GRANTHAM ENGINEERING

Civil • Mechanical • Marine

STRUCTURAL CALCULATIONS FOR

LIFTING DEVICE #DL-426
(LIFTING DEVICE FOR RIMS)

FOR

KENWORTH MEXICANA,
S.A. DE C.V.
MEXICALI, BAJA
CALIFORNIA, MEXICO

SEPTEMBER 18, 2019

Prepared By:

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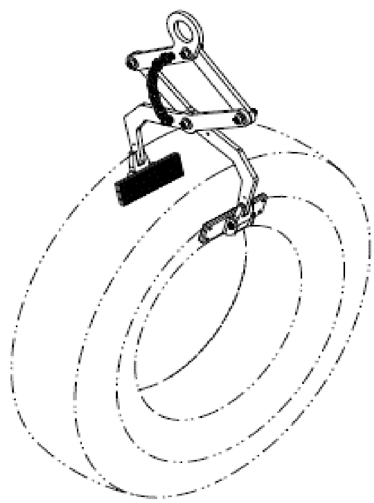
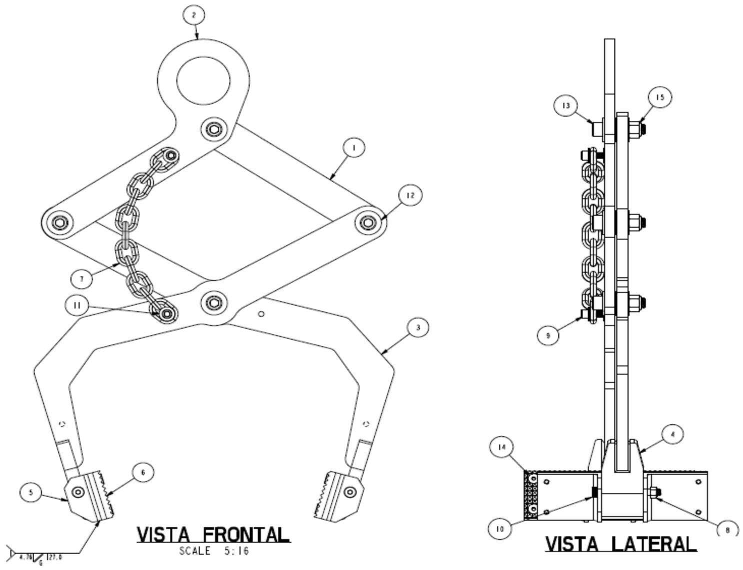
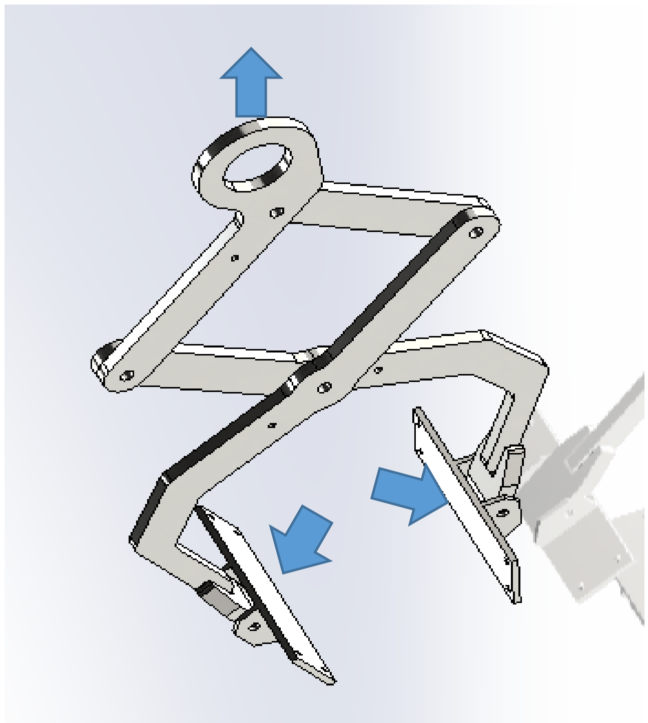
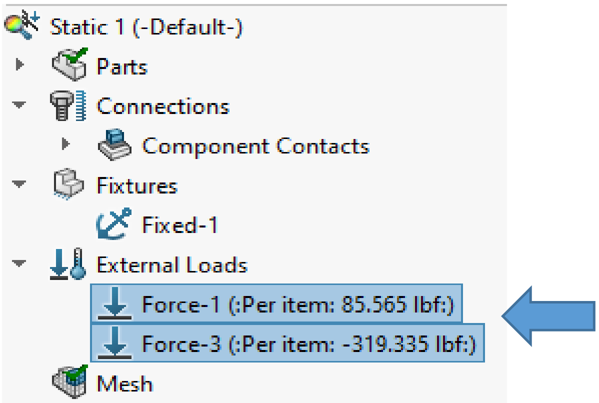
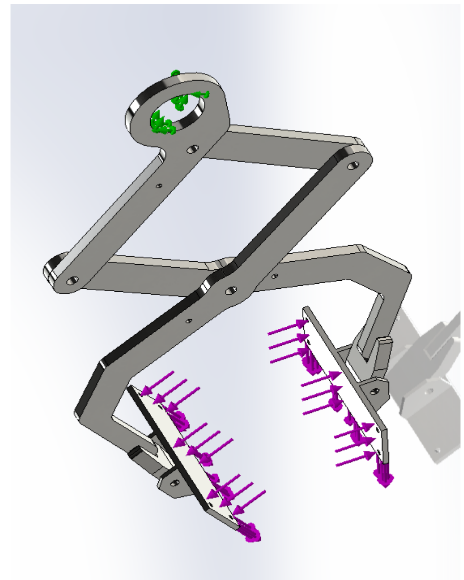
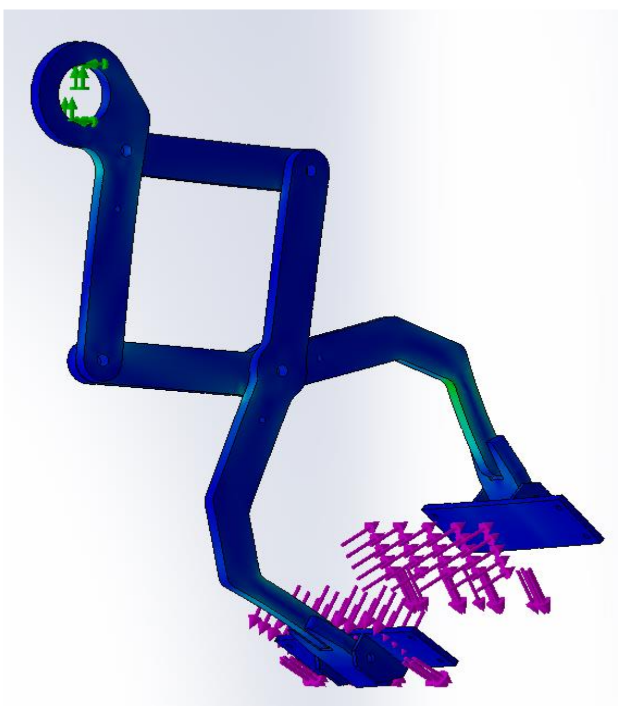
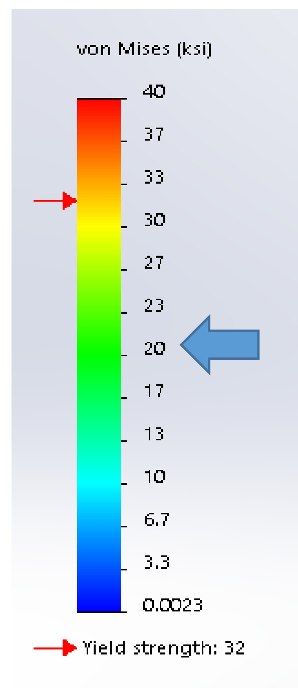
San Diego, CA 92120
(619) 994-0748

<table>
<tr><td>1</td><td>Structural Calculations for DL-426 (Lifting Device for Rims)</td></tr>
<tr><td>2</td><td>Summary of Analysis: Lifting Device is rated for 100 kg (220.4 lbs) Service Class 4</td></tr>
<tr><td>3</td><td>
<table>
<tr><th colspan="3">CERTIFICACION</th></tr>
<tr><td colspan="3">DISPOSITIVO DE LEVANTE PARA LLANTAS</td></tr>
<tr><td>ALTA:</td><td></td><td rowspan="8"></td></tr>
<tr><td>No. HERRAMIENTA:</td><td>DL-426</td></tr>
<tr><td>PESO:</td><td>12 KG</td></tr>
<tr><td>CAPACIDAD:</td><td>100 KG</td></tr>
<tr><td>PRUEBA:</td><td>125 KG</td></tr>
<tr><td>LOCACION:</td><td>ENSAMBLE II</td></tr>
<tr><td>CATEGORIA</td><td>B</td></tr>
<tr><td>SERVICIO</td><td>4</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>
VISTA ISOMETRICA
SCALE 7:80</td></tr>
<tr><td>5</td><td>Basis of Analysis: The overall lifting device is analyzed using Solidworks simulation.</td></tr>
</table>

