

**“INNOVATIVE SOLUTIONS TO SERVE YOU BEST!”**



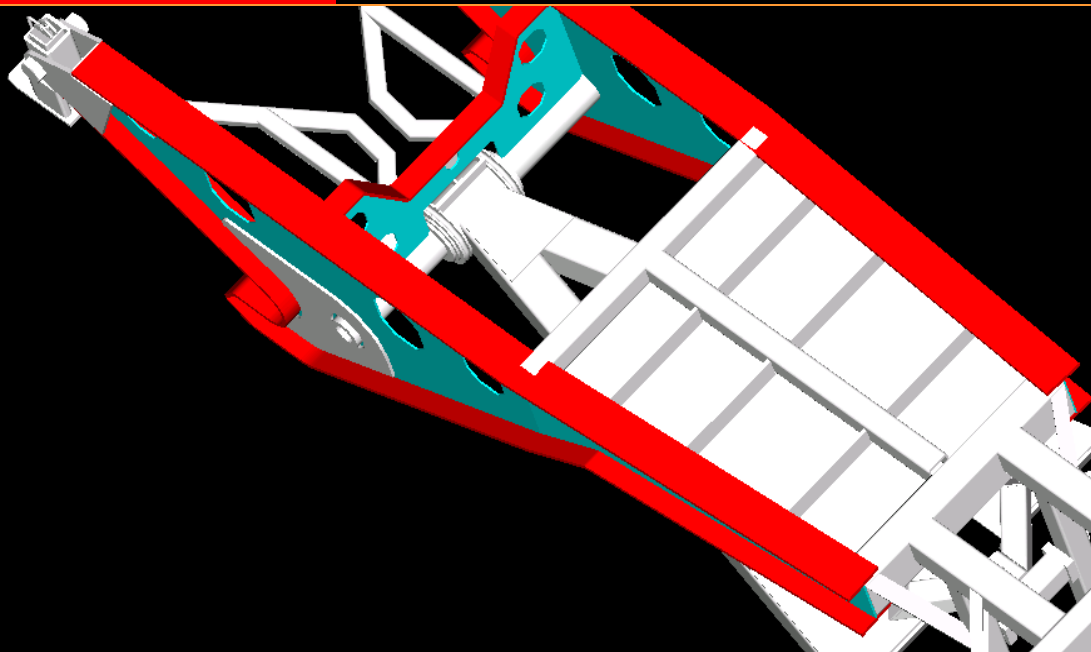
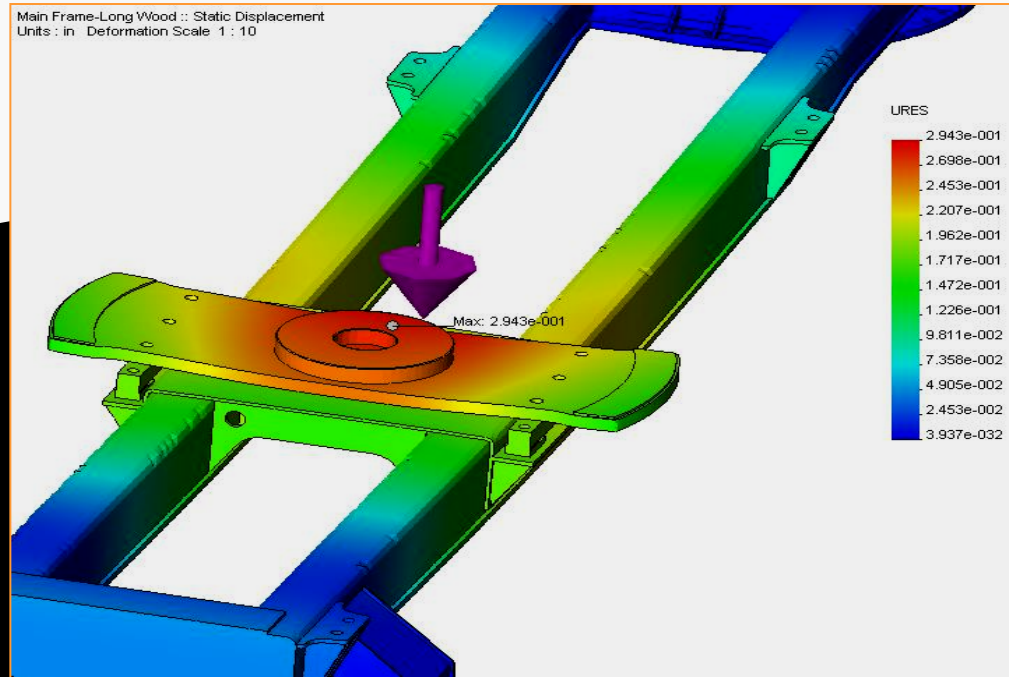
# **GENMARK Engineering & Management**

- **10010 – 164 Street, Edmonton, AB**
- **T5P 4Y3 CANADA**
- **Phone: (780) 461 - 9234**
- **Fax : (780) 461 - 9624**

