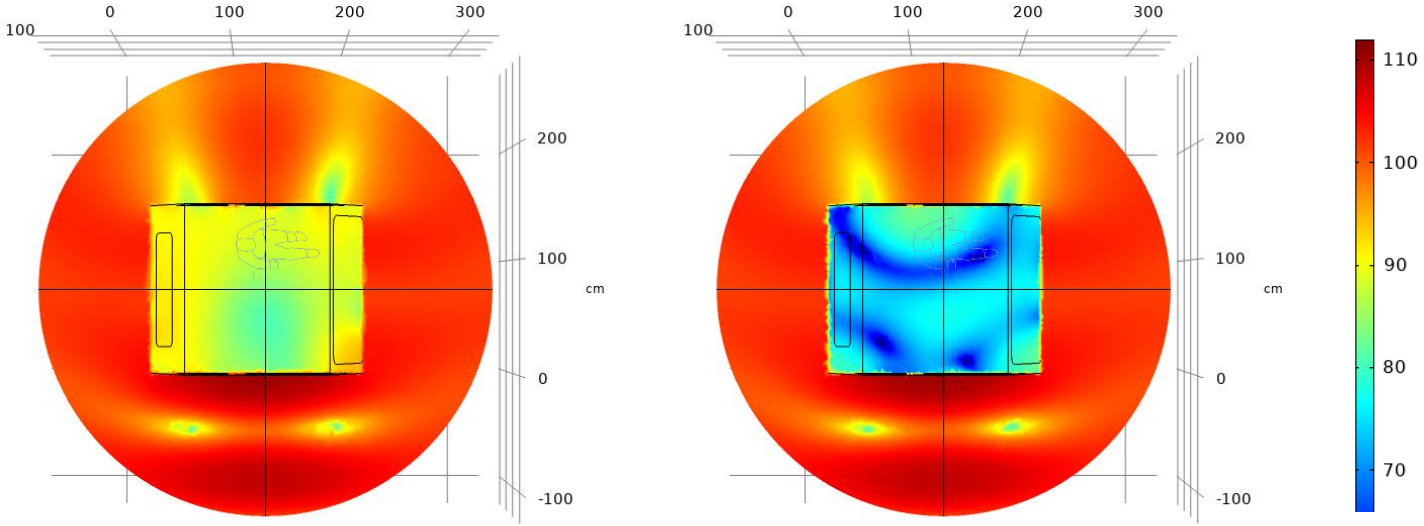


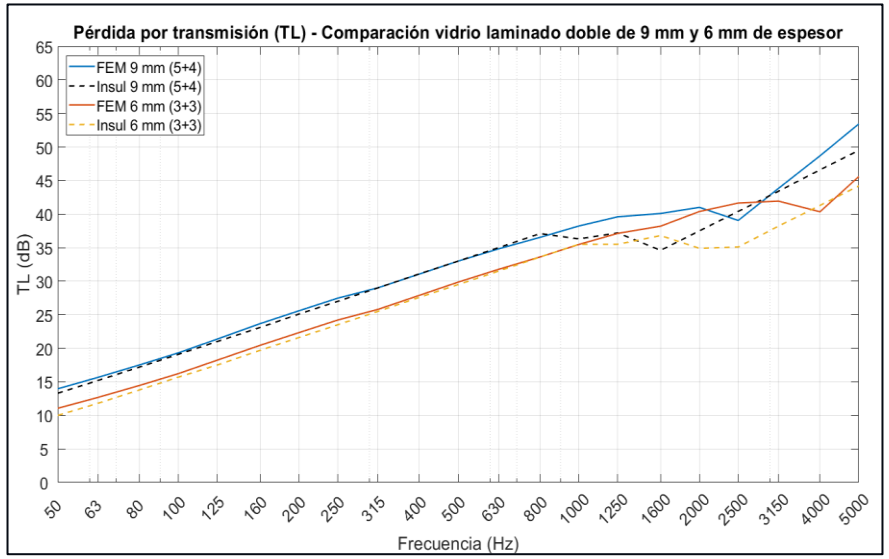

90
85
80
75
dBA
TLV
AL
Before control
Post control
Post control + radios

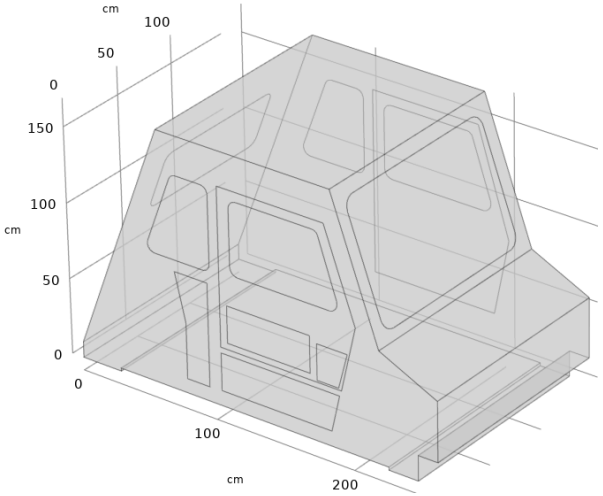

Before control
Post Control
dBA
0
10
20
30
40
50
60
70
80
90
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10000 12500 16000 20000
Frequency (Hz)

INGENIERÍA DE DETALLE



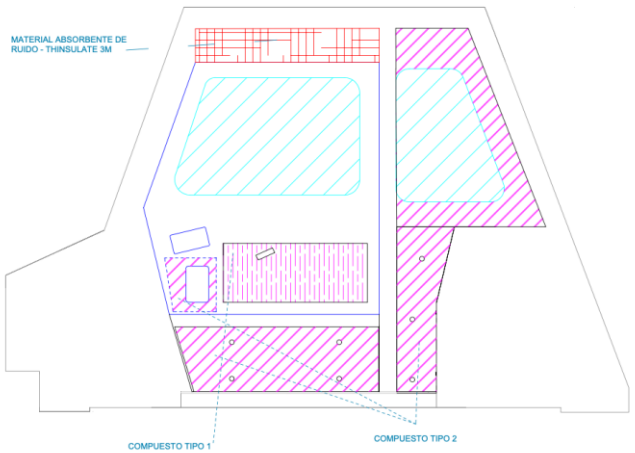




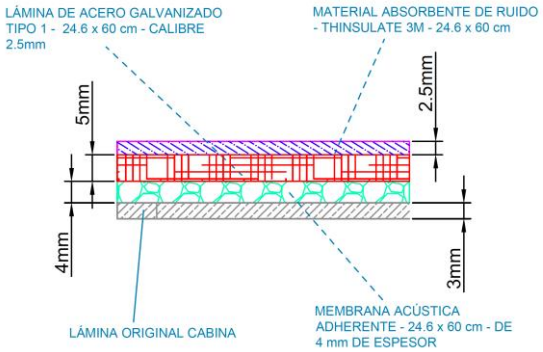


Sellamientos y acoples - Materialidad y ventanas - Silenciador pasivo

VISTA INTERNA LATERAL DERECHA



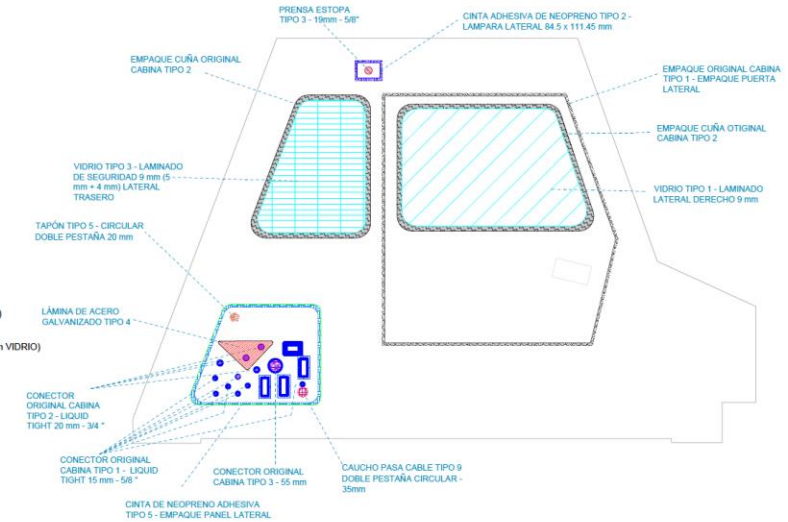
DETALLES COMPUESTO TIPO 1



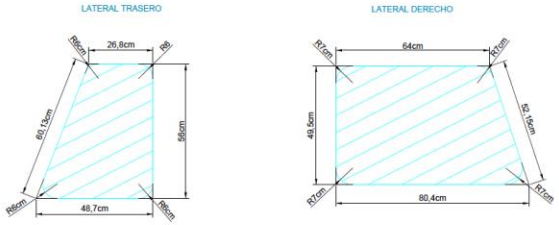
VISTA LATERAL DERECHA

CONVENCIONES

- CONECTOR ORIGINAL CABINA TIPO 1 - 15 mm - 5/8 "
- CONECTOR ORIGINAL CABINA TIPO 2 - CORAZA AMERICANA LIQUID TIGHT 20 mm - 3/4"
- CONECTOR ORIGINAL CABINA TIPO 3 - 55 mm
- CINTA DE NEOPRENO ADHESIVA TIPO 2- 19 mm DE ANCHO x 6 mm DE ESPESOR
- CINTA DE NEOPRENO ADHESIVA TIPO 5 - 19 mm DE ANCHO x 6 mm DE ESPESOR
- EMPAQUE ORIGINAL CABINA TIPO 1 - PUERTAS LATERALES
- EMPAQUE CUÑA TIPO 2 - PARA VIDRIO DE 9 mm
- PRENSA ESTOPA TIPO 3 - 15.8 mm - 5/8 "
- VIDRIO TIPO 1 - LAMINADO DOBLE DE 9 mm (5 mm VIDRIO + 0.76 mm BUTIRAL DE POLIVINILO + 4 mm VIDRIO)
- VIDRIO TIPO 3 - LAMINADO DE SEGURIDAD DE 9 mm (5 mm VIDRIO + 0.76 mm BUTIRAL DE POLIVINILO + 4 mm VIDRIO)
- TAPON TIPO 5 - CIRCULAR DE DOBLE PESTAÑA - 20mm
- LÁMINA DE ACERO GALVANIZADO TIPO 4
- CAUCHO PASACABLE TIPO 9 - CIRCULAR DE DOBLE PESTAÑA - 35 mm



DETALLE DE VENTANAS



DETALLE PLATINA

Conhintec
Tranquilidad en tu organización, bienestar para el mundo

CONHINTEC S.A.S.

PROYECTO

CONTROL DE RUIDO CABINAS CERREJÓN

REVISIÓN		
REV	MODIFICACIÓN	FECHA
0	Versión inicial	05/12/2019
1	Empaque cuña Tipo 2 - Dimensiones vidrios	16/12/2019
2	Detalles de sellamiento	19/12/2019

CONTIENE
Detalle de ventanas y sellamientos de la cabina del camión de 240 toneladas.