<table>
<tr><td>6</td><td colspan="3">Drawing of Lifting Device</td></tr>
<tr><td>7</td><td colspan="3">
</td></tr>
<tr><td>8</td><td colspan="3">Code Reference: ASME BTH-1-2017, Below the Hook Lifting Devices; issued March 15, 2017</td></tr>
<tr><td>9</td><td>Service Class</td><td>4</td><td>Per Drawing</td></tr>
<tr><td>10</td><td colspan="3">Table 2-3-1 Service Class
<table>
<tr><th>Service Class</th><th>Load Cycles</th></tr>
<tr><td>0</td><td>0–20,000</td></tr>
<tr><td>1</td><td>20,001–100,000</td></tr>
<tr><td>2</td><td>100,001–500,000</td></tr>
<tr><td>3</td><td>500,001–2,000,000</td></tr>
<tr><td>4</td><td>Over 2,000,000</td></tr>
</table></td></tr>
<tr><td>11</td><td>Design Category</td><td>B</td><td>Lifters shall be designed to Design Category B, unless a qualified person determines that Design Category A is appropriate or that Design Category C is required for a special application.</td></tr>
<tr><td>12</td><td>Nominal Design Factor, N_d</td><td>3</td><td>Safety Factor for Static Strength Design</td></tr>
<tr><td>13</td><td>Nominal Design Factor, N_{dd}</td><td>3.6</td><td>The Safety Factor for Connections</td></tr>
<tr><td>14</td><td colspan="3">Design Factor = the ratio of the limit state stress (es) or strength of an element to the permissible internal stress (es) or forces created by the external force (s) that act upon the element. (section 1-2).</td></tr>
<tr><td>15</td><td colspan="3">3-1.3 Static Design Basis

(17) 3-1.3.1 Nominal Design Factors. The static strength design of a below-the-hook lifting device shall be based on the allowable stresses defined in sections 3-2 and 3-3. The minimum values of the nominal design factor, N_d, in the allowable stress equations shall be as follows:
N_d = 2.00 for Design Category A lifters
= 3.00 for Design Category B lifters
= 6.00 for Design Category C lifters</td></tr>
</table>

16	*(b)* Design factors for Design Category B lifting devices shall be not less than 3.00 for limit states of yielding or buckling and 3.60 for limit states of fracture and for connection design.		
17	Job Load, J_{load} (kg)	100.0	Weight lifted by device (defined by client on drawings)
18	Job Load, J_{load} (lbs)	220.4	J_{load} x 2.2 lbs/kg
19	Using Solidworks, a model is created of the handling device		
20			
21	Rated Force on Upper Connection Point, F (lbs)	220.4	Job Load
22	Design factor, Df	3	For Structure
23	Applied Force, AF (lbs)	661.20	F x Df
24	Applied Force per Load Point Aft, (lbs)	330.60	AF/2

25	Apply the load to the Model using Solidworks Simulation		
26	 		
27	Run the Model		
28	 		
29	Max Von Mises Stress, Fm (ksi)	20.00	See above
30	Yield Strength of Material, Fy (ksi)	60.20	4140 Alloy Steel
31	Safety Factor	3.01	Fy/Fm = 1 OK

32	**Fatigue Analysis**
33	Worst case is the top of the lifting device. (shown in solidworks simulation above). See Fatigue Stress Categories below (Ref. Table 3-4.4.1, ASME BTH-1-2017):

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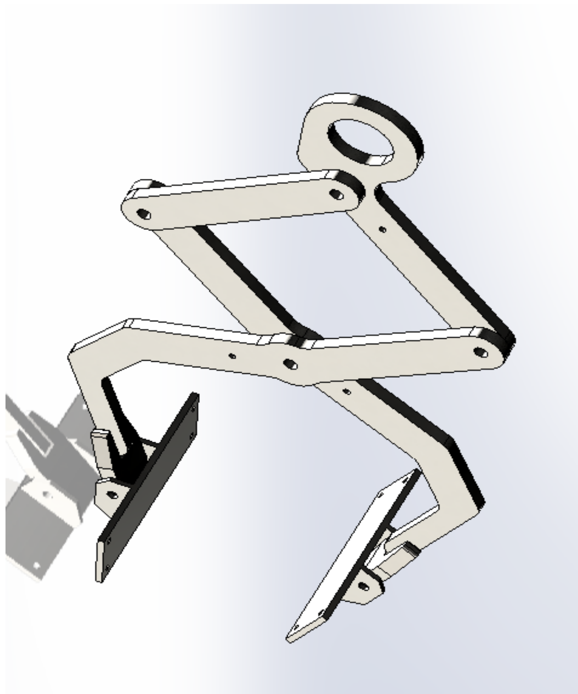

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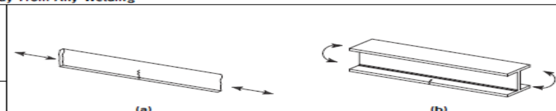
Description	Stress Cate-gory	Constant, C_f	Threshold, F_{TH}, ksi (MPa)	Potential Crack Site Initiation	Illustrative Typical Examples
Section 1 — Plain Material Away From Any Welding					
1.1 Base metal, except noncoated weathering steel, with rolled or cleaned surface. Flame-cut edges with surface roughness value of 1,000 μin. (25 μm) or less, but without re-entrant corners.	A	250×10^8	24 (165)	Away from all welds or structural connections	
1.2 Noncoated weathering steel base metal with rolled or cleaned surface. Flame-cut edges with surface roughness value of 1,000 μin. (25 μm) or less, but without re-entrant corners.	B	120×10^8	16 (110)	Away from all welds or structural connections	

36	Max Rated Load, W_{max} (lbs)	220.4	***Assumed loading 100% of time***
37	Max Rated Lift Point Load, W_{mc} (lbs)	110.20	$W_{max/2}$
38	Service Class	4	Per drawing

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Table 2-3-1 Service Class

Service Class	Load Cycles
0	0–20,000
1	20,001–100,000
2	100,001–500,000
3	500,001–2,000,000
4	Over 2,000,000

40	Allowable Stress Range, Fs (ksi)	16.0	Table 3-4.3-1, based on Service Class and worst case Stress Category for fatigue

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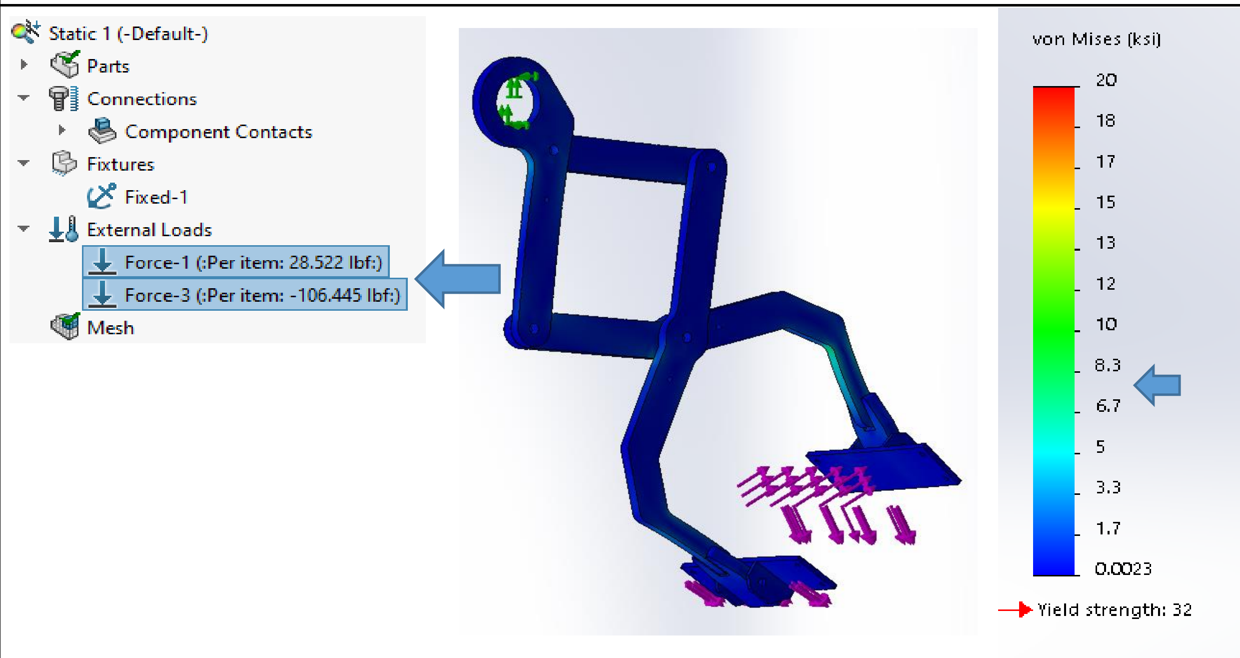
Table 3-4.3-1 Allowable Stress Ranges, ksi (MPa)

Stress Category (From Table 3-4.4-1)	Service Class 1	Service Class 2	Service Class 3	Service Class 4
A	63 (435)	37 (255)	24 (165)	24 (165)
B	49 (340)	29 (200)	18 (125)	16 (110)
B'	39 (270)	23 (160)	15 (100)	12 (80)
C	35 (240)	21 (145)	13 (90)	10 (70) [Note (1)]
D	28 (190)	16 (110)	10 (70)	7 (48)
E	22 (150)	13 (90)	8 (55)	5 (34)
E'	16 (110)	9 (60)	6 (40)	3 (20)
F	15 (100)	12 (80)	9 (60)	8 (55)
G	16 (110)	9 (60)	7 (48)	7 (48)

NOTE:
(1) Flexural stress range of 12 ksi (80 MPa) permitted at the toe of stiffener welds on flanges.