# “INNOVATIVE SOLUTIONS TO SERVE YOU BEST!”



Main Frame-Long Wood :: Static Displacement  
Units : in Deformation Scale 1 : 10



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## **GENMARK Engineering & Management**

- **Contract engineering and management services**
- **Design concepts to project reality**
- **Long-time client relationship**
- **Quality service under demanding project timelines**
- **Complete solution for modifications to existing equipment**
- **Design and drafting at competitive prices**

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# **Heavy Transportation Equipment for Oilfield Application**

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## **OBJECTIVES**

- **Types of heavy oilfield trailers**
- **Design considerations**
- **Future considerations**

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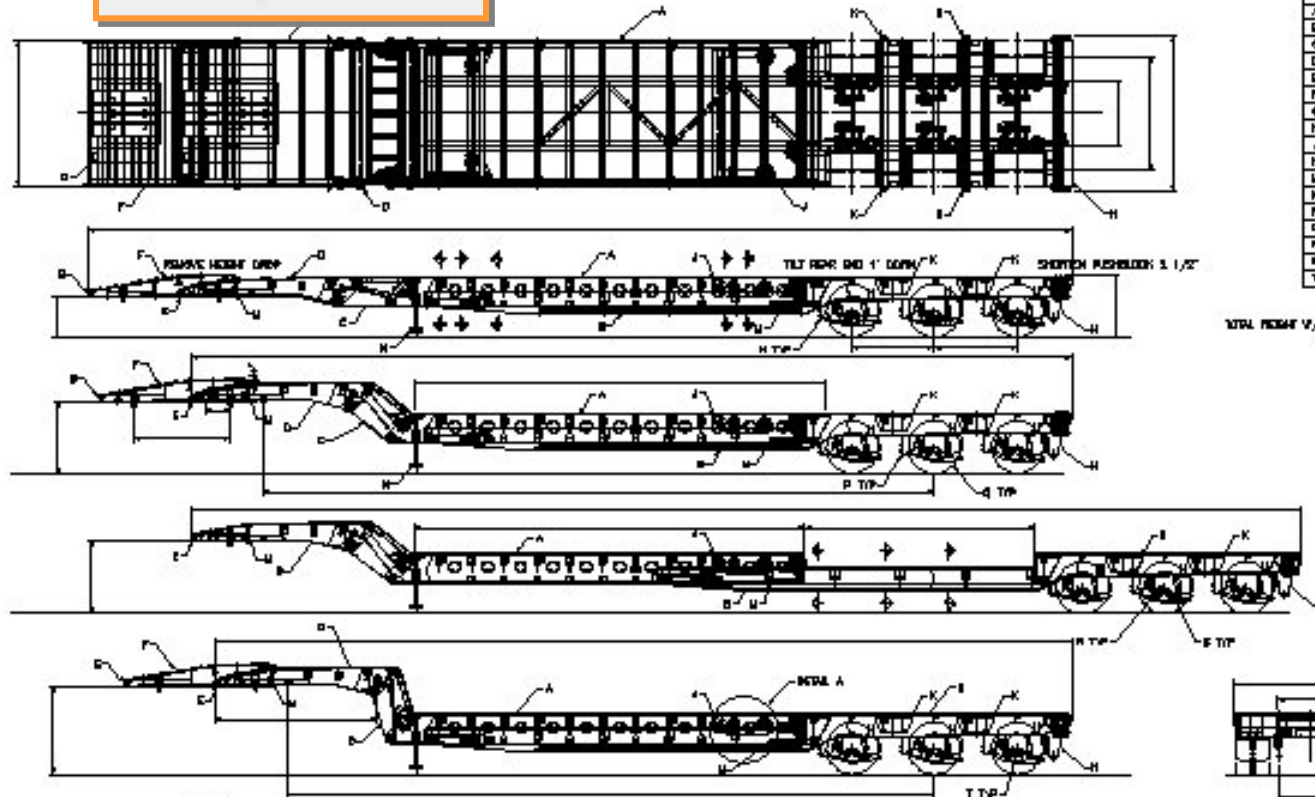
## **Types of oilfield trailers**

- **Highboy**
  - **Live roll**
- **Lowboy**
  - **Goose neck**
  - **Scissors neck**
  - **Beaver tail**
  - **Live roll**
  - **Single drop**
  - **Double drop**

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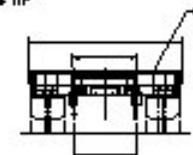


## SCISSORNECK TROMBONE

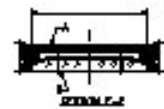
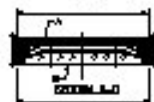
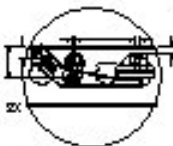