DISEÑO	DIEGO MURILLO Ph.D.
MATRÍCULA PROFESIONAL	25341198153CND
COLABORADORES	JOSE CANO
DIBUJO	ALEJANDRO ARDILA

UNIDAD	FECHA
mm - cm	05/12/2019
ARCHIVO	
PE3	

PLANO NO.
PE3-01

CONVENCIONES

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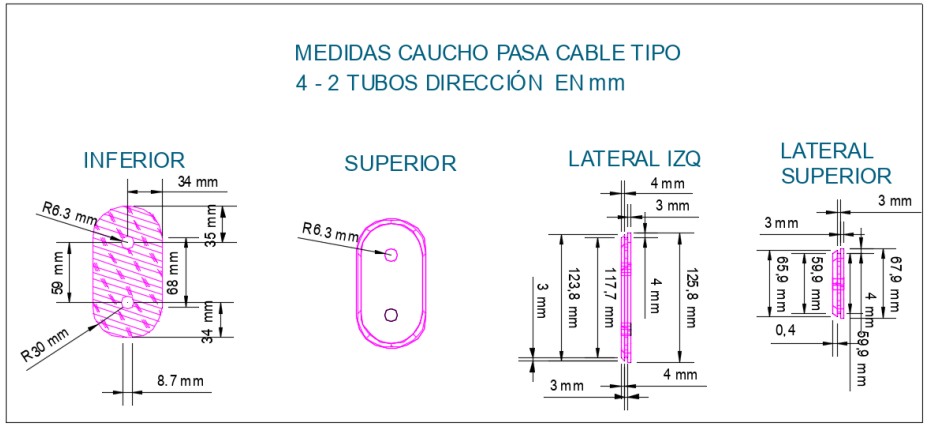
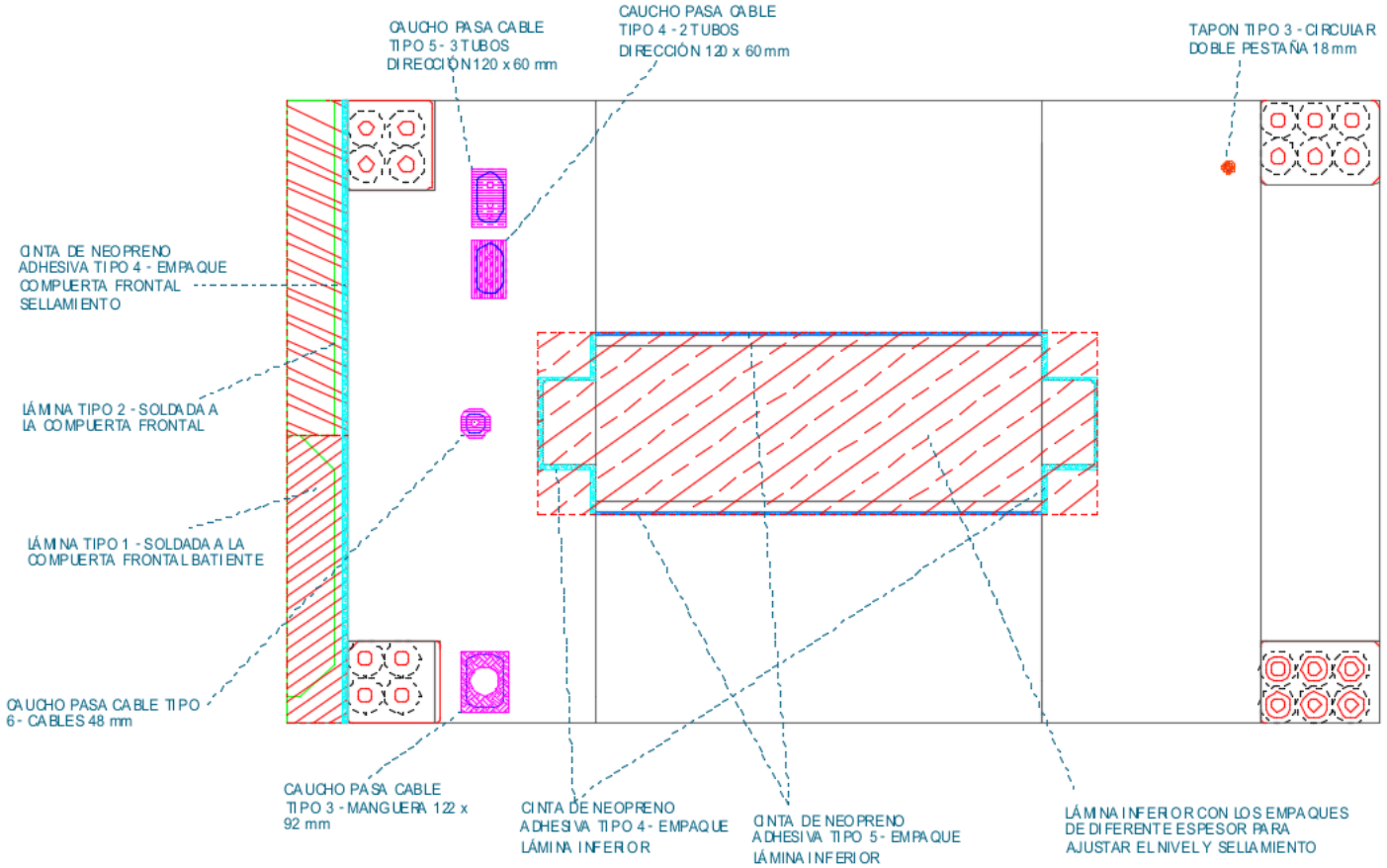
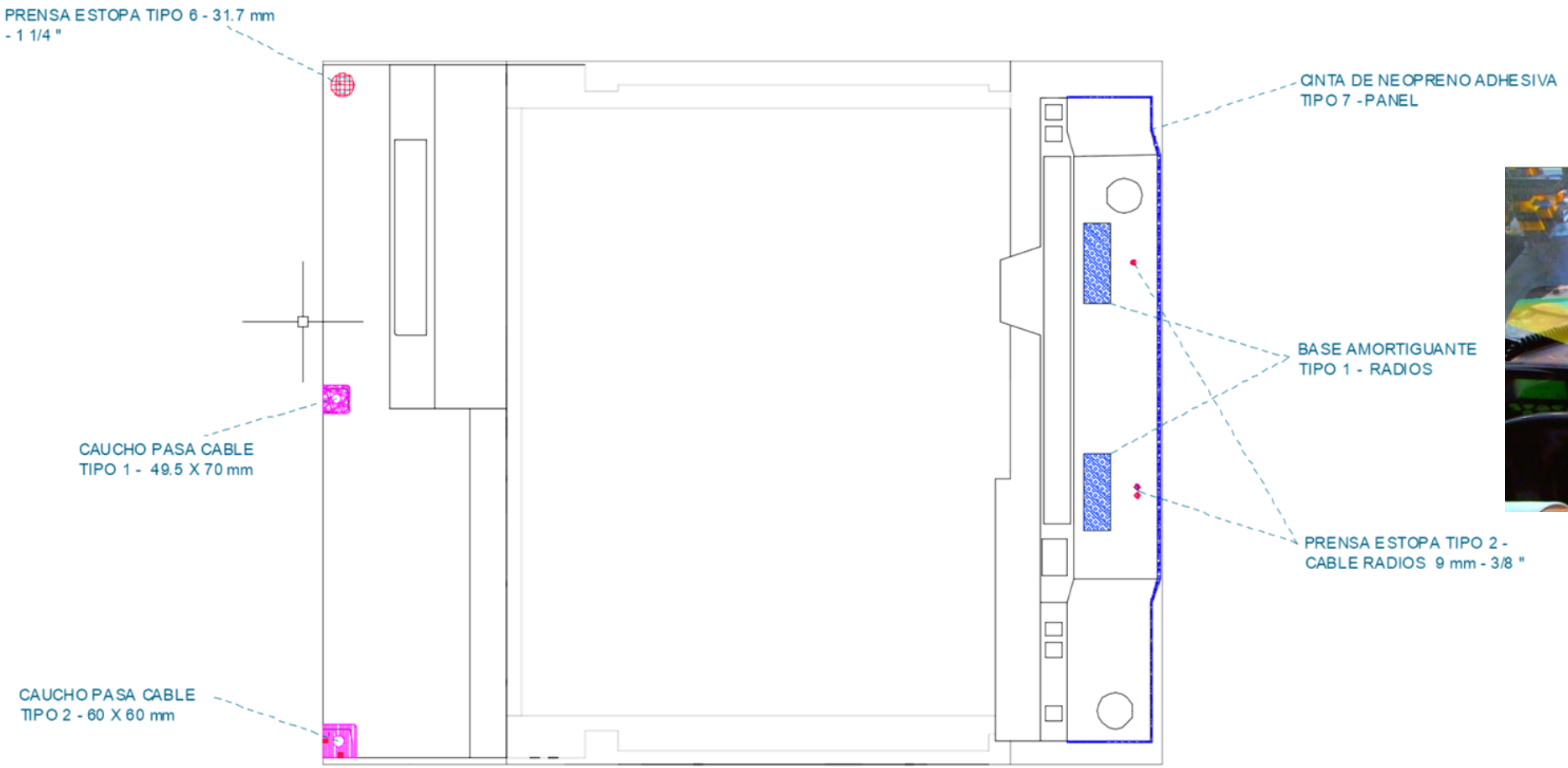
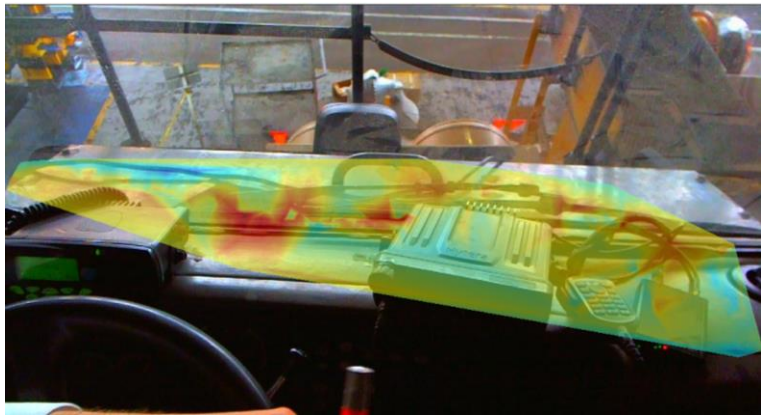