42



43	Actual Stress, F_a (ksi)	7	See above, loading is also a conservative assumption
44	Safety Factor	2.29	$F_s/F_a > 1$ OK

45	**Connection Weld Analysis -Top Lift Tab**		

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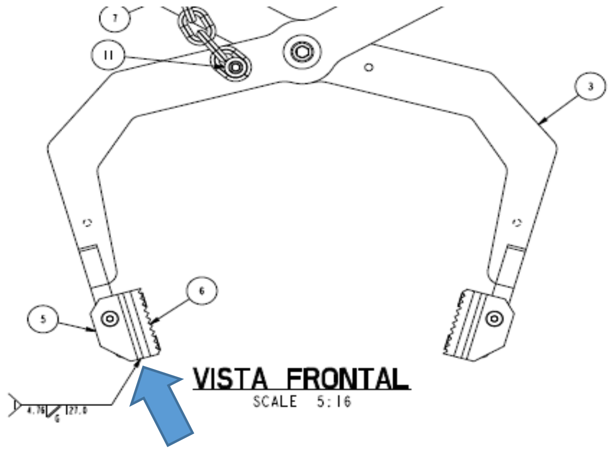

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(b) The design strength of fillet or partial-joint-penetration groove welds subject to shear shall be equal to the effective area of the weld multiplied by the allowable stress F_v given by eq. (3-55). Stresses in the base metal shall not exceed the limits defined in section 3-2.

$$F_v = \frac{0.60Exx}{1.20N_d} \qquad (3\text{-}55)$$

48	Allowable Stress, F_v (ksi)	11.667	See above Eqn. 3-55
49	Nominal Tensile Strength of weld material, E_{xx} (ksi)	70	Typical Value

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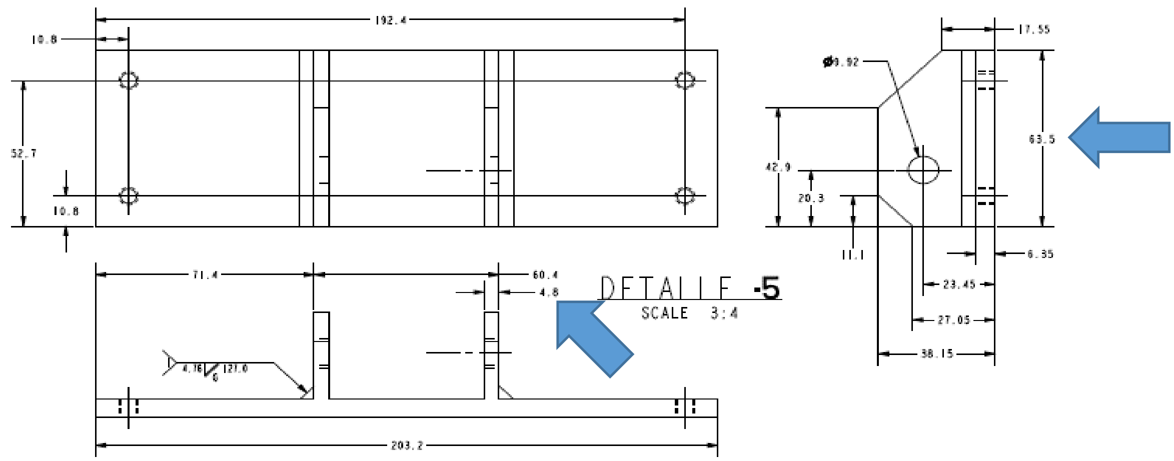
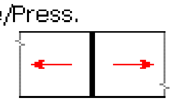
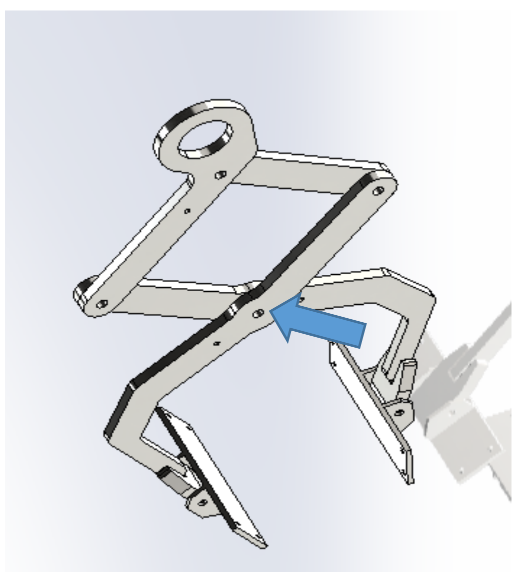
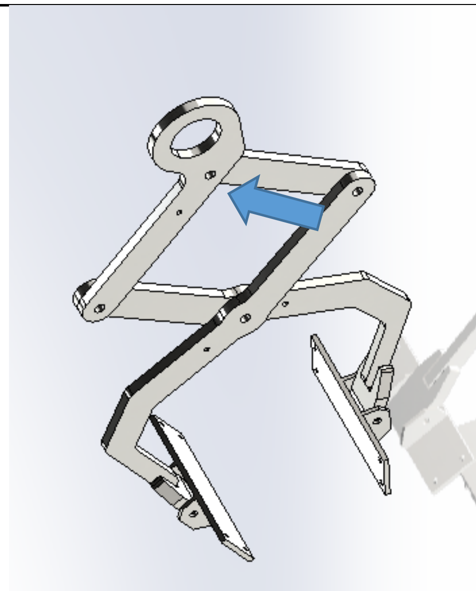
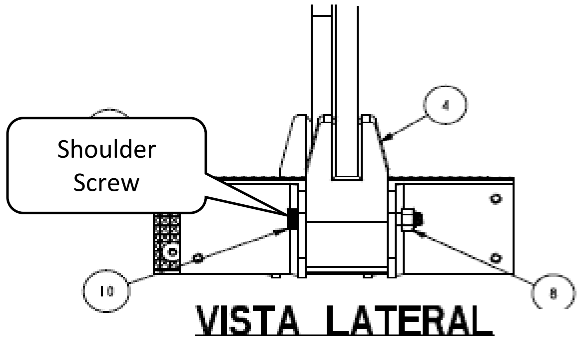
Table 3-3.4.3-1 Minimum Sizes of Fillet Welds

Material Thickness of Thicker Part Joined, in. (mm)	Minimum Size of Fillet Weld, in. (mm)
To $\frac{1}{4}$ (6)	$\frac{1}{8}$ (3)
Over $\frac{1}{4}$ (6) to $\frac{1}{2}$ (13)	$\frac{3}{16}$ (5)
Over $\frac{1}{2}$ (13) to $\frac{3}{4}$ (19)	$\frac{1}{4}$ (6)
Over $\frac{3}{4}$ (19)	$\frac{5}{16}$ (8)

51	Tensile Load on weld, T_n (kips)	0.50	Iterative until safety factor met
52	Length of Tab, L (in)	2.50	See below
53	Thickness of Tab, t (in)	0.19	
54	Length of Fillet Weld, L (in)	2.50	L

55			
56	Weld Leg, W_{leg} (in)	0.13	Refer to Table 3-3.4.3-1
57	Nominal Stress on Weld, F_n (ksi)	2.26	See below eqn (area of weld = length x effective throat thickness)
58	**Load** / **Rated stress** [MPa, psi] Tensile/Press.  $\sigma_{\perp} = \frac{F_n}{A_w} = \frac{F_n}{L \cdot a}$		a = .707 x Wl
59	Safety Factor	5.16	F_v/F_n > 1 OK
60	**Shear Analysis**		
61			
62	Max Rated Load, W_{max} (lbs)	661.2	***Assumed loading 100% of time***
63	Max Rated Lift Point Load, W_{mc} (lbs)	661.20	W_{max}
64	Surface Area, A (in²)	0.196	$A = \pi r^2 \times 2$

65	Shear stress, τ (psi)	3,367.46	$\tau = F/A$
66	Tensile Strength of Material, ft (psi)	21,300.0	Tensile strength of alloy steel (Grade 8) cap screws
67	Shear Strength of Material, v (psi)	12,290.10	$0.577 \times f_y$
68	Safety Factor	3.65	$=V/\tau > 1$ OK
69	**Shear Analysis**		
70			
71	Max Rated Load, W_{max} (lbs)	661.2	***Assumed loading 100% of time***
72	Max Rated Lift Point Load, W_{mc} (lbs)	661.20	W_{max}
73	Surface Area, A (in²)	0.196	$A = \pi r^2 \times 2$, 1/2" socket head screw
74	Shear stress, τ (psi)	3,367.46	$\tau = F/A$
75	Tensile Strength of Material, ft (psi)	21,300.0	Tensile strength of alloy steel (Grade 8) cap screws
76	Shear Strength of Material, v (psi)	12,290.10	$0.577 \times f_y$
77	Safety Factor	3.65	$=V/\tau > 1$ OK