ITEM	QTY	DESCRIPTION/MATERIALS	LENGTH	WEIGHT
A	1	SECTION 1/2" VEE	11.00	11.00
B	1	SECTION 1/2" VEE	11.00	11.00
C	1	SECTION 1/2" VEE	11.00	11.00
D	1	SECTION 1/2" VEE	11.00	11.00
E	1	SECTION 1/2" VEE	11.00	11.00
F	1	SECTION 1/2" VEE	11.00	11.00
G	1	SECTION 1/2" VEE	11.00	11.00
H	1	SECTION 1/2" VEE	11.00	11.00
I	1	SECTION 1/2" VEE	11.00	11.00
J	1	SECTION 1/2" VEE	11.00	11.00
K	1	SECTION 1/2" VEE	11.00	11.00
L	1	SECTION 1/2" VEE	11.00	11.00
M	1	SECTION 1/2" VEE	11.00	11.00
N	1	SECTION 1/2" VEE	11.00	11.00
O	1	SECTION 1/2" VEE	11.00	11.00
P	1	SECTION 1/2" VEE	11.00	11.00
Q	1	SECTION 1/2" VEE	11.00	11.00
R	1	SECTION 1/2" VEE	11.00	11.00
S	1	SECTION 1/2" VEE	11.00	11.00
T	1	SECTION 1/2" VEE	11.00	11.00
U	1	SECTION 1/2" VEE	11.00	11.00
V	1	SECTION 1/2" VEE	11.00	11.00
W	1	SECTION 1/2" VEE	11.00	11.00
X	1	SECTION 1/2" VEE	11.00	11.00
Y	1	SECTION 1/2" VEE	11.00	11.00
Z	1	SECTION 1/2" VEE	11.00	11.00

TOTAL WEIGHT 1/2" VEE, AIR/FRONT AND BACK - 10000 LBS



DETAIL A  
SCALE: 1/2" = 1'-0"