INGENIERÍA DE DETALLE





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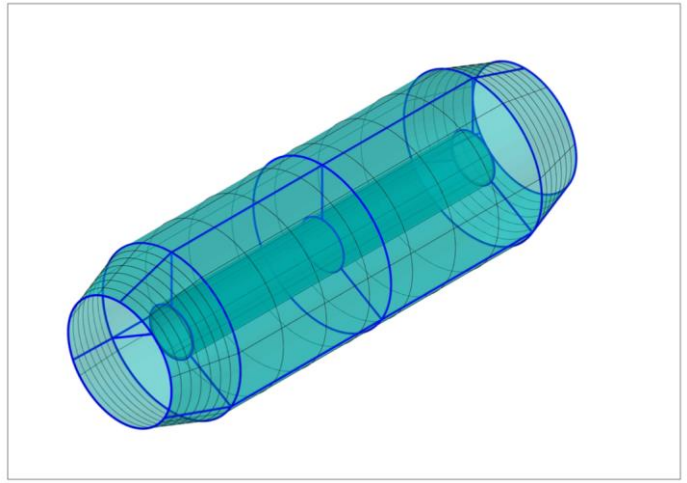
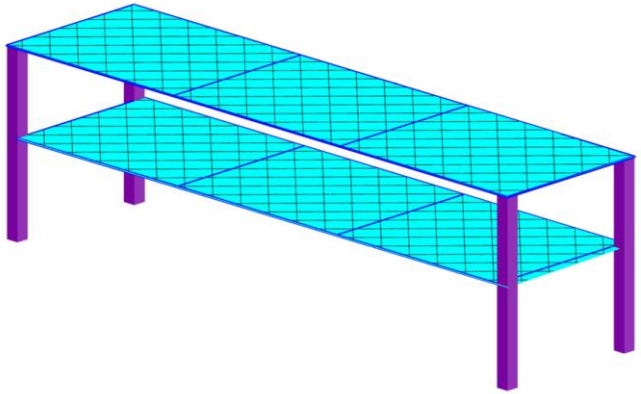
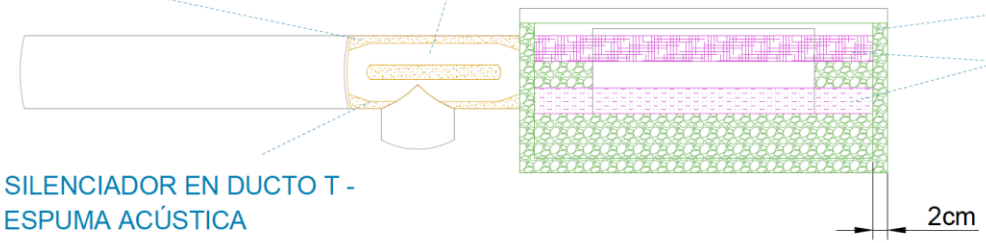
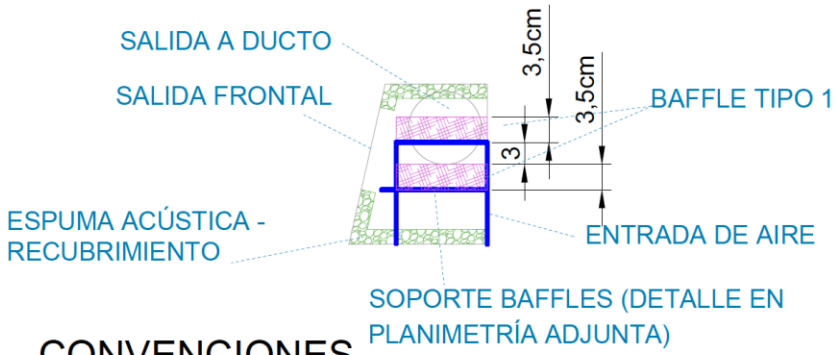




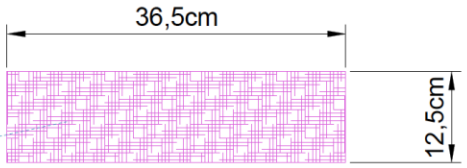
VISTA FRONTAL DEL DUCTO AA



VISTA LATERAL COMPARTIMIENTO



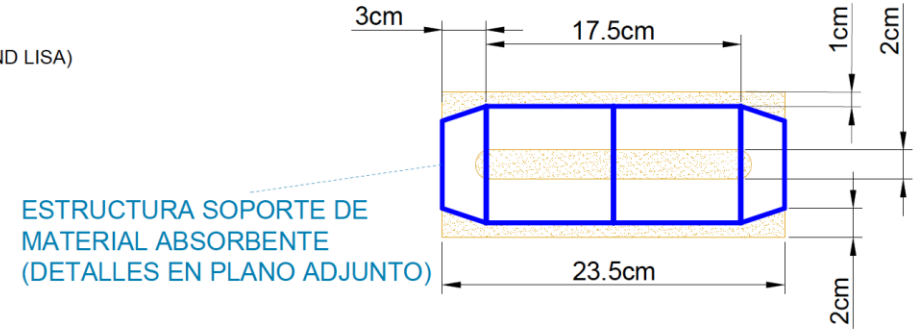
DETALLE BAFFLES PARALELOS



CONVENCIONES

- SILENCIADOR - ESPUMA ACÚSTICA (LOWSOUND LISA)
- RECUBRIMIENTO DEL COMPARTIMIENTO AA - ESPUMA ACÚSTICA (LOWSOUND LISA)
- BAFFLE ABSORBENTE TIPO 1 - ESPUMA ACÚSTICA (LOWSOUND LISA)
- BAFFLE ABSORBENTE TIPO 2 - ESPUMA ACÚSTICA (LOWSOUND LISA)

CORTE DEL SILENCIADOR INSTALADO EN DUCTO T



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PROYECTO

CONTROL DE RUIDO CABINAS CERREJÓN

REVISIÓN		
REV	MODIFICACIÓN	FECHA
0	Versión inicial	12/12/2019
1	Detalles silenciador	14/02/2019
2		

CONTIENE

Detalle de silenciador de Aire Acondicionado del camión de 240 toneladas.