<table>
<tr><td>78</td><td colspan="3">Other Rated Components</td></tr>
<tr><td>79</td><td colspan="3">
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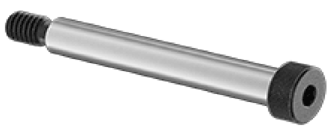
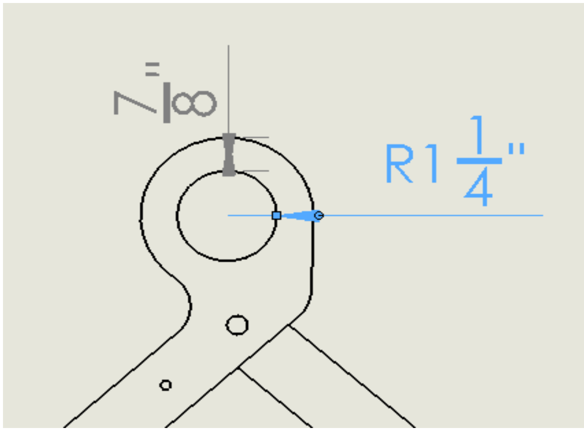
<tr><td>80</td><td colspan="3">
Alloy Steel Shoulder Screw
3/8" Shoulder Diameter, 2-1/2" Shoulder Length, 5/16"-18 Thread

Each
ADD TO ORDER
In stock
1-4 Each $2.09
5 or more $1.77
91259A634
<table>
<tr><td>Shoulder Fit</td><td>Standard</td></tr>
<tr><td>Shoulder Diameter</td><td>3/8"</td></tr>
<tr><td>Shoulder Diameter Tolerance</td><td>-0.004" to -0.002"</td></tr>
<tr><td>Shoulder Length</td><td>2 1/2"</td></tr>
<tr><td>Shoulder Length Tolerance</td><td>-0.005" to 0.005"</td></tr>
<tr><td>Thread Size</td><td>5/16"-18</td></tr>
<tr><td>Screw Size Decimal Equivalent</td><td>0.313"</td></tr>
<tr><td>Thread Type</td><td>UNC</td></tr>
<tr><td>Thread Spacing</td><td>Coarse</td></tr>
<tr><td>Thread Fit</td><td>Class 3A</td></tr>
<tr><td>Thread Direction</td><td>Right Hand</td></tr>
<tr><td>Thread Length</td><td>1/2"</td></tr>
<tr><td>Head Diameter</td><td>9/16"</td></tr>
<tr><td>Head Height</td><td>1/4"</td></tr>
<tr><td>Material</td><td>Alloy Steel</td></tr>
<tr><td>Finish</td><td>Black Oxide</td></tr>
<tr><td>Hardness</td><td>Rockwell C32</td></tr>
<tr><td>Tensile Strength</td><td>140,000 psi</td></tr>
</table>
</td></tr>
<tr><td>81</td><td>Max Rated Load, W_{max} (lbs)</td><td>661.2</td><td>Assumed loading 100% of time</td></tr>
<tr><td>82</td><td>Max Rated Lift Point Load, W_{mc} (lbs)</td><td>330.60</td><td>W_{max}</td></tr>
<tr><td>83</td><td>Surface Area, A (in^2)</td><td>0.308</td><td>$A = \pi r^2 \times 2$</td></tr>
<tr><td>84</td><td>Shear stress, τ (psi)</td><td>1,074.15</td><td>$\tau = F/A$</td></tr>
<tr><td>85</td><td>Tensile Strength of Material, ft (psi)</td><td>140,000.0</td><td>ft</td></tr>
</table>

<table>
<tr><td>86</td><td>Shear Strength of Material, v (psi)</td><td>80,780.00</td><td>0.577 x f_y</td></tr>
<tr><td>87</td><td>Safety Factor</td><td>75.20</td><td>=V/τ >1 OK</td></tr>
<tr><td>88</td><td colspan="3">Top Lift Tab Analysis</td></tr>
<tr><td>89</td><td colspan="3">

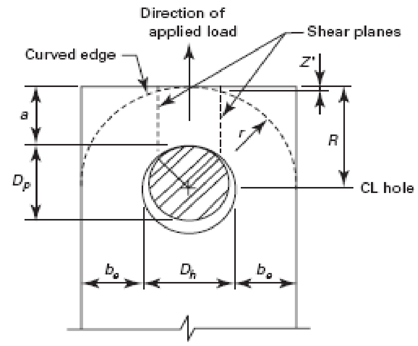


Fig. C3-3 Pin-Connected Plate Notation</td></tr>
<tr><td>90</td><td colspan="3">Lifting Lug Design Per ASME BTH-1-2017 (Static Strength of the Plates)</td></tr>
<tr><td>91</td><td colspan="3">CHECK #1 - ALLOWABLE TENSILE STRENGTH THROUGH PINHOLE (Sect. 3-3.3.1)</td></tr>
<tr><td>92</td><td colspan="3">The allowable tensile strength through the pinhole, P_t, shall be calculated as follows:
$$P_t = C_r \frac{F_u}{1.20N_d} 2tb_{\text{eff}} \qquad (3\text{-}45)$$</td></tr>
<tr><td>93</td><td>Allowable Tensile Strength through the pinhole, P_t (kips)</td><td>17.02</td><td>See above equation and parameters below</td></tr>
<tr><td>94</td><td>C_r</td><td>0.7330</td><td>$$C_r = 1 - 0.275 \sqrt{1 - \frac{D_p^2}{D_h^2}} \qquad (3\text{-}46)$$</td></tr>
<tr><td>95</td><td>Hole Diameter, D_h (in)</td><td>1.25</td><td>See drawing clip above</td></tr>
<tr><td>96</td><td>Pin Diameter, D_p (in)</td><td>0.3</td><td>Reasonable assumption or measured</td></tr>
<tr><td>97</td><td colspan="3">The effective width shall be taken as the smaller of the values calculated as follows:
$$b_{\text{eff}} = 4t \le b_e \qquad (3\text{-}47)$$
$$b_{\text{eff}} = b_e 0.6 \frac{F_u}{F_y} \sqrt{\frac{D_h}{b_e}} \le b_e \qquad (3\text{-}48)$$
where beff = effective width to each side of pinhole, and;
b_e = actual width of a pin-connected plate between the edge of the hole and the edge of the plate...</td></tr>
</table>

98	b_{eff} (in)	2.00	equation 3-47 (width limit of <= b_e does not apply if plates are stiffened or otherwise prevented from buckling)
99	b_{eff} (in)	0.99	equation 3-48
100	Plate Thickness, t (in)	0.5	See drawing
101	b_e (in)	0.88	See drawing above
102	Ultimate Strength of Plate Material, F_u (ksi)	95	4140 Alloy Steel
103	Yield Strength of Plate Material, F_y (ksi)	60	A36 Steel
104	b_{eff} used in calculations, $b_{eff\ min}$ (in)	0.88	Pick lowest beff of Eqns. 3-47 and 3-48 or b_e
105	CHECK #2 - ALLOWABLE DOUBLE PLANE SHEAR STRENGTH BEYOND THE PINHOLE (Sect. 3-3.3.1)		
106	The allowable double plane shear strength beyond the pinhole P_v is $$P_v = \frac{0.70F_u}{1.20\,N_d}A_v \qquad (3\text{-}50)$$		
107	Allowable double plane shear strength beyond pinhole, P_v (kips)	16.236	See above equation
108	A_v = total area of the two shear planes beyond the pinhole $$A_v = 2\left[a + \frac{D_p}{2}(1 - \cos\phi)\right]t \qquad (3\text{-}51)$$		
109	A_v	0.879	See above
110	a (in)	0.875	See above
111	ϕ	13.20	$\phi = 55\,\frac{D_p}{D_h}$
112	cos ϕ	0.974	

113	CHECK #3 - ALLOWABLE SINGLE PLANE FRACTURE STRENGTH BEYOND THE PINHOLE (Sect. 3-3.3.1)		
114	Allowable Single Plan Fracture strength beyond the pinhole, P_b (kips)	23.71	See below
115	The allowable single plane fracture strength beyond the pinhole P_b is $$P_b = C_r \frac{F_u}{1.20N_d}\left[1.13\left(R - \frac{D_h}{2}\right) + \frac{0.92b_e}{1 + b_e/D_h}\right]t \qquad (3\text{-}49)$$ where R = distance from the center of the hole to the edge of the plate in the direction of the applied load		
116	R	1.50	a + $D_h/2$
117	CHECK #4 - BEARING STRESS BETWEEN PIN AND PLATE TAB (Sect. 3-3.3.4)		
118	**3-3.3.4 Bearing Stress.** The bearing stress between the pin and the plate, based on the projected area of the pin, shall not exceed the value given by eq. (3-53), where F_y is the yield stress of the pin or plate, whichever is smaller. The bearing stress between the pin and the plate in connections that will rotate under load for a large number of load cycles (Service Class 1 or higher) shall not exceed the value given by eq. (3-54). $$F_p = \frac{1.25F_y}{N_d} \qquad (3\text{-}53)$$		
119	Allowable Bearing Load, F_p (kips)	3.75	See above eqn x t x D_p (Allowable Stress x area)
120	**Summary of Loads - Top Lifting Tab**		
121	Allowable Tensile Strength through the pinhole, P_t (kips)	17.02	See above
122	Allowable double plane shear strength beyond pinhole, P_v (kips)	16.236	See above
123	Allowable Single Plan Fracture strength beyond the pinhole, P_b (kips)	23.71	See below
124	Bearing Load, F_p (kips)	3.75	See above
125	Max Load, P (lbs)	3,750.00	Choose lowest & Convert to lbs by X 1000
126	Applied Force, AF (lbs)	661.20	F x Df
127	Safety Factor	5.67	P/AF > 1 OK