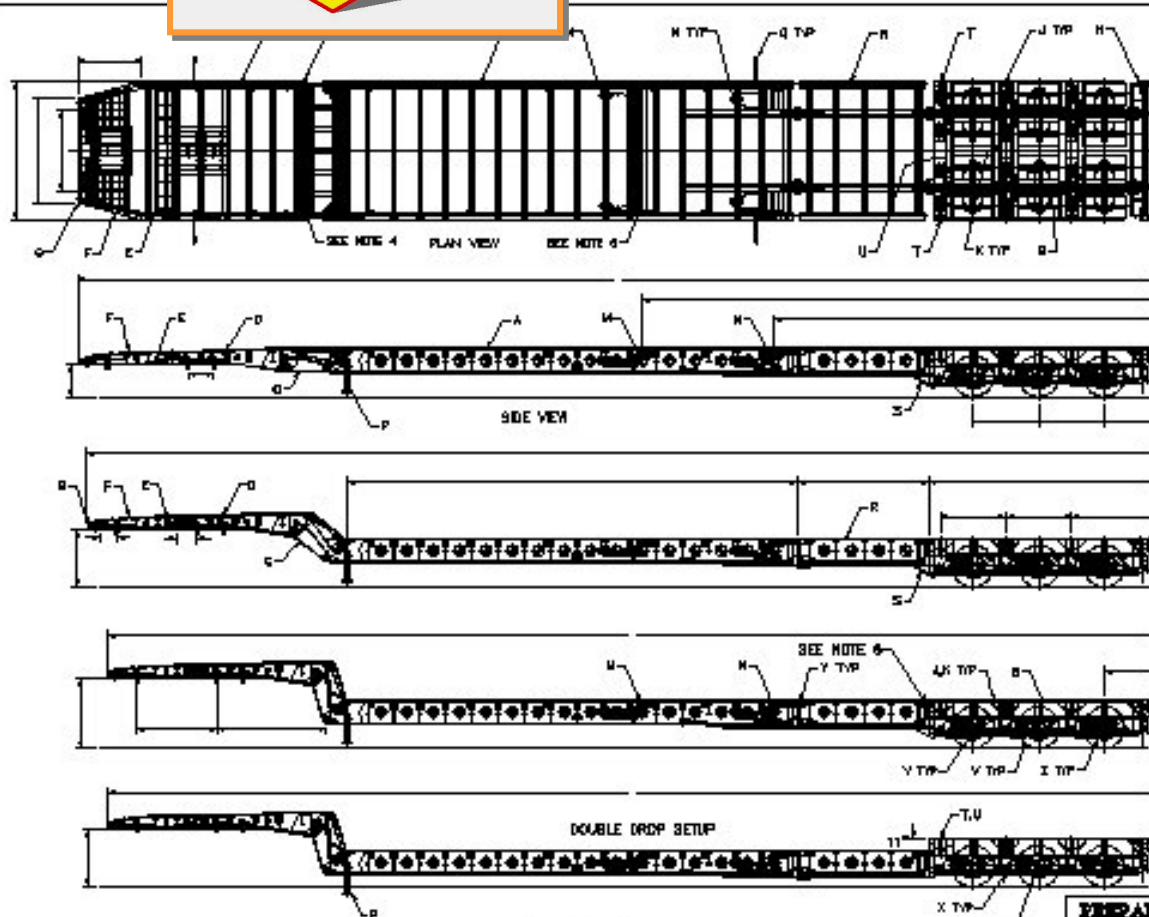


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B	1	SECTION 1/2" VEE	11.00	11.00
C	1	SECTION 1/2" VEE	11.00	11.00
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L	1	SECTION 1/2" VEE	11.00	11.00
M	1	SECTION 1/2" VEE	11.00	11.00
N	1	SECTION 1/2" VEE	11.00	11.00
O	1	SECTION 1/2" VEE	11.00	11.00
P	1	SECTION 1/2" VEE	11.00	11.00
Q	1	SECTION 1/2" VEE	11.00	11.00
R	1	SECTION 1/2" VEE	11.00	11.00
S	1	SECTION 1/2" VEE	11.00	11.00
T	1	SECTION 1/2" VEE	11.00	11.00
U	1	SECTION 1/2" VEE	11.00	11.00
V	1	SECTION 1/2" VEE	11.00	11.00
W	1	SECTION 1/2" VEE	11.00	11.00
X	1	SECTION 1/2" VEE	11.00	11.00
Y	1	SECTION 1/2" VEE	11.00	11.00
Z	1	SECTION 1/2" VEE	11.00	11.00

# "INNOVATIVE SOLUTIONS TO SERVE YOU BEST!"

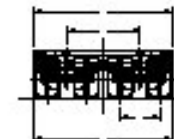


## 24 WHEEL LOWBED



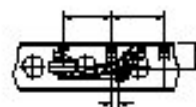
ITEM	QTY	DESCRIPTION/MATERIALS	LENGTH	WEIGHT	REV
A	-	SEE DWG 64000000AB02	-	2200	-
B	-	SEE DWG 64000000AB03	-	3000	-
C	-	SEE DWG 64000000AB04	-	2800	-
D	-	SEE DWG 64000000AB05	-	2800	-
E	-	SEE DWG 64000000AB06	-	480	-
F	-	SEE DWG 64000000AB07	-	8000	-
G	-	SEE DWG 64000000AB08	-	400	-
H	-	SEE DWG 64000000AB09	-	2100	-
I	-	SEE DWG 64000000AB10	-	1000	-
J	-	SEE DWG 64000000AB11	-	1100	-
K	-	SEE DWG 64000000AB12	-	700	-
L	-	SEE DWG 64000000AB13	-	800	-
M	-	SEE DWG 64000000AB14	-	90	-
N	4	SWING OUT LIGHT ASSEMBLY	-	30	-
O	-	SEE DWG 64000000AB15	-	4800	-
P	-	SEE DWG 64000000AB16	-	100	-
Q	-	SEE DWG 64000000AB17	-	500	-
R	-	SEE DWG 64000000AB18	-	500	-
S	24	TIRE	-	2800	-
T	4	TRUCK AXLE	-	1000	-
U	-	SUSPENSION	-	5000	-
V	12	STUD	-	1000	-
W	24	STEEL WHEEL	-	1000	-

TOTAL WEIGHT W/O WOOD, WELDING,  
PAINT & AIR/WIRING = 30000 LBS



REFERENCE DRAWING NO. -

- NOTES:
1. ALL DIMENSIONS 1/4" UNLESS OTHERWISE SPECIFIED
  2. SOME DIMENSIONS OMITTED FOR CLARITY
  3. REMOVE DIMENSION LINES
  4. LIVE ROLL AND SUPPORT ROLLERS BY CTR
  5. SUPPORT ROLLERS BY CTR
  6. WIRE 4 BOLT 1 1/4" NO 5/8 HWT/UNS-50 & 1/2" UNB



REV	DATE	DESCRIPTION	BY	CHKD BY	APP'D BY
1					

PREPARED BY:



GENMARK &  
ENGINEERING  
1000, 10450-175 ST  
Edmonton, Alberta  
Ph: (780) 461-8234  
Fax: (780) 461-8924