DISEÑO
DIEGO MURILLO Ph.D.
MATRÍCULA PROFESIONAL
25341198153CND
COLABORADORES
JOSE CANO
DIBUJO
ALEJANDRO ARDILA

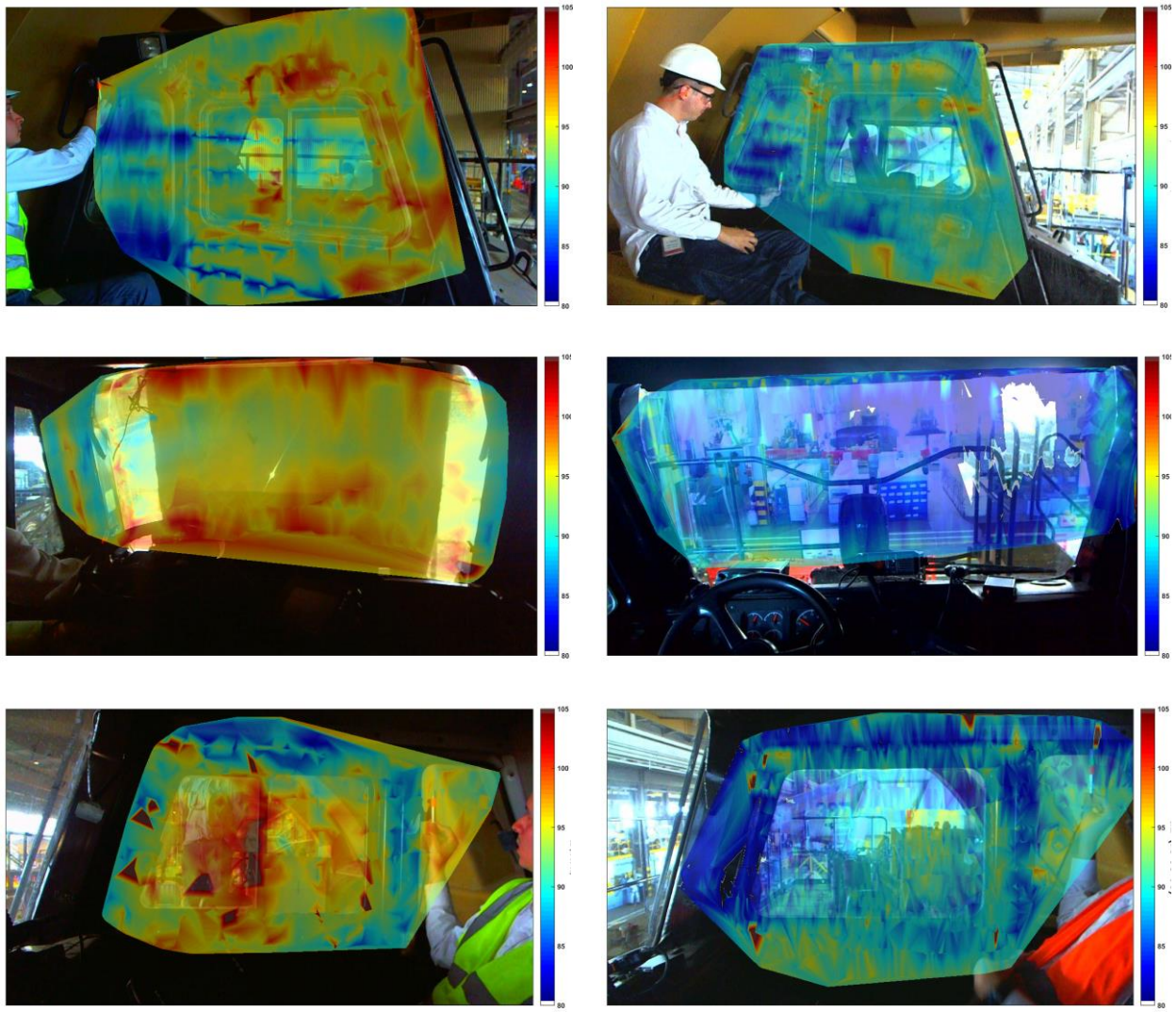
UNIDAD	FECHA
cm	12/12/2019
ARCHIVO	
PE5	

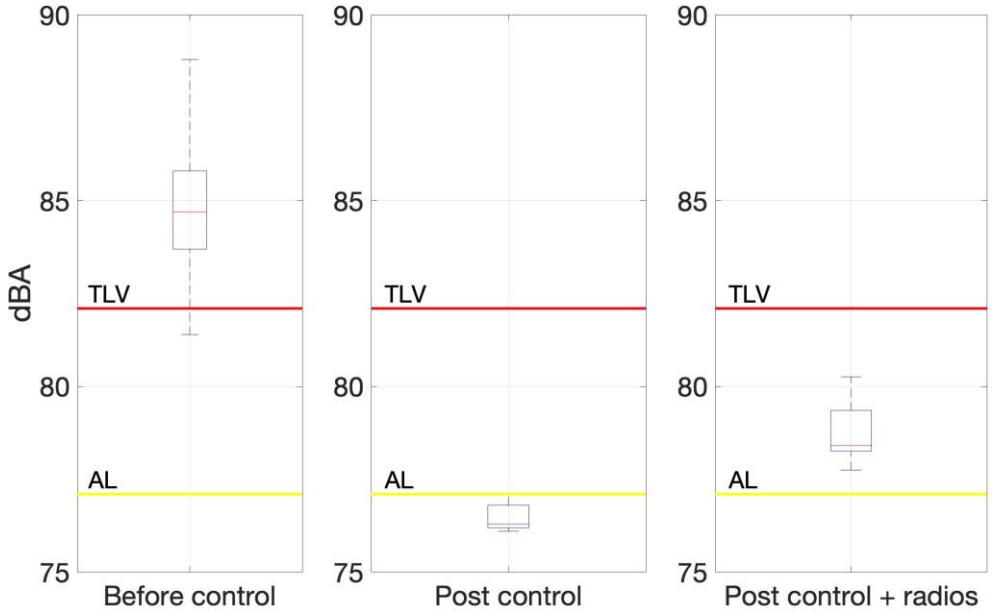
PLANO NO.
PE5-01

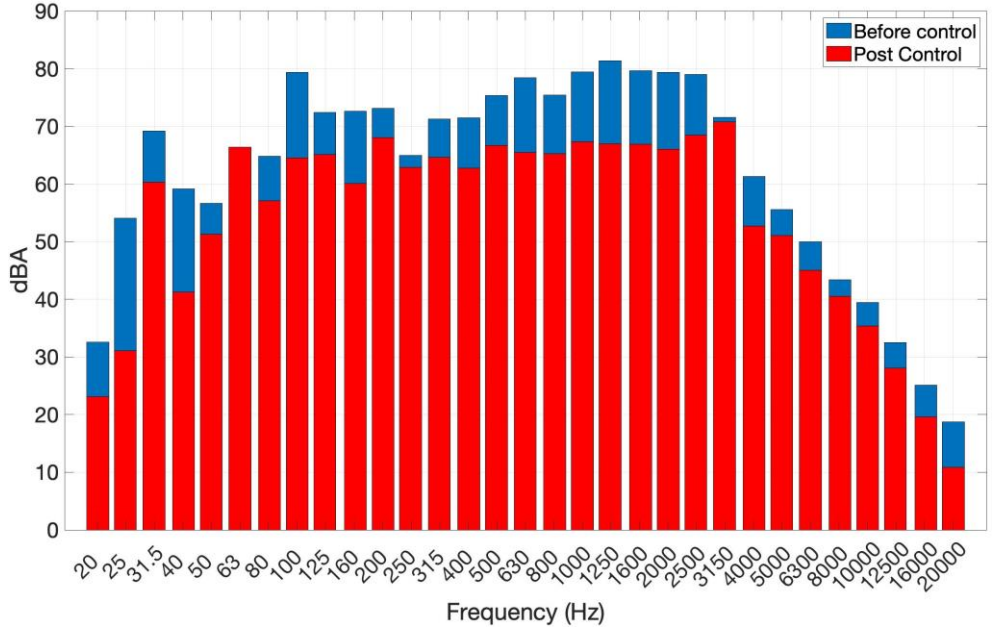
IMPLEMENTACIÓN

danosa
danosa
AFEX

RESULTADOS




90
85
80
75
dBA
TLV
AL
Before control
Post control
Post control + radios


Before control
Post Control
dBA
0
10
20
30
40
50
60
70
80
90
20 25 31.5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10000 12500 16000 20000
Frequency (Hz)

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bienestar para el mundo.

GRACIAS

Laboratorio acreditado por el IDEAM bajo Resolución 0019 del 10 de enero de 2017 para toma de muestra y análisis en la Matriz Aire. Con extensión del alcance bajo Resolución 1433 del 16 de diciembre de 2020, y prórroga del alcance de acreditación bajo radicado 20206010025021.

ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007
BUREAU VERITAS Certification

CCS Consejo Colombiano de Seguridad

RUC® Registro Uniforme para Contratistas

GOBERNACIÓN DE ANTIOQUIA
Secretaría Seccional de Salud y Protección Social de Antioquia
Licencia SO Nº 60090253

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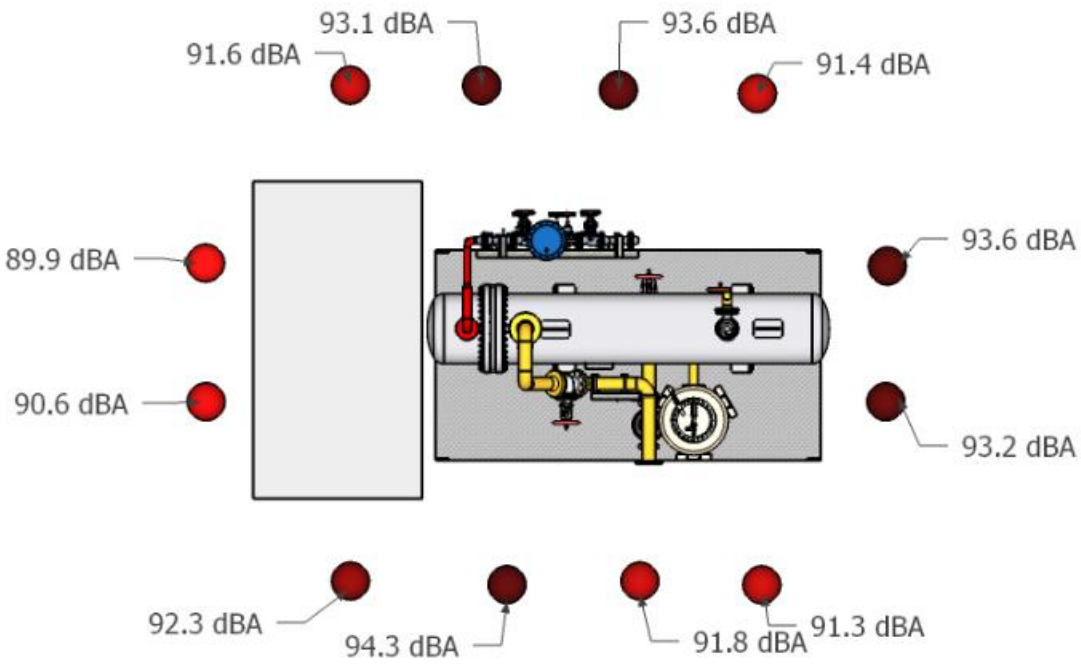
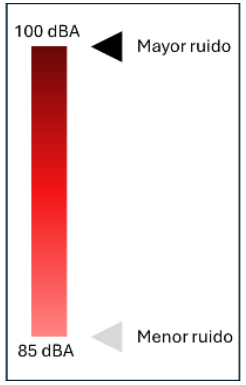
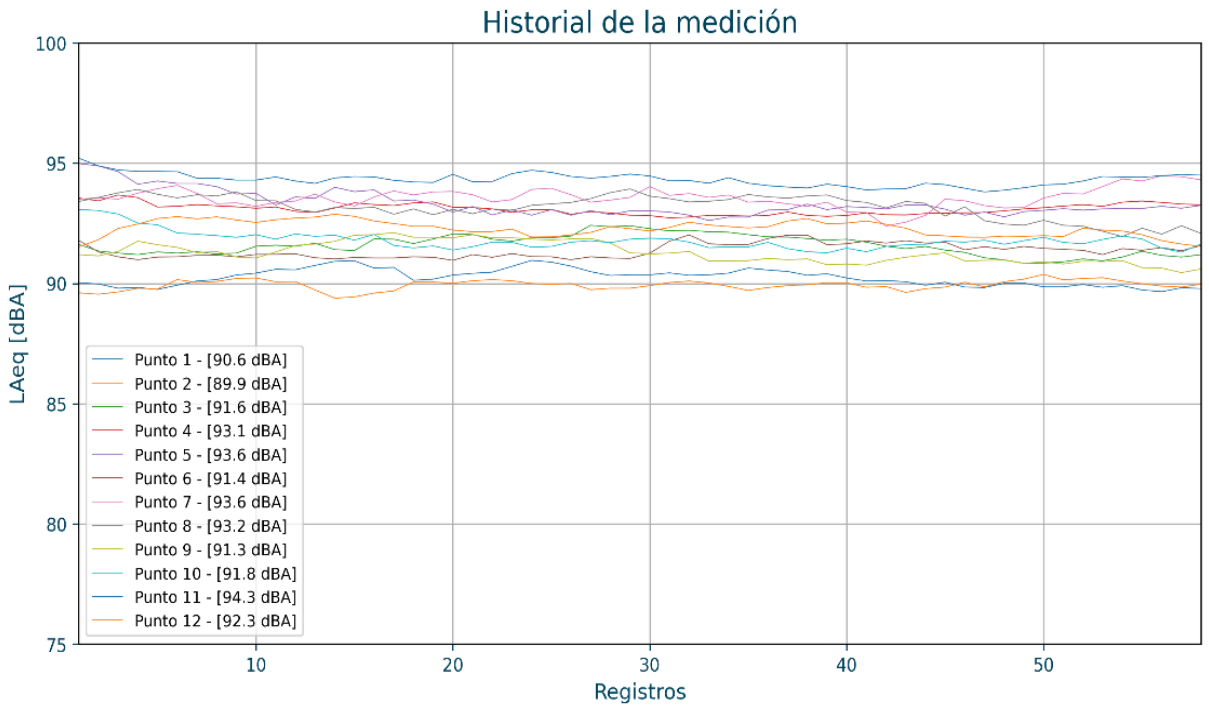
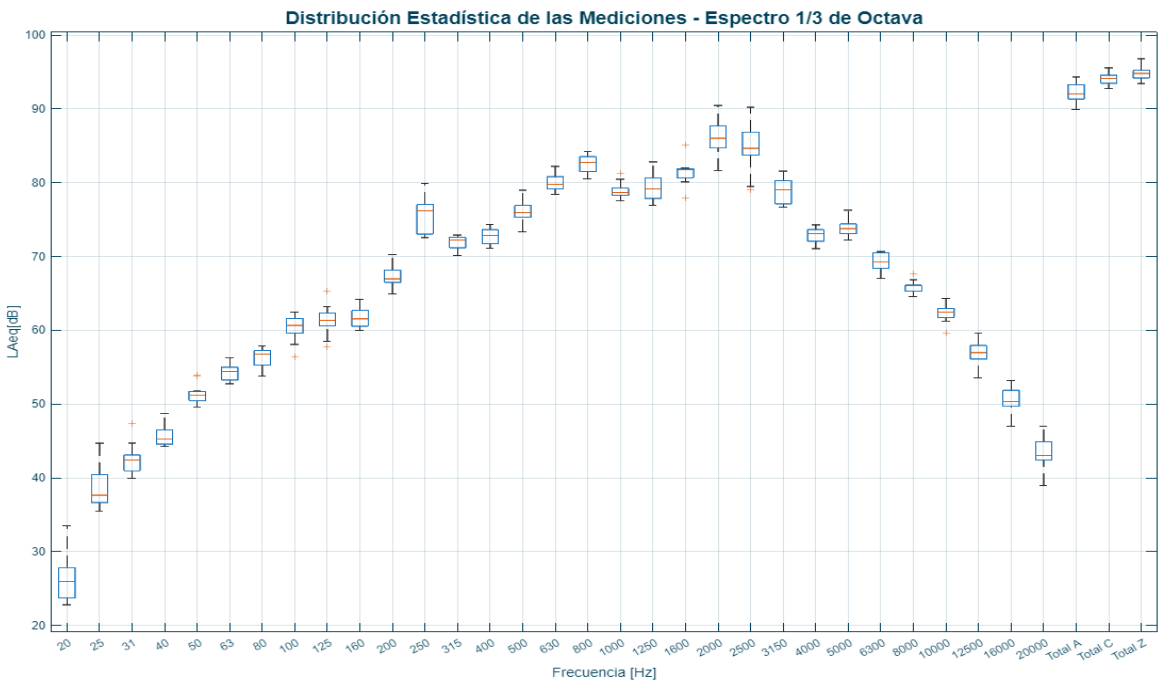
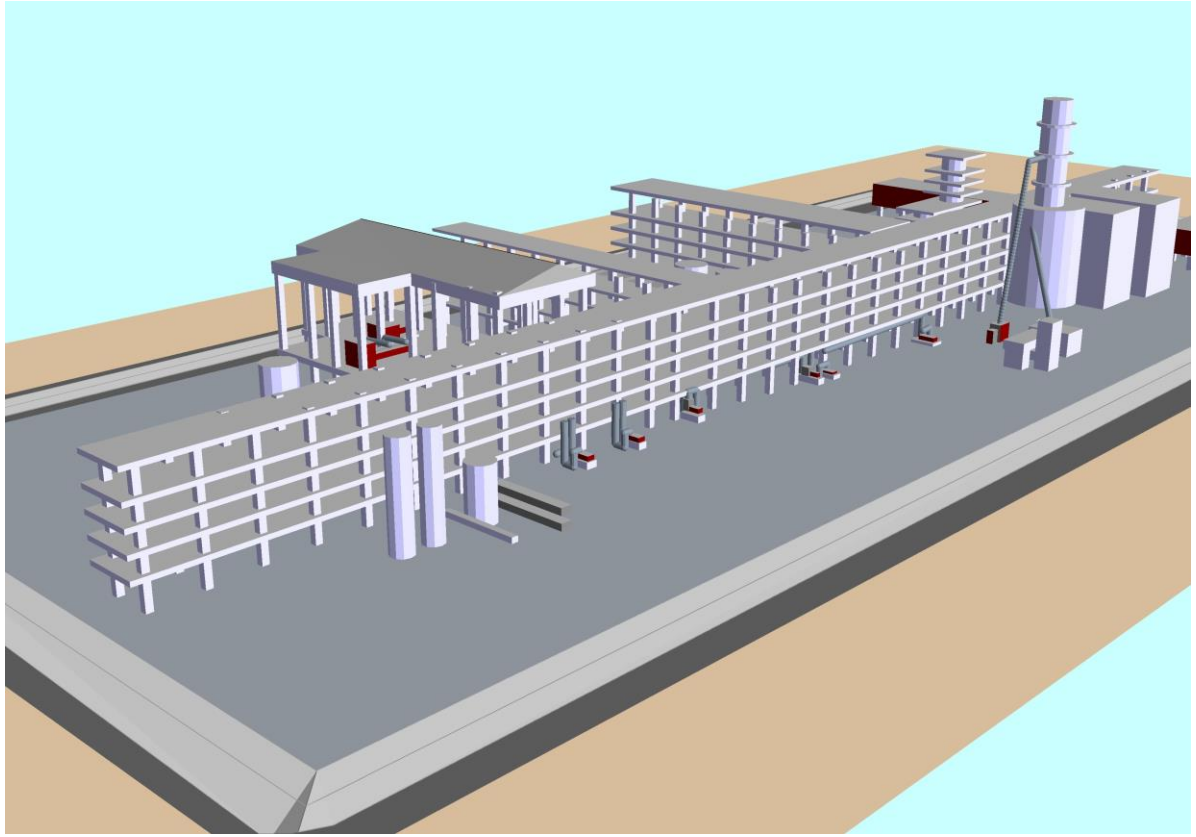
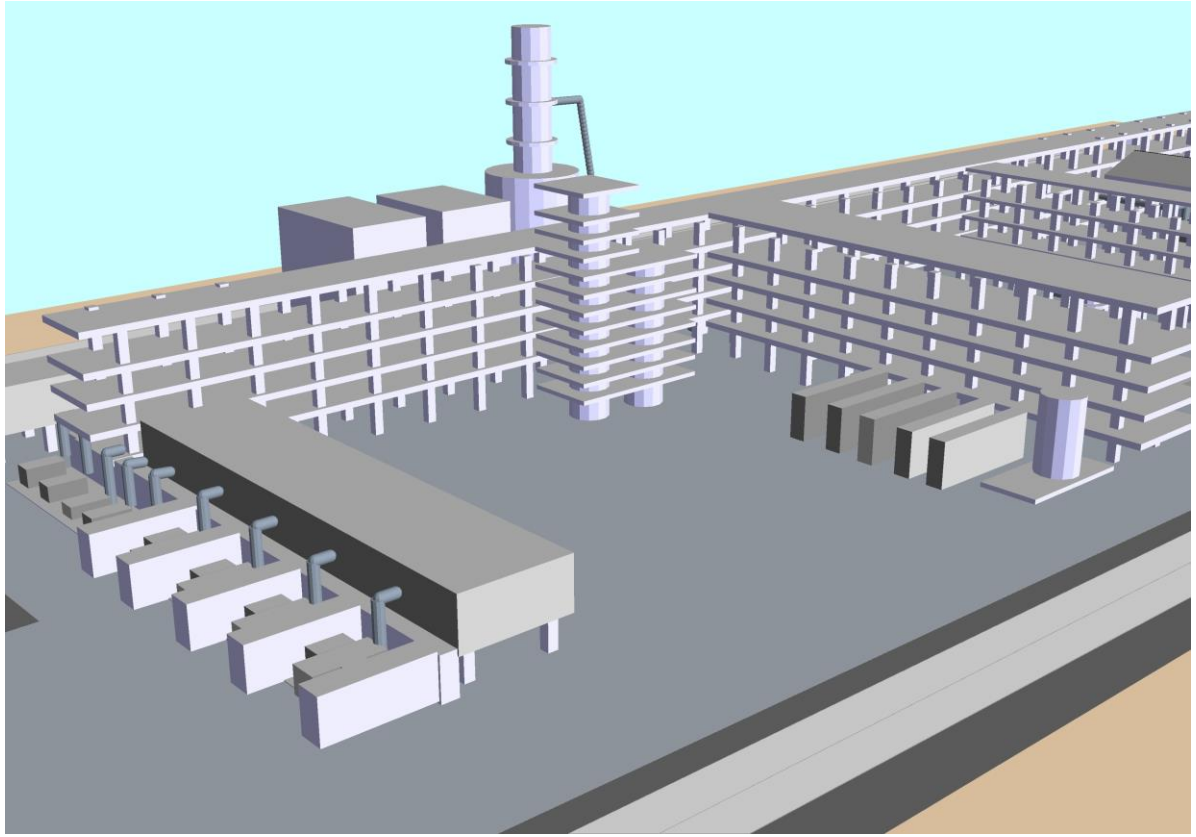