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REV	DISEÑÓ / APROBÓ	DESCRIPCIÓN	ZONA	FECHA / FOLIO O. DE T.
-	LUIS MEJIA / PEDRO MARQUEZ	-SE GENERO NUEVO DISEÑO APARTIR DE LA ESTRUCTURA DEL DL-055 Y LA SUJECION DEL DL-410	-	6/11/2019 5216

NOTA:

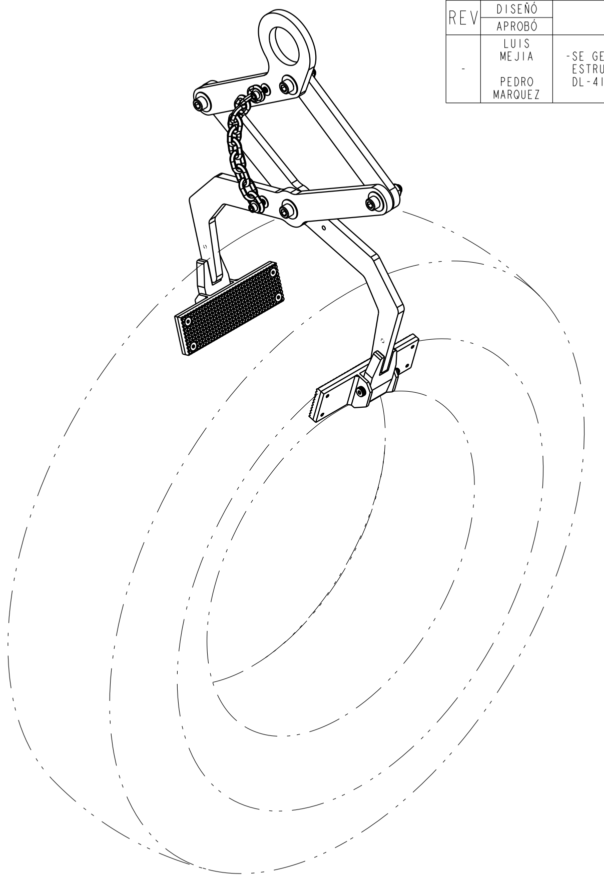
-EL DISPOSITIVO HA SIDO CLASIFICADO COMO "DISPOSITIVO DE LEVANTE DEBAJO DEL GANCHO" DE ACUERDO CON LA ASME B30.20-2010, QUE A SU VEZ HACE REFERENCIA A LA ASME BTH-1-2008.
-ESTE DISPOSITIVO HA SIDO CLASIFICADO COMO DISEÑO CATEGORÍA B, DISPOSITIVO DE SERVICIO CLASE 4, COMO ES DEFINIDO EN LA BTH-1-2008.
-COMO DISPOSITIVO DE SERVICIO CLASE 4, ESTE DISPOSITIVO ESTÁ CLASIFICADO PARA 3,000,000 LEVANTES DESPUÉS DE LOS CUALES DEBE SER REEMPLAZADO.
-ESTE DISPOSITIVO DEBE USARSE SOLAMENTE PARA EL PROPÓSITO REQUERIDO, CUALQUIER OTRO USO INVALIDARA ESTA CLASIFICACIÓN.
-CARGA LÍMITE DE TRABAJO 100 KG.
-LA PRUEBA DE CARGA FUE REALIZADA A 125 KG. DE ACUERDO A LA ASME 30.20-2010 PÁRRAFO 20-1-3.8.
-CUALQUIER DAÑO A ESTE DISPOSITIVO INVALIDARA LA CLASIFICACIÓN.
-ESTE DISPOSITIVO DEBE INSPECCIONARSE DE ACUERDO A LA ASME B30.20.2010 PÁRRAFO 20-1.3. QUE INCLUYE PERO

NO ESTÁ LIMITADO A LOS SIGUIENTES REQUERIMIENTOS:
- -ESTE DISPOSITIVO DEBE SER INSPECCIONADO PREVIAMENTE A SU USO INICIAL PARA VERIFICAR SU CUMPLIMIENTO CON EL PLANO.
- -ESTE DISPOSITIVO DE LEVANTE DEBE SER INSPECCIONADO VISUALMENTE CADA DÍA ANTES DE USARLO.
- -ESTE DISPOSITIVO DE LEVANTE DEBE SER INSPECCIONADO MENSUALMENTE PARA BUSCAR DEFORMACIONES ESTRUCTURALES, CUARTEADURAS O DESGASTE EXCESIVO. ESTOS REGISTROS DEBEN DE QUEDAR FUERA DE LA INSPECCIÓN ANUAL.

-SI CUALQUIER DAÑO ESTÁ MÁS ALLÁ DE RASGUÑOS SUPERFICIALES VISUALMENTE APARENTES, ESTE DISPOSITIVO DEBE SER REEMPLAZADO.
-ES ALTAMENTE RECOMENDADO QUE ESTE DISPOSITIVO DEBA ESTAR ESTAMPADO, GRAVADO O DE CUALQUIER OTRA FORMA MARCADO CON SU NÚMERO DL-426 EN ADICIÓN A SU REQUERIMIENTO DE NÚMERO DE DISPOSITIVO.
-ESTE DISPOSITIVO DEBE ESTAR MARCADO O ETIQUETADO DE ACUERDO A LA ASME B30.20-2010 PÁRRAFO 20-1.2.1, QUE SE REFIERE AL ESTÁNDAR DE QUE LA INFORMACIÓN ES REQUERIDA.
-LA CLASIFICACIÓN ASUME QUE EL DISPOSITIVO ES USADO DE ACUERDO A LOS PROCEDIMIENTOS DE LEVANTE SEGURODE KENWORTH, QUE DEBEN INCLUIR

PERO NO LIMITARSE A:
- -NO LEVANTAR MÁS CARGA DE LA NECESARIA.
- -NO HACER MODIFICACIONES A ESTE DISPOSITIVO.
- -TODOS LOS LEVANTES DEBEN DE HACERSE DE UNA MANERA FLUIDA Y ESTABLE PARA MINIMIZAR EL IMPACTO DEL DISPOSITIVO.
- -TODOS LOS DEMÁS REQUERIMIENTOS DE OPERACIÓN RELEVANTES ESTÁN LISTADOS EN LA ASME B30.20-2010 PÁRRAFO 20-1.4.

-ESTE DISPOSITIVO, INCLUYENDO LOS COMPONENTES NO MOSTRADOS, DEBERÁN SER MANTENIDO DE ACUERDO A LA ASME B30.20-2010 PÁRRAFO20-1.3.9.
-TODA LA SOLDADURA DEBE SER REALIZADA DE ACUERDO A LA AWS D14.1 (SOLDADOR cERTIFICADO).



VISTA ISOMETRICA
SCALE 7:80

NOTAS:
1. DISPOSITIVO SIN DIMENSIONES CRITICAS
2. REALIZAR INSPECCION VISUAL DE COMPONENTES

PARTE	CANT.	DESCRIPCION	MATERIAL	OBSERVACIONES
15	4	LOCKNUT	3/8"-16 UNC, STEEL GRADE 8	McMASTER 97135A250
14	8	FLAT HEAD SCREW	1/4"-20 UNC X 5/8"L, ALLOY STEEL	McMASTER 9253A539
13	4	SOCKET HEAD SCREW	1/2"-13 UNC X 2"L, ALLOY STEEL	McMASTER 9251A720
12	16	WASHER	FOR 1/2" SCREW, 18-8 SS STEEL	McMASTER 92141A033
11	4	WASHER	FOR SCREW 5/16", 18-8 SS STEEL	McMASTER 92141A030
10	2	SHOULDER SCREW	3/8"DIA X 2-1/2"L, ALLOY STEEL	McMASTER 91259A634
9	2	SOCKET HEAD SCREW	5/16"-18 UNC X 1-1/4"L, ALLOY STEEL	McMASTER 91251A585
8	2	LOCKNUT	5/16"-18 UNC, STEEL GRADE 8	McMASTER 90630A115
7	1	CHAIN	9/32" CHAIN SIZE, MIN. LENGTH 7"	McMASTER 3410T62
6	2	LIFT PAD	STEEL A2 (45-48 HRC)	FABRICAR
5	2	PLATE HOLDER	MILD STEEL	FABRICAR
4	2	SOPORTE	ACERO 4140, 5/8" THK	FABRICAR
3	2	MANIVELA 2	ACERO 4140, 1/2" THK	FABRICAR
2	1	MANIVELA 1	ACERO 4140, 1/2" THK	FABRICAR
1	1	BIELA	ACERO 4140, 1/2" THK	FABRICAR