TITLE	-	DWG. NO.	-	DATE	-
CUSTOMER	-	CHK'D BY	-	DATE	-
DATE	-	SCALE	-	APPROVED BY	-
DATE	-	DWG.	-	REV	-



# GENMARK

FILE	-	OWN BY	-	DATE	-
	-	CHK'D BY	-	DATE	-
CUSTOMER	-	SCALE	-	APPROXIMATE	
W.O.#	-	WBS	-	BPA	

REV NO.	DATE	DESCRIPTION	ISSUED BY	CHECKED BY	APPROVED BY
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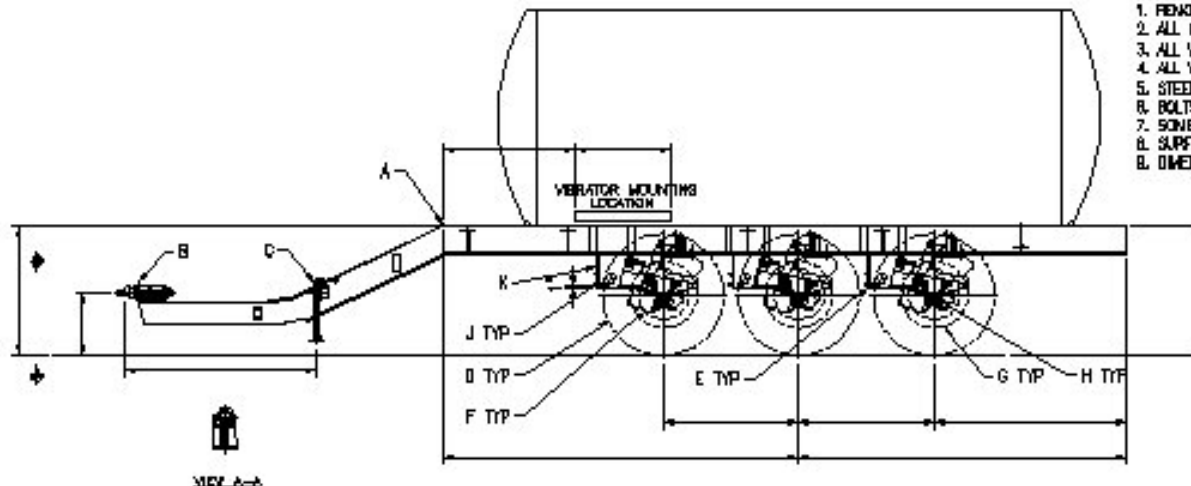
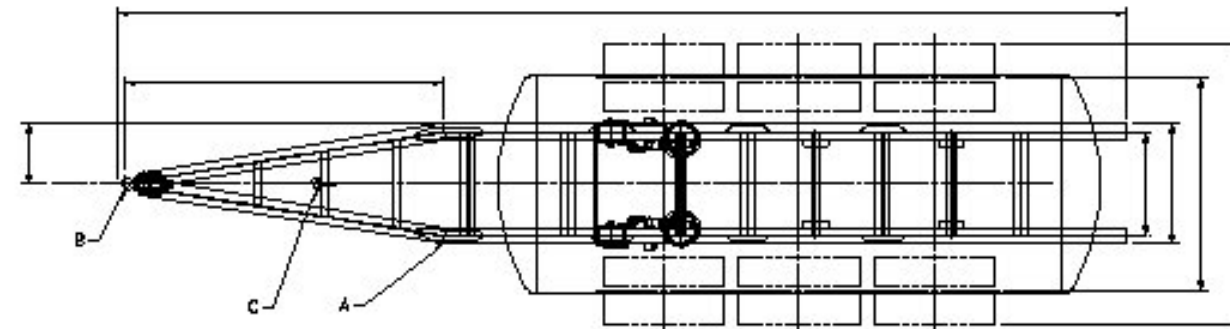
## PUP CHASSIS

ITEM	QTY	DESCRIPTION/MATERIAL	LENGTH	WEIGHT
A	-	WELD SHIP BULKHEAD/CHASSIS	-	3000
B	-	WELD SHIP BULKHEAD/CHASSIS	-	75
C	ONE	FRONT AIR	-	30
D	10	WEL	-	1740
E	3	CLAMP/SHIM	-	1044
F	5	WELD LINE HOLE/SHIM ARM	-	972
G	10	WELD VIBRA	-	1044
H	3	WEL	-	1044
I	3	2" x 4" x 1/4"	4-10	60
K	ONE	PL 3/8	4-10	30

TOTAL WEIGHT W/O AIR/WIRING  
WELDING AND PAINT APPROX = XXXX LBS

### NOTES:

1. REMOVE ALL SHARP EDGES.
2. ALL CONSUMABLES FOR STRUCTURAL STEEL TO BE CONTROLLED.
3. ALL WELDS TO BE 1/4" FILLET.
4. ALL WELDS TO CONFORM TO C.S.A. W88 LATEST.
5. STEEL IS TO CONFORM TO C.S.A. G40.21/44W.
6. BOLTS ARE TO CONFORM TO A.S.T.M. A325, UNLESS NOTED OTHERWISE.
7. SOME HIDDEN LINES ARE OMITTED FOR CLARITY.
8. SURFACE PREPARATION S.S.P.C.-SP3.
9. DIMENSIONS OF RECTANGULAR PLATES ONLY IN PART LIST.