93.1 dBA
93.6 dBA
91.6 dBA
91.4 dBA
89.9 dBA
93.6 dBA
90.6 dBA
93.2 dBA
92.3 dBA
94.3 dBA
91.8 dBA
91.3 dBA

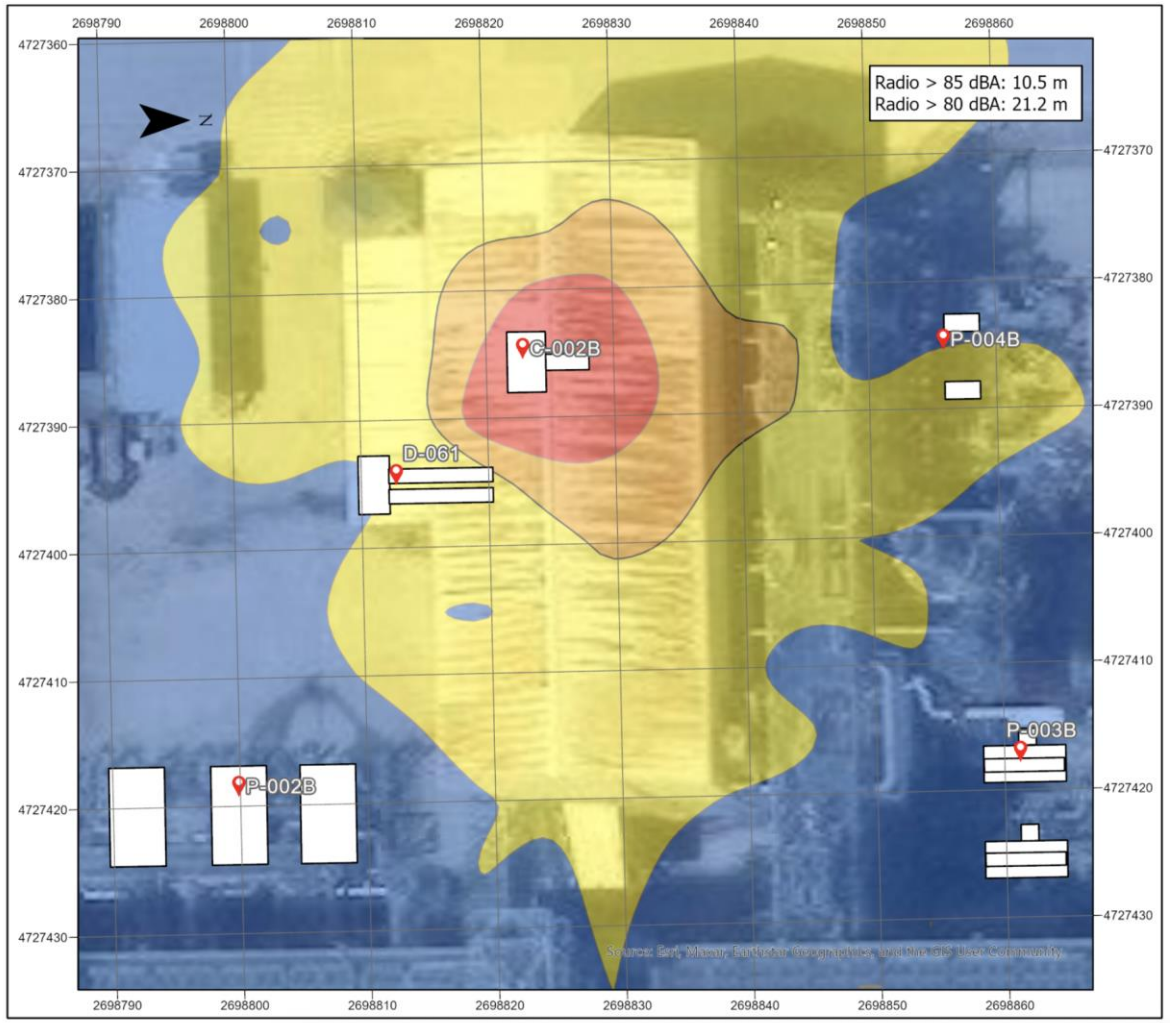

100 dBA
Mayor ruido
85 dBA
Menor ruido


Historial de la medición
LAeq [dBA]
Registros
100
95
90
85
80
75
10
20
30
40
50
Punto 1 - [90.6 dBA]
Punto 2 - [89.9 dBA]
Punto 3 - [91.6 dBA]
Punto 4 - [93.1 dBA]
Punto 5 - [93.6 dBA]
Punto 6 - [91.4 dBA]
Punto 7 - [93.6 dBA]
Punto 8 - [93.2 dBA]
Punto 9 - [91.3 dBA]
Punto 10 - [91.8 dBA]
Punto 11 - [94.3 dBA]
Punto 12 - [92.3 dBA]


Distribución Estadística de las Mediciones - Espectro 1/3 de Octava
LAeq[dB]
Frecuencia [Hz]
100
90
80
70
60
50
40
30
20
20 25 31 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000 10000 12500 16000 20000 Total A Total C Total Z







MAPA DE RUIDO COMPRESOR C-002B

ECOPETROL PLANTA HIDROCRACKEO REFINERIA CARTAGENA

CONVECCIONES

- Puntos de Interes
- Fuentes industriales

Nivel de presión sonora [dBA]

- 55 < ... < 70
- 70 < ... < 80
- 80 < ... < 85
- 85 < ...