HOJA DE VERIFICACION

CERTIFICACION

DISPOSITIVO DE LEVANTE PARA LLANTAS

ALTA:	
No. HERRAMIENTA:	DL-426
PESO:	12 KG
CAPACIDAD:	100 KG
PRUEBA:	125 KG
LOCACION:	ENSAMBLE 11
CATEGORIA	B
SERVICIO	4

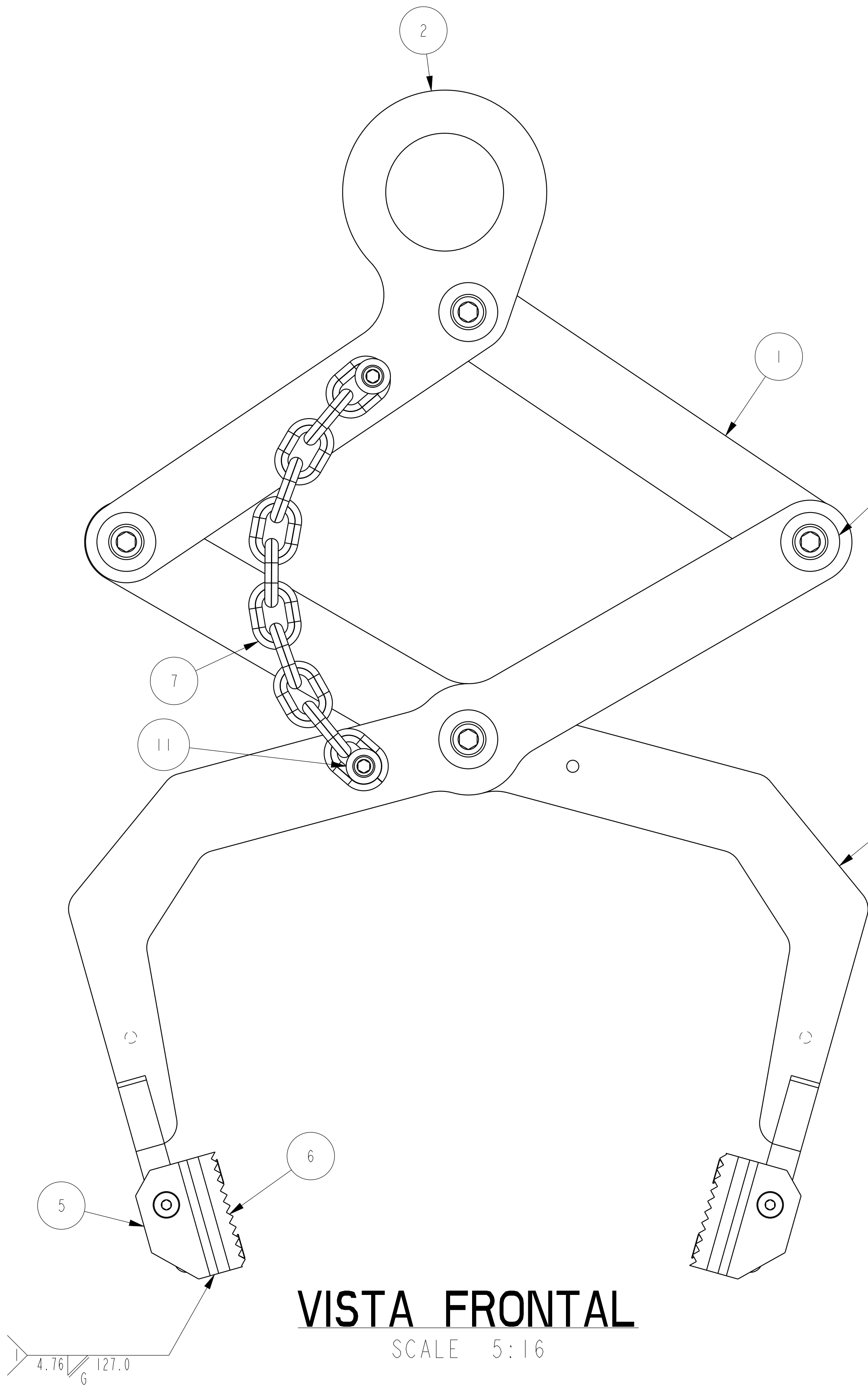
08/18/2019

KENWORTH TRUCK CO. UNA DIVISION DE PACCAR

THIRD ANGLE PROJECTION — NO ESCALAR EL DIBUJO

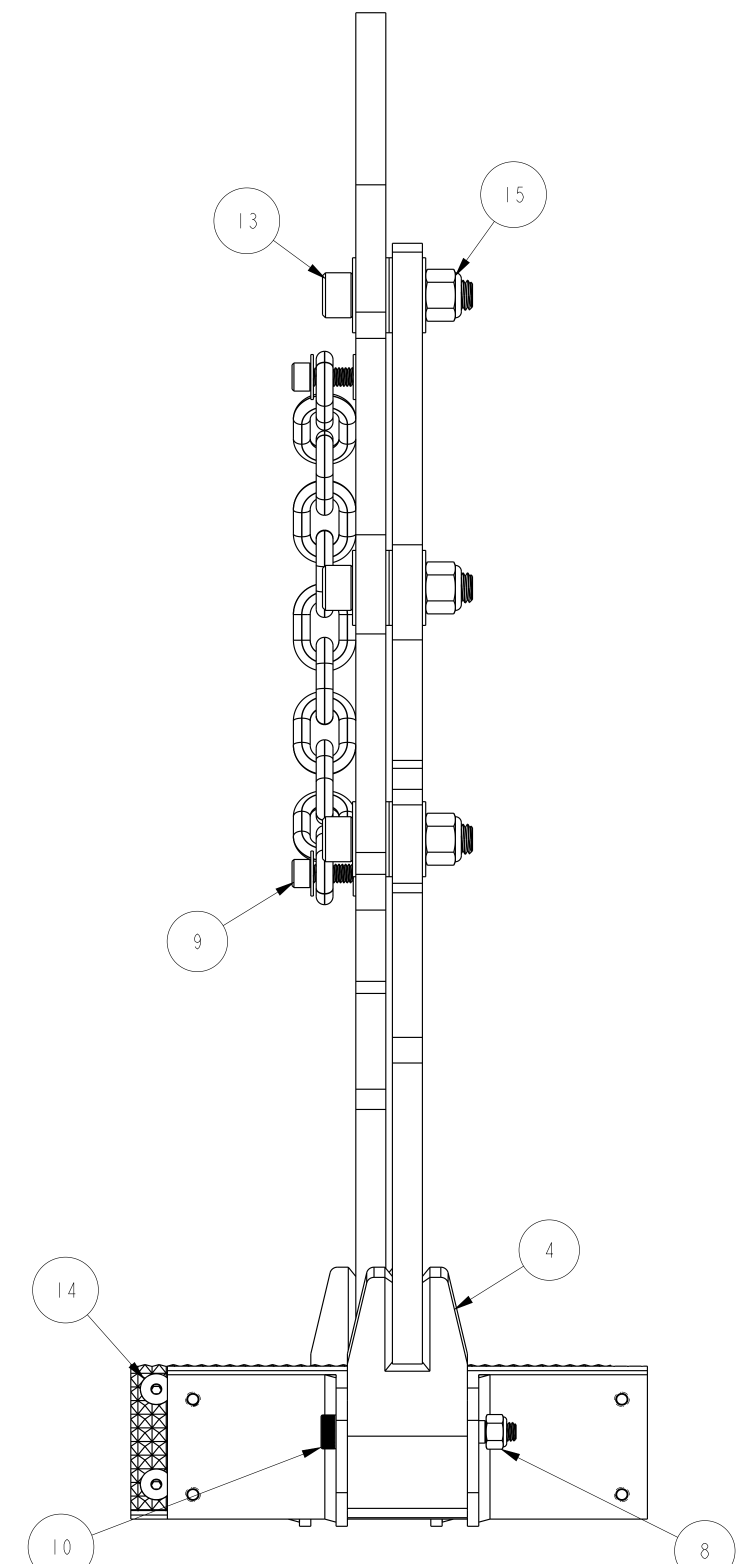
ESCALA: 7:80	DISEÑADO POR: LUIS MEJIA	TITULO: DISPOSITIVO DE LEVANTE PARA LLANTAS
FECHA: 6/11/2019	REVISADO POR: PEDRO MARQUEZ	
MAQ. NO.: -	DIMENSIONES EN: MILIMETROS	CLIENTE: ENSAMBLE 11
MODELO: -	CAMBIO: -	No. DE PARTE: LLANTAS
ORDEN DE TRABAJO: 5216	FOLDER: KWC/MXL/ENGINEERING/Mfg/	ARCHIVO: DL-426.DRW