VIEW A-B

REFERENCE DRAWING NO. -

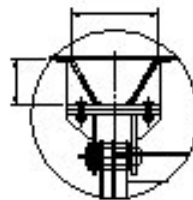
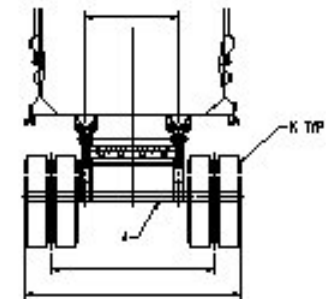
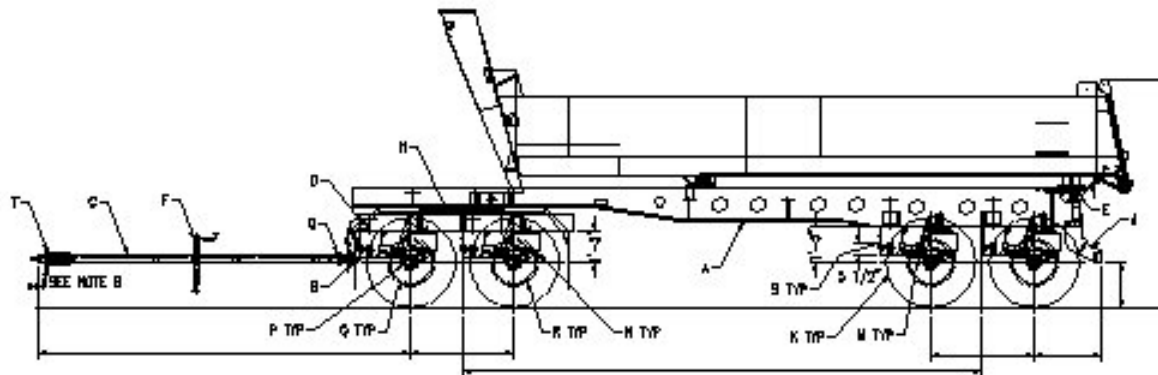
		<b>ENGINEERING and MANAGEMENT LTD</b> (708) 1040-170 Street, Edmonton, Alberta T6E 1M5 Phone: (708) 481-0004 Fax: (708) 481-0004	
		ALL DIMENSIONS ARE IN FEET UNLESS NOTED OTHERWISE UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE MAINTAINED TO THE CLOSEST POSSIBLE TOLERANCE	
TITLE: PUP CHASSIS GENERAL ARRANGEMENT		DRAWN BY: [blank] CHECKED BY: [blank] SCALE: 1/8" = 1'-0"	DATE: [blank] DATE: [blank]
REV. NO. [blank] QTY [blank]	DESCRIPTION [blank]	APPROVED BY: [blank] DATE: [blank]	REV. NO. [blank] QTY [blank]



**GENMARK**

A detailed technical cross-sectional diagram of a ship's hull. The diagram illustrates the internal structure from the bow (left) to the stern (right). Key components are labeled as follows:

- T**: Bow tip.
- C**: Deck plating.
- B**: Bulkhead structure.
- H**: Internal stiffeners or ribs.
- D**: Bottom plating.
- N TYP**: Typical section of the bottom structure.
- A**: Longitudinal bulkhead or stiffener running along the length of the hull.
- M TYP**: Typical section of the side structure.
- S TYP**: Typical section of the deck structure.
- K TYP**: Typical section of the upper hull structure.
- E**: Stern transverse bulkhead.

TOTAL WEIGHT W/O YELLOW PAINT  
AIRWEIGHT APPROX. = XXXXXX LB.

- | REF<br>No. | DATE | DESCRIPTION | ENTER<br>DATE | ENTER<br>DATE | ENTER<br>DATE |
|------------|------|-------------|---------------|---------------|---------------|
|------------|------|-------------|---------------|---------------|---------------|

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TITLE: <b>ROAD CROSSING</b> <b>GENERAL AGREEMENT</b>	DRAWN BY: _____ CHECKED BY: _____ SCALE: 1/8" = 1'-0"	DATE: _____ DATE: _____ DATE: _____
CLIENT: <b>ALBERTA GOVERNMENT</b>	DRAWING NO.: <b>GNXXXXXXAB01</b> REV. _____	