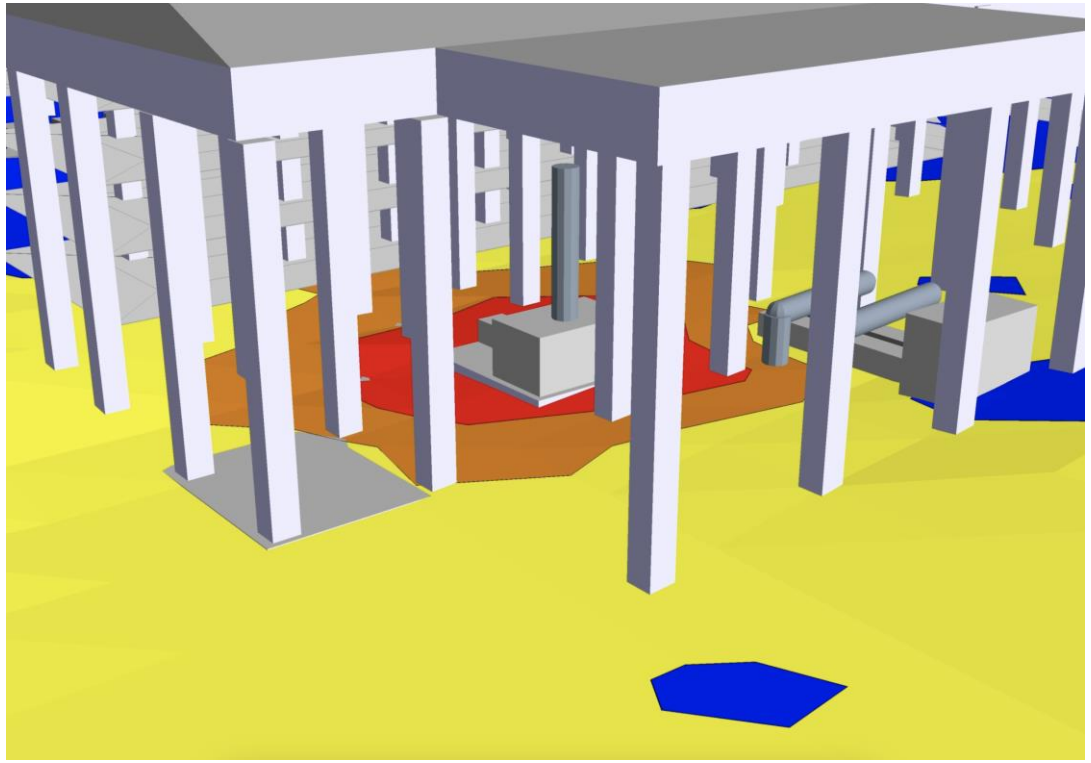
Elabora

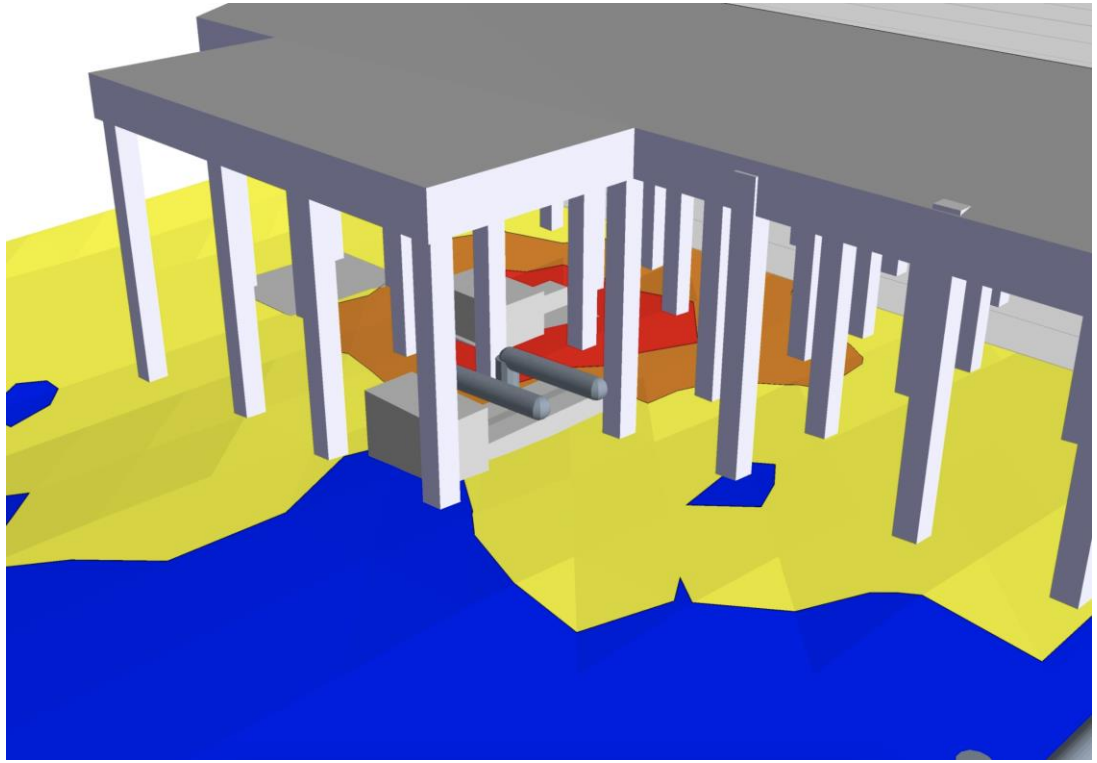
Conhintec

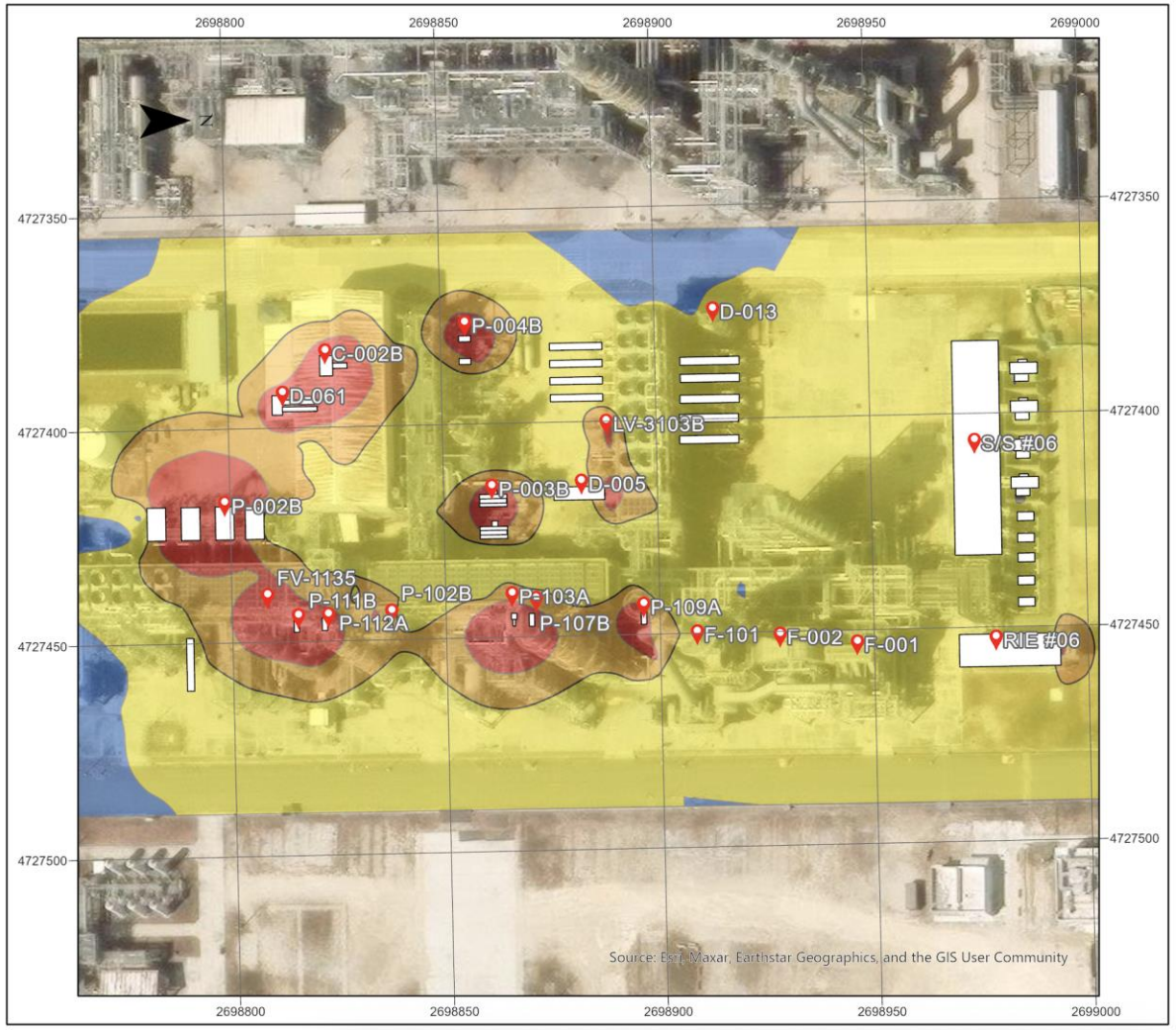
1:400

MAGNA-SIRGAS Origen-Nacional
Projection: Transverse Mercator
Central Meridian: -73,0000
Latitude of Origin: 4,0000
False Easting: 5.000.000,0000
False Northing: 2.000.000,0000
Scale Factor: 0,9992
Map Units: Meter

JULIO DE 2025







MAPA DE RUIDO INDUSTRIA TOTAL

ECOPETROL PLANTA HIDROCRACKEO REFINERIA CARTAGENA

CONVECCIONES

- Puntos de Interes
- Fuentes industriales

Total_Union_Dissolve

- 55 < ... < 70
- 70 < ... < 80
- 80 < ... < 85
- 85 < ...