X PROPRIETARIO   NO-PROPRIETARIO



VISTA FRONTAL

SCALE 5:16



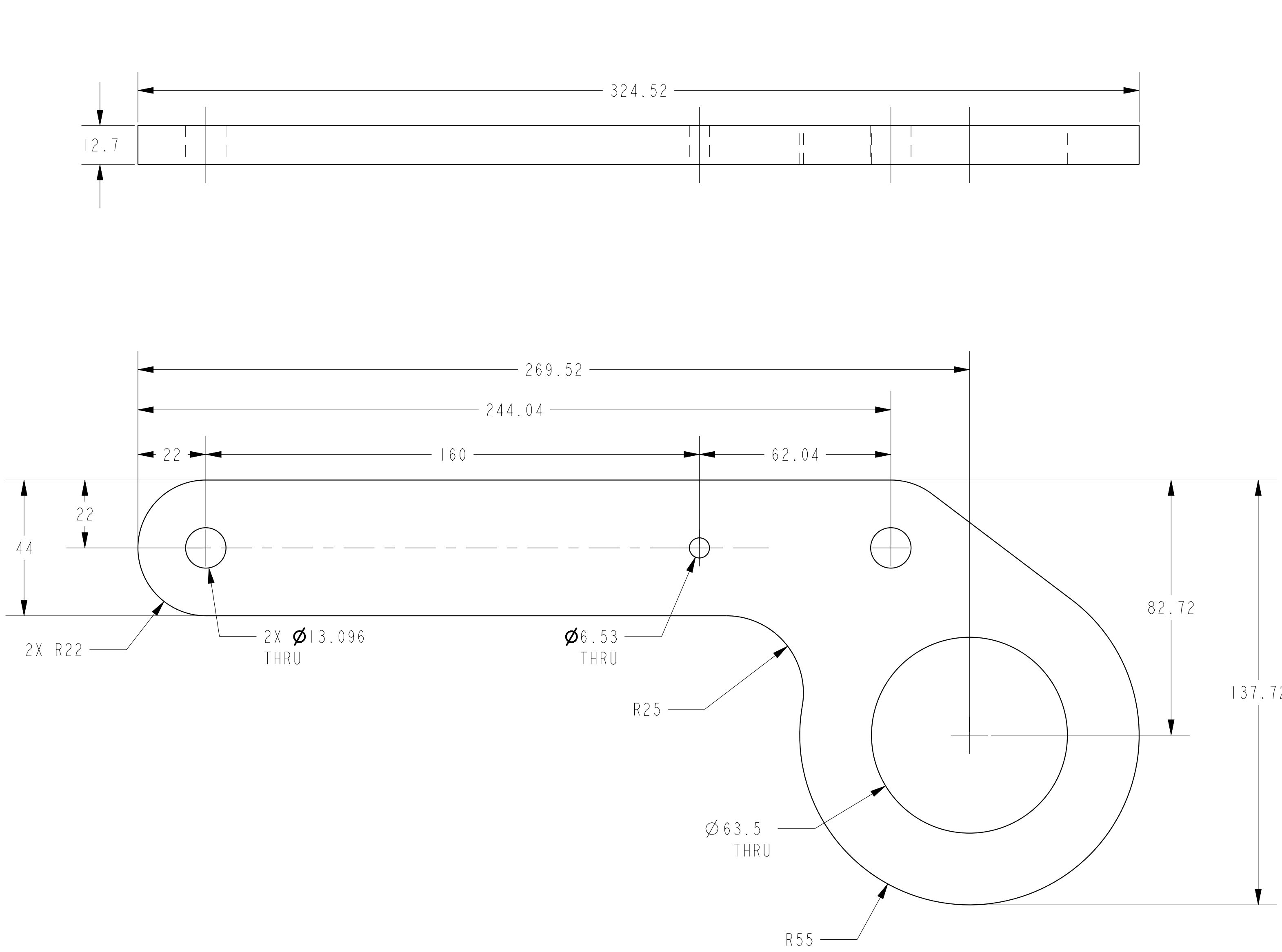
VISTA LATERAL

08/18/2019

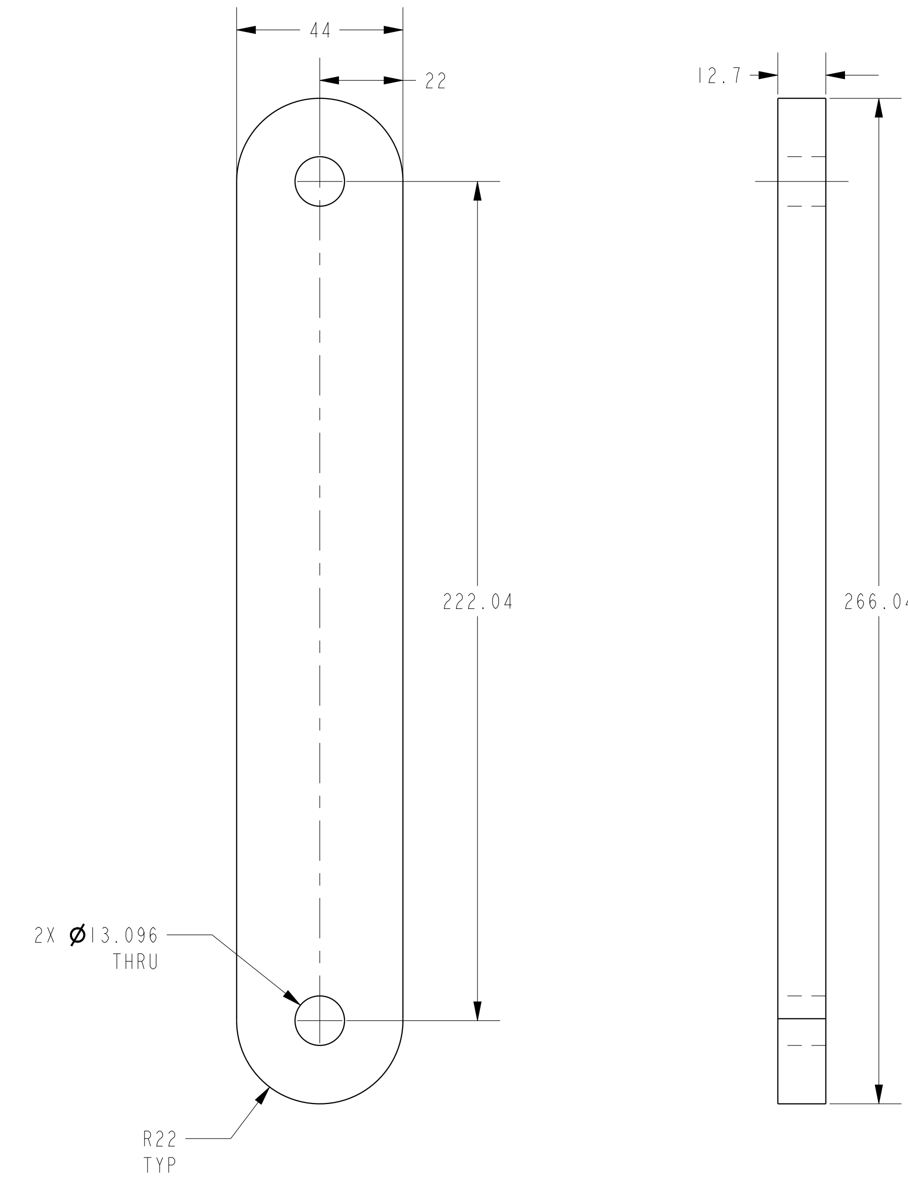
KENWORTH KENWORTH TRUCK CO. UNA DIVISION DE PACCAR	TITULO: DISPOSITIVO DE LEVANTE PARA LLANTAS
X PROPRIETARIO NO-PROPRIETARIO	ARCHIVO: DL-426.DRW