# “INNOVATIVE SOLUTIONS TO SERVE YOU BEST!”



## REMOVABLE NECK LOWBED

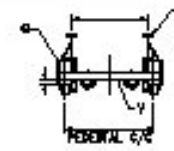
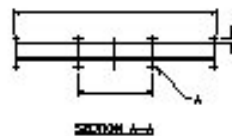
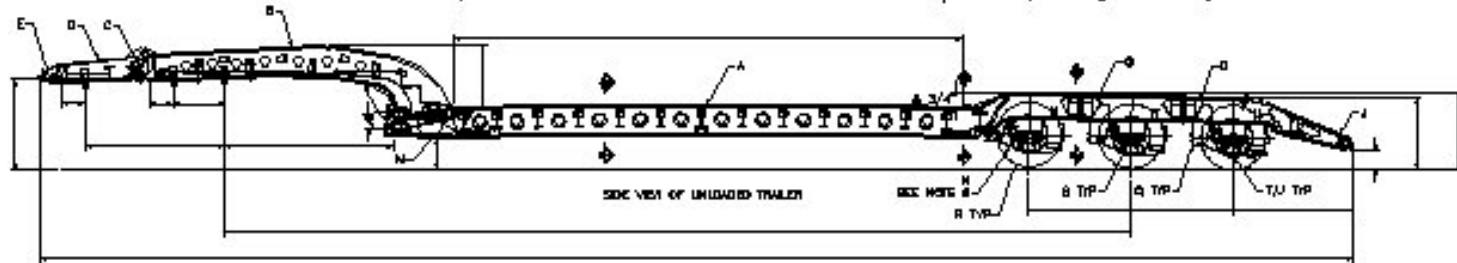
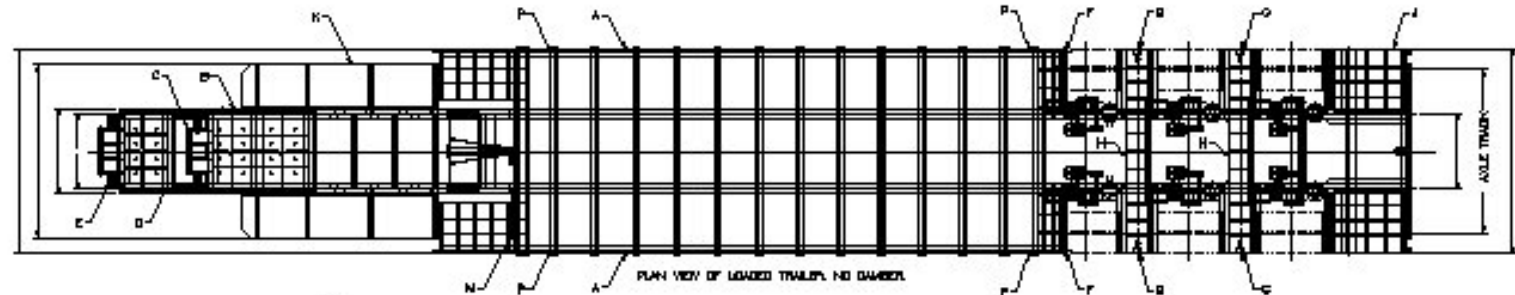
### NOTES:

1. SOME HIDDEN LINES OMITTED FOR CLARITY.
2. REMOVE ALL SHARP EDGES
3. ALL WELDS TO BE 1/4" FILLET UNLESS NOTED OTHERWISE.
4. ALL CONSUMABLES FOR STRUCTURAL STEEL TO BE CONTROLLED
5. WELDS TO CSA W89 LATEST.
6. TRAILER IS DESIGNED FOR XX TON @ XX FT LOAD.
7. ROTATE AIRBAGS AS REQUIRED TO CLEAR FITTINGS
8. TRIM FRONT SUSPENSION PEDESTALS AS REQUIRED.

ITEM	QTY	DESCRIPTION/MATERIALS	LENGTH	WEIGHT	REV
M	ONE	SUSPENSION	-	480	-
P	4	SPRING OUT LIGHT	-	40	-
Q	2	HYDRAULIC SUSPENSION	-	912	-
R	12	TIRE	-	1200	-
S	3	AXLE	-	1200	-
T	8	STUD H/D ASSY	-	670	-
U	12	STEEL WHEEL	-	810	-
V	2	64 x 64	4'-10"	84	-

TOTAL WEIGHT W/D WELD, AIR & WIRING,  
PAINT AND WOOD APPROX. = XXXXX LBS

ITEM	QTY	DESCRIPTION/MATERIALS	LENGTH	WEIGHT	REV
A	-	SEE DWG EN000000000002	-	2907	-
B	-	SEE DWG EN000000000003	-	3403	-
C	-	SEE DWG EN000000000004	-	292	-
D	-	SEE DWG EN000000000006	-	684	-
E	-	SEE DWG EN000000000008	-	200	-
F	-	SEE DWG EN000000000007	-	857	-
G	-	SEE DWG EN000000000009	-	1308	-
H	-	SEE DWG EN000000000010	-	430	-
I	-	SEE DWG EN000000000010	-	1500	-
K	-	SEE DWG EN000000000011	-	248	-
M	-	SEE DWG EN000000000012	-	20	-



REFERENCE DRAWING NO. -

PREPARED BY:



ENGINEERING &  
MANAGEMENT

MOOD, 10450-175 St.  
Edmonton, Alberta  
CAN (780) 461-8234  
Fax (780) 401-0624

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CHECKED BY: -	DATE: -	
APPROVED BY: -	DATE: -	
DATE: -	DWG: -	REV: -