Elabora

Conhintec

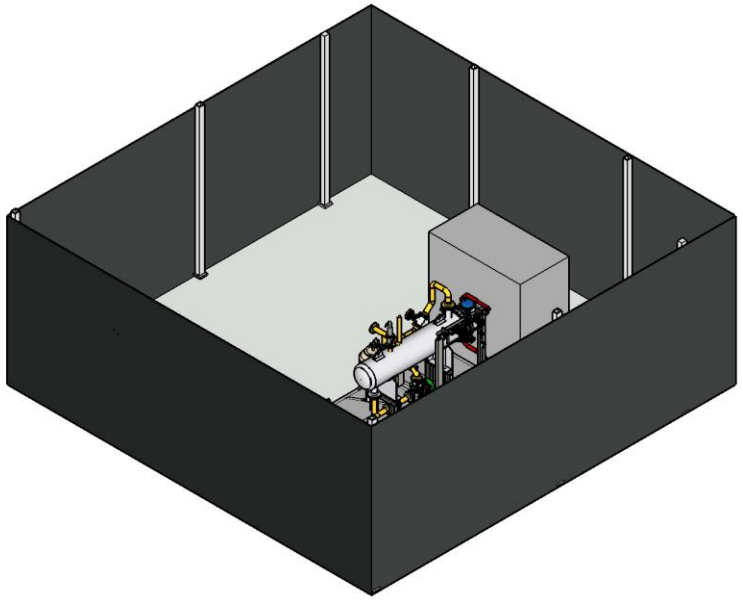
1:1.200

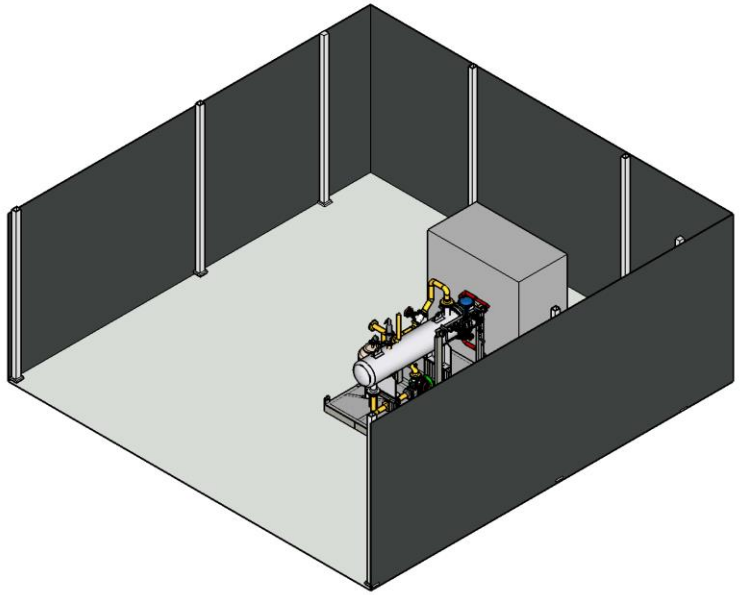
MAGNA-SIRGAS Origen-Nacional
Projection: Transverse Mercator
Central Meridian: -73,0000
Latitude of Origin: 4,0000
False Easting: 5.000.000,0000
False Northing: 2.000.000,0000
Scale Factor: 0,9992
Map Units: Meter

JULIO DE 2025

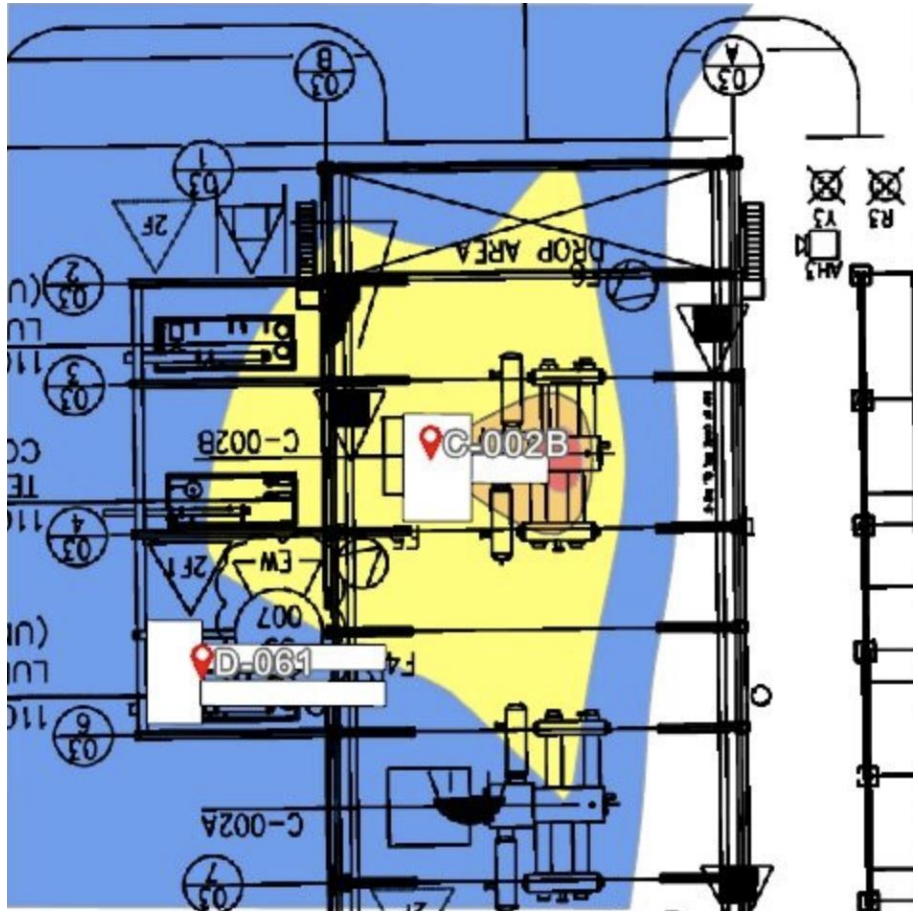
Fuente de ruido	Nivel de presión sonora [dBA]	Radio de exposición [m] TLV (85 dBA)	Radio de exposición [m] AL (80 dBA)	Target de atenuación [dB]
Bomba P-107B	99,0	7,3	12,3	15,0
Bomba P-002B	98,3	19,0	32,0	14,3
Compresor D-061	96,7	9,7	16,0	12,7
Compresor C-002B	94,3	9,5	18,6	10,3
Bomba P-112A	94,1	5,5	9,5	10,1
Bomba P-111B	93,5	4,5	7,6	9,5
Bomba P-109A	91,4	3,8	5,9	7,4
Bomba P-003B	91,3	7,0	10,8	7,3
Bomba P-004	90,7	5,3	9,6	6,7
Entre los tubos D-005	89,5	2,2	6,0	5,5
Bomba P-102B	89,1	1,6	5,5	5,1
FV-1135	89,1	4,0	7,0	5,1
LV-3103B	88,2	2,8	6,0	4,3
Bomba P-103A	87,3	3,0	7,0	3,3