DIBUJO: DL-426.DRW | Pro/ENGINEER®

VER HOJA "1" P/DETALLES SOBRE REVISIONES



DETALLE -2
SCALE 1:2



DETALLE -1
SCALE 1:2

REGISTERED PROFESSIONAL ENGINEER
FREDERICK WILLIAM GRANTHAM
No. 82413
CIVIL
STATE OF CALIFORNIA

08/18/2019

KENWORTH
KENWORTH TRUCK CO.
UNA DIVISION DE PACCAR

X PROPRIETARIO | NO-PROPRIETARIO

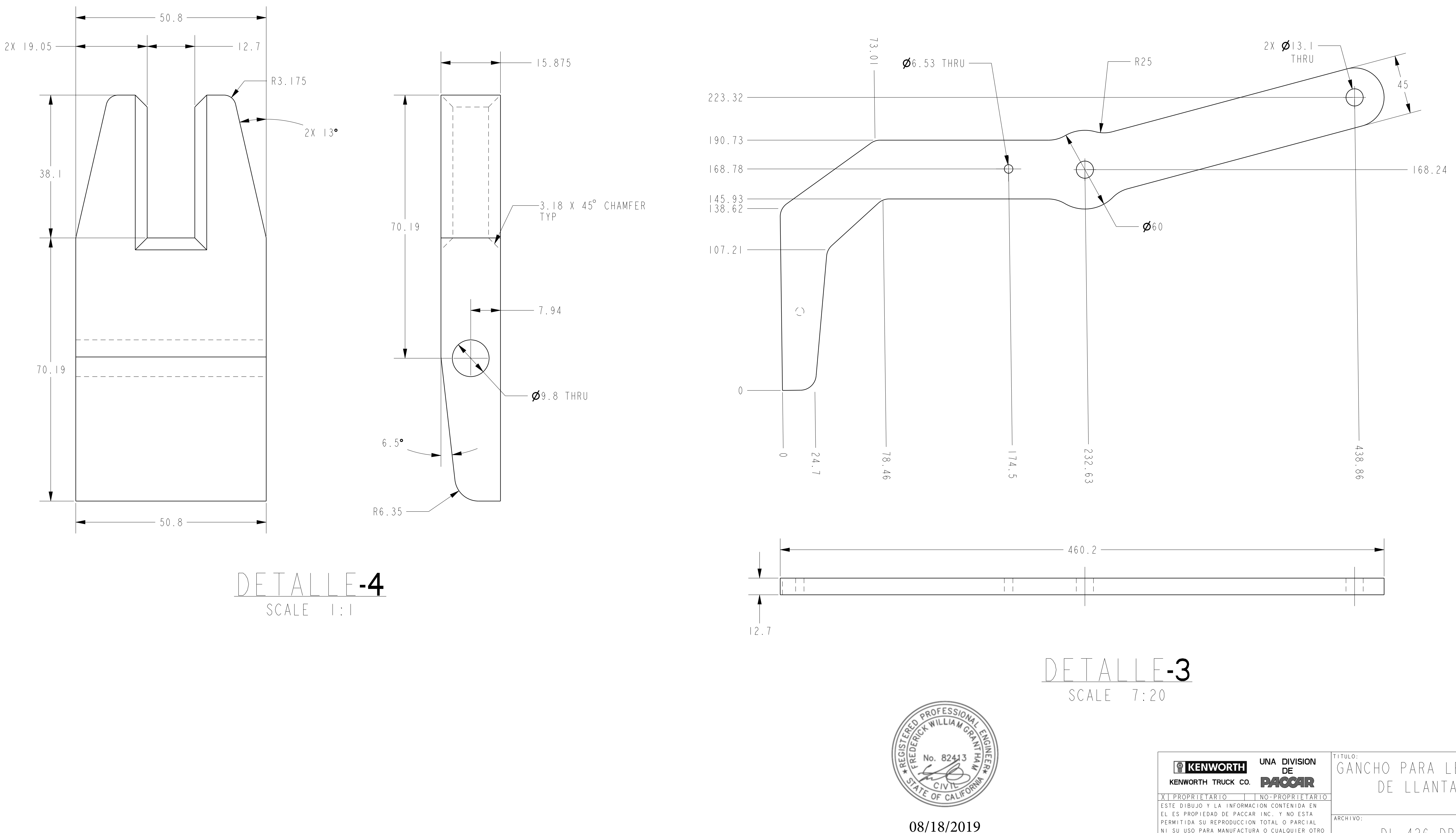
TITULO: GANCHO PARA LEVANTE DE LLANTAS

ARCHIVO: DL-426.DRW

HOJA B

DIBUJO: DL-426.DRW Pro/ENGINEER®

VER HOJA "1" P/DETALLES SOBRE REVISIONES



KENWORTH
KENWORTH TRUCK CO.
UNA DIVISION DE PACCAR

X PROPRIETARIO | NO-PROPRIETARIO

ESTE DIBUJO Y LA INFORMACION CONTENIDA EN EL ES PROPIEDAD DE PACCAR INC. Y NO ESTA PERMITIDA SU REPRODUCCION TOTAL O PARCIAL NI SU USO PARA MANUFACTURA O CUALQUIER OTRO PROPOSITO SIN LA ADECUADA AUTORIZACION POR ESCRITO DE PACCAR INC.

TITULO: GANCHO PARA LEVANTE DE LLANTAS

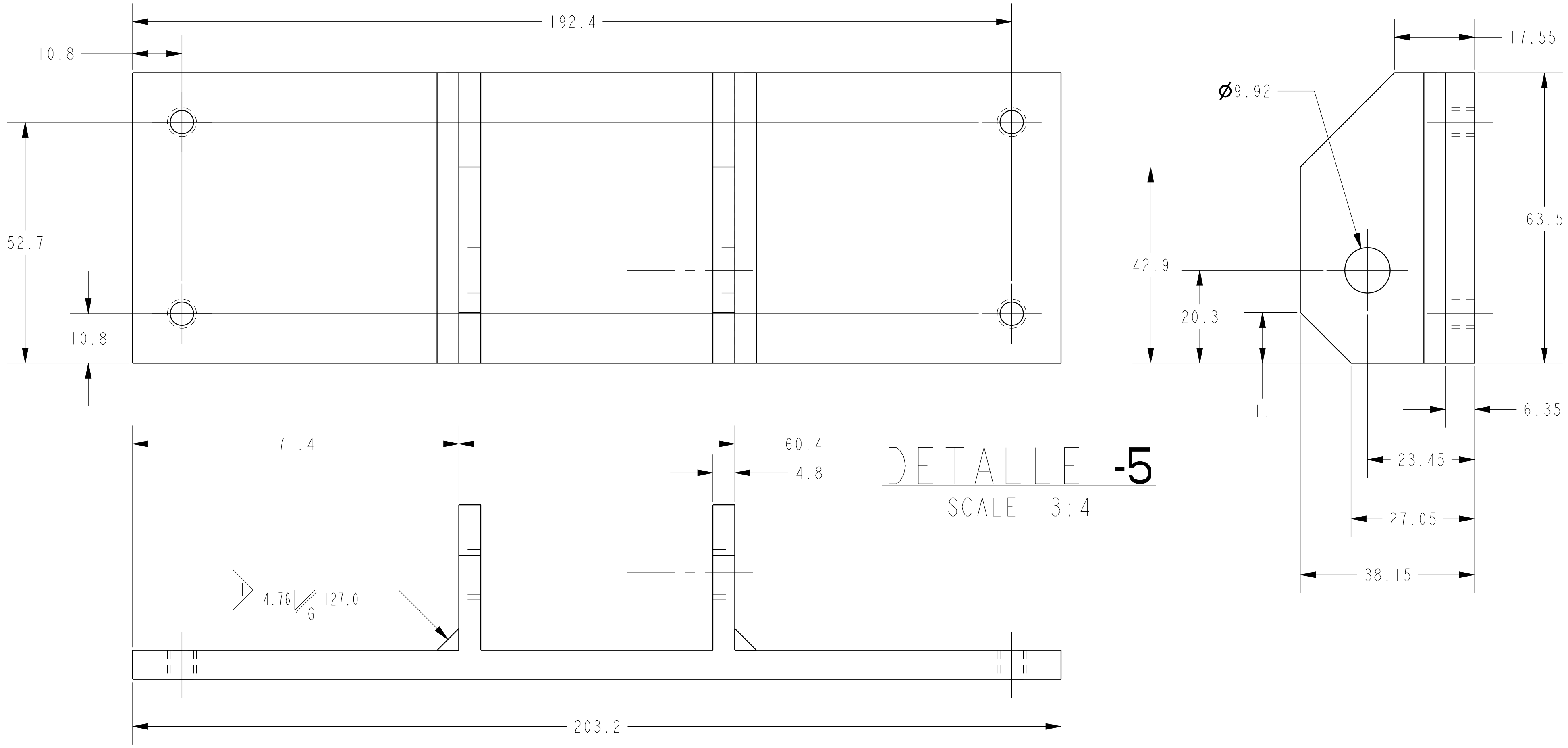
ARCHIVO: DL-426.DRW

HOJA 4 DE 5

HOJA B

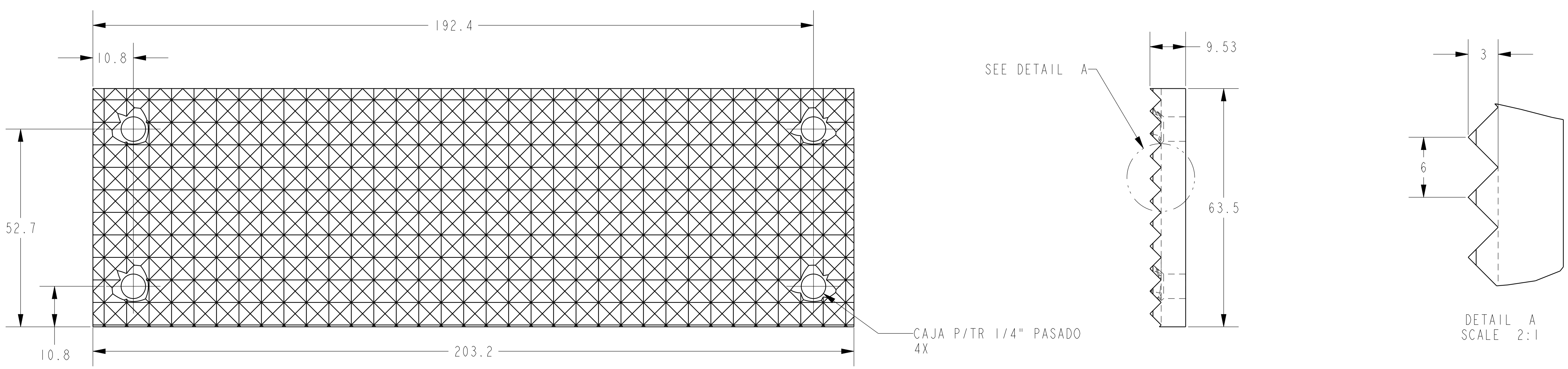
DIBUJO: DL-426.DRW Pro/ENGINEER®

VER HOJA "1" P/DETALLES SOBRE REVISIONES



DETALLE -5

SCALE 3:4



DETAIL A
SCALE 2:1

DETALLE -6

SCALE 3:4

08/18/2019

KENWORTH TRUCK CO. UNA DIVISION DE PACCAR

X PROPRIETARIO | NO-PROPRIETARIO

TITULO: DISPOSITIVO DE LEVANTE PARA LLANTAS

ARCHIVO: DL-426.DRW

HOJA B