Barrera acústica
Lámina de acero

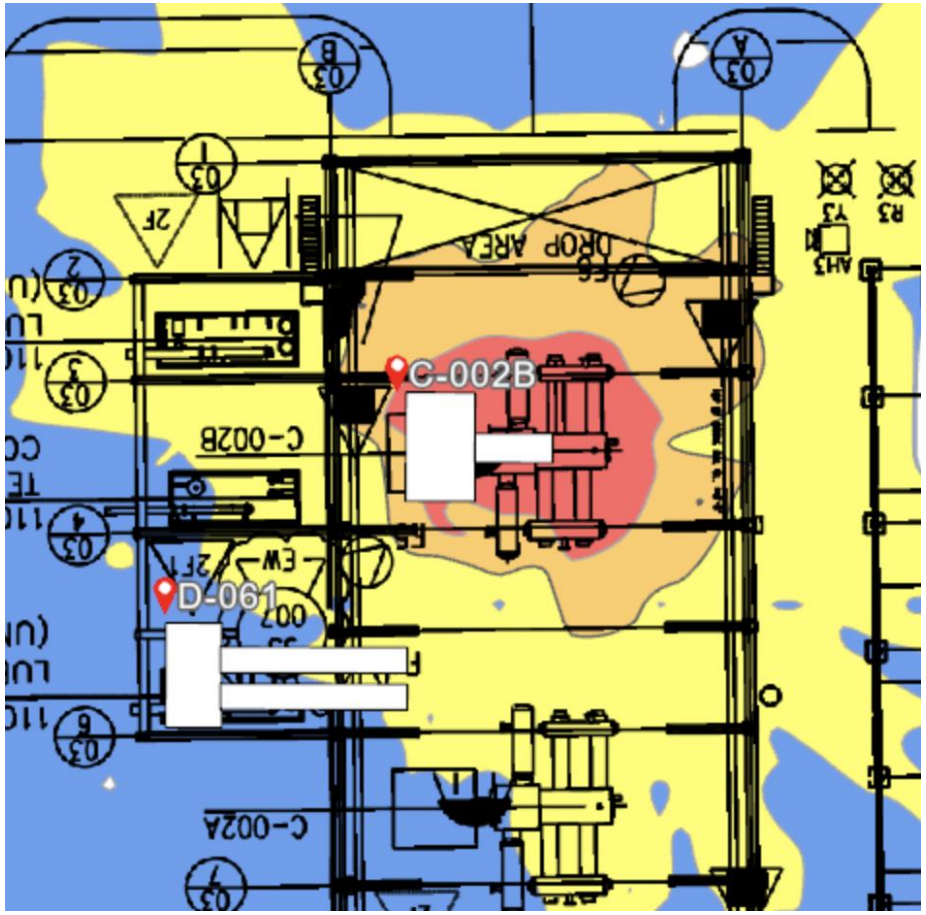




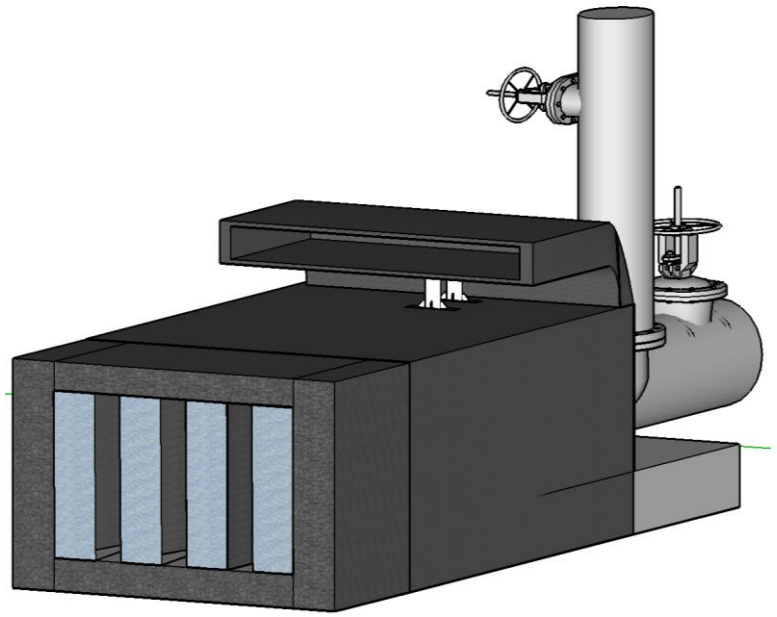
Cerramiento completo

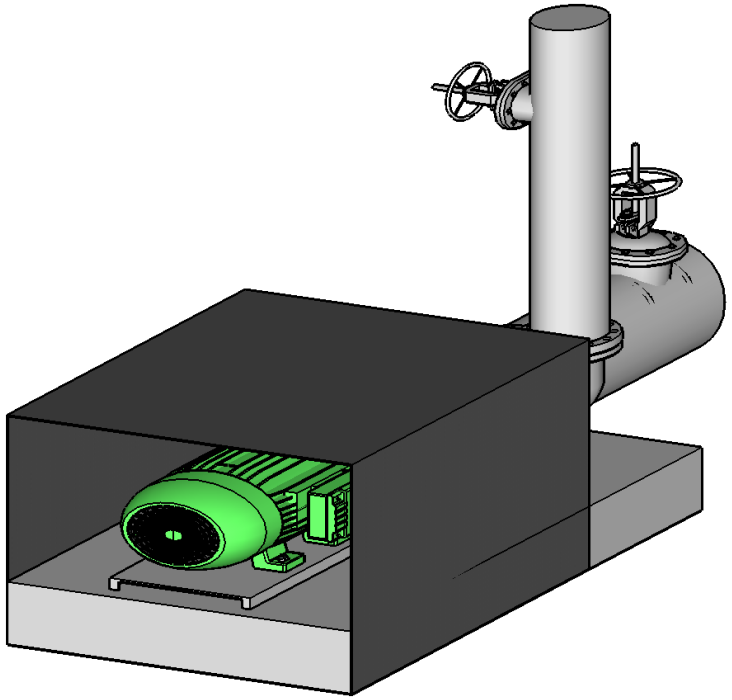


Cerramiento parcial

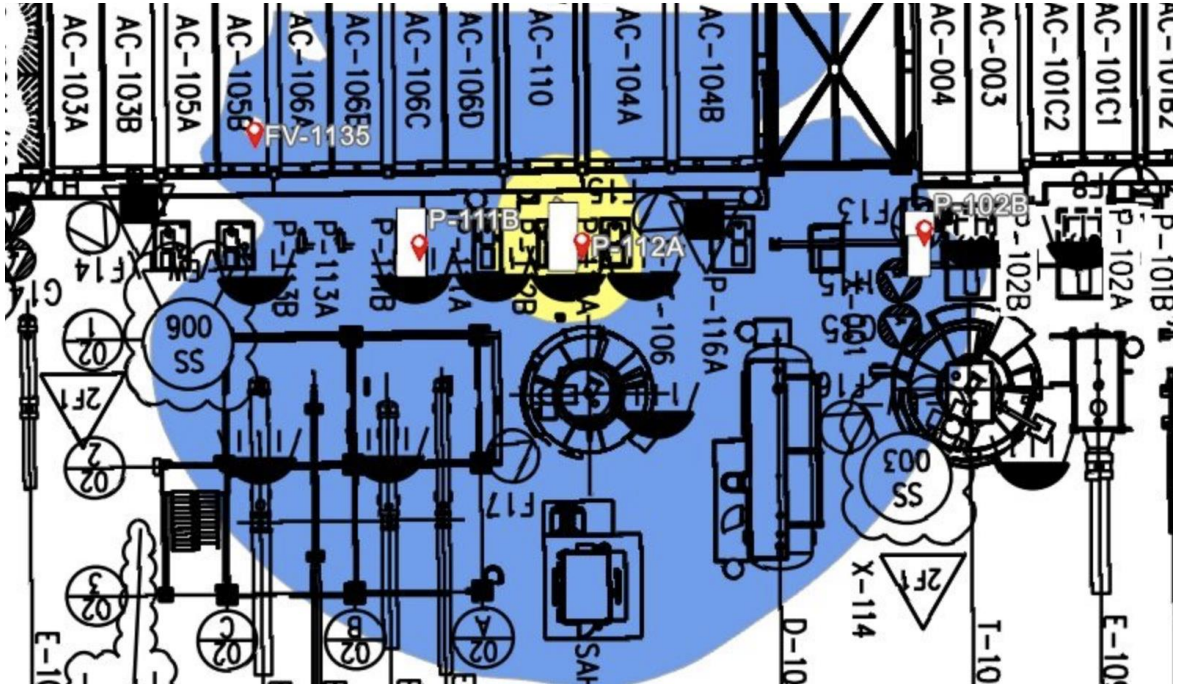


Barrera acústica
P-112 A





Cerramiento completo



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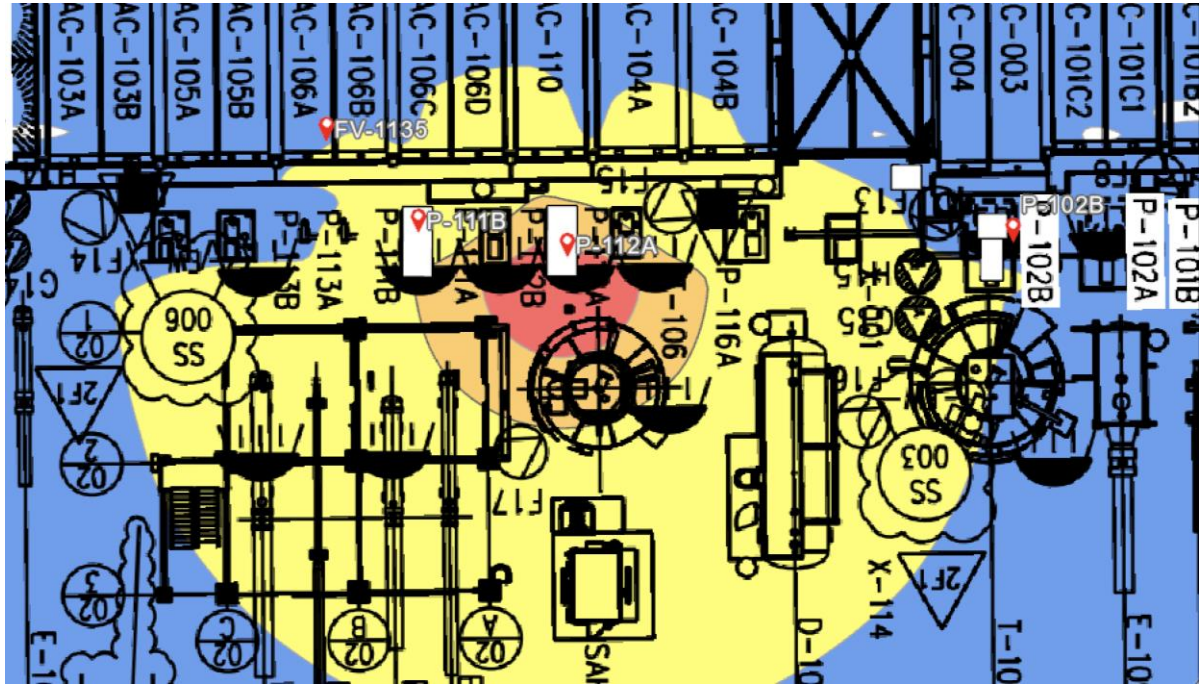
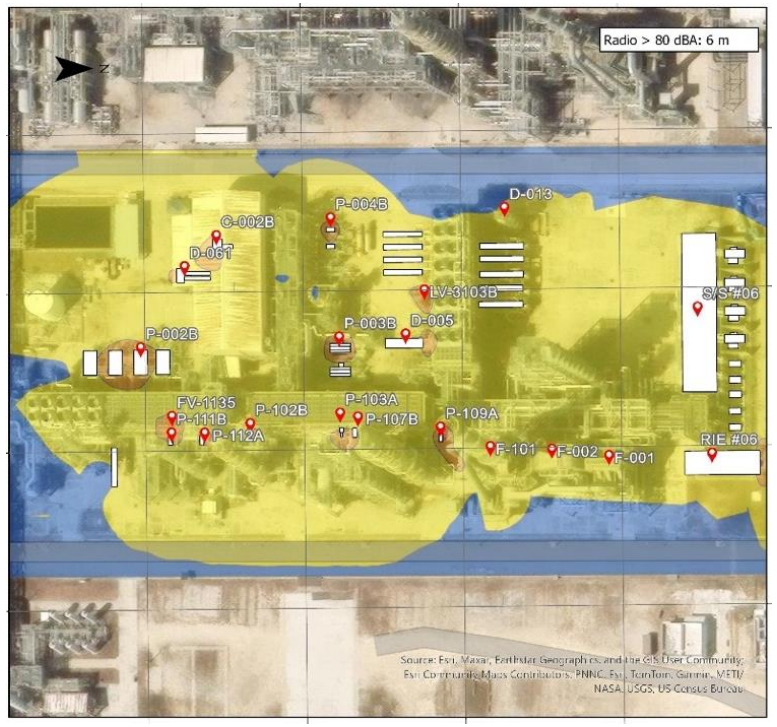


Cerramiento completo



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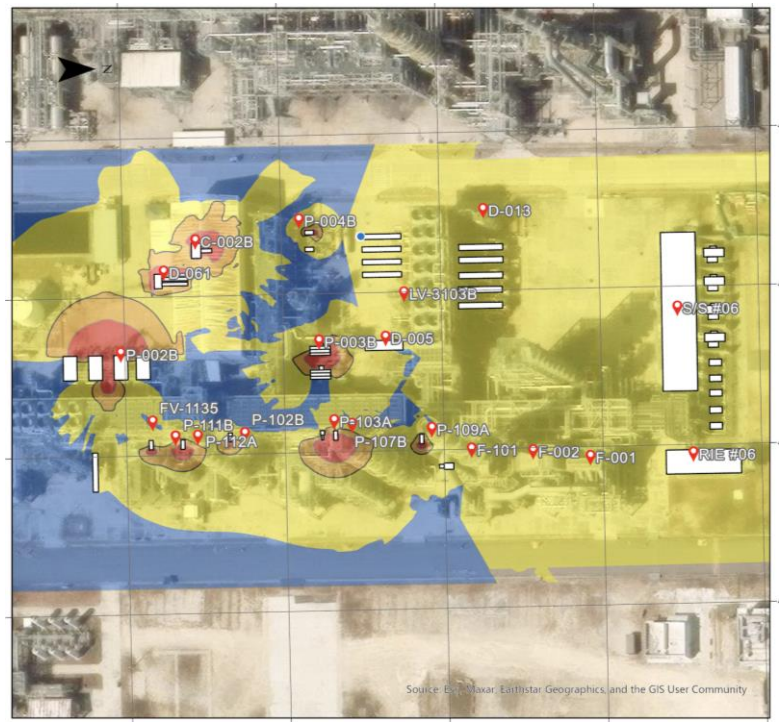
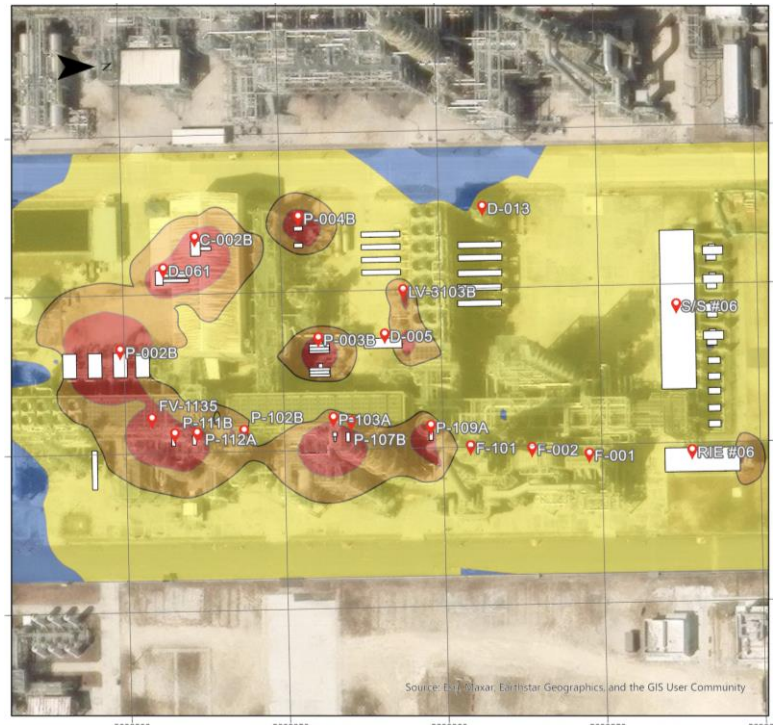
Línea base