REV	DATE	DESCRIPTION	BY	CHECKED BY	APPROVED BY
1		FILE BETWEEN PAPER FOR STAMP			

**“INNOVATIVE SOLUTIONS TO SERVE YOU BEST!”**



## **Accessories**

- **Booster**

- Single axle

- Tandem axle

- **Jeep**

- Single axle

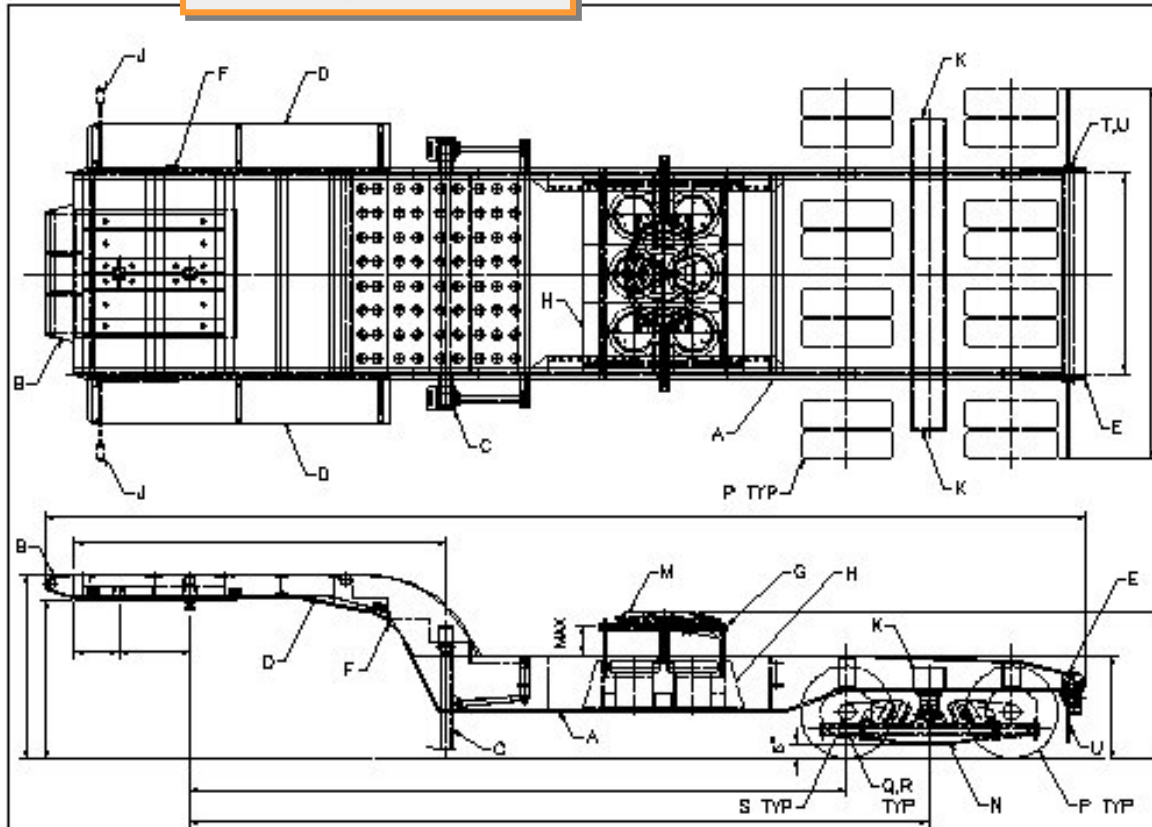
- Tandem axle



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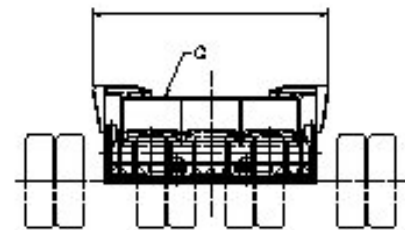


## 16 WHEEL JEEP



ITEM	QTY	DESCRIPTION/MATERIALS	LENGTH	HEIGHT	REV
A	-	SEE DWG 8N000000AB02	-	1407	-
B	-	SEE DWG 8N000000AB03	-	174	-
C	-	SEE DWG 8N000000AB04	-	180	-
D	-	SEE DWG 8N000000AB05	-	211	-
E	-	SEE DWG 8N000000AB06	-	485	-
F	-	SEE DWG 8N000000AB07	-	3078	-
G	-	SEE DWG 8N000000AB08	-	1294	-
H	-	SEE DWG 8N000000AB09	-	1659	-
J	2	SWING OUT LIGHT	-	18	-
K	-	SEE DWG 8N000000AB11	-	181	-
M	-	FIFTH WHEEL	-	302	-
N	-	SUSPENSION	-	-	-
P	18	TIRE	-	1840	-
Q	18	STEEL WHEEL	-	400	-
R	5	H/D ASBW	-	978	-
S	4	TRUCK AXLE	-	700	-
T	4	MUDFLAP	-	32	-
U	4	MUDFLAP	-	72	-

TOTAL WEIGHT W/O SUSPENSION, PLYWOOD, WELDING, PAINT & AIR/WIRING = XXXXX LBS



### NOTES:

1. ALL WELDS 1/4" UNLESS OTHERWISE SPECIFIED
2. SOME HIDDEN LINES OMITTED FOR CLARITY
3. REMOVE SHARP EDGES
4. MAXIMUM RECOMMENDED LOAD ON FIFTH WHEEL XXXXX LBS
5. USE DOLLY LEGS TO SUPPORT EMPTY UNLOADED JEEP ONLY
6. DO NOT LIFT FIFTH WHEEL MORE THAN XX".

REV	DATE	DESCRIPTION	BY	CHECKED BY	APPROVED BY

### PREPARED BY:



ENGINEERING & MANAGEMENT LTD.

1000, 10450-175 St.  
Edmonton, Alberta  
Ph: (780) 461-8224  
Fax: (780) 461-8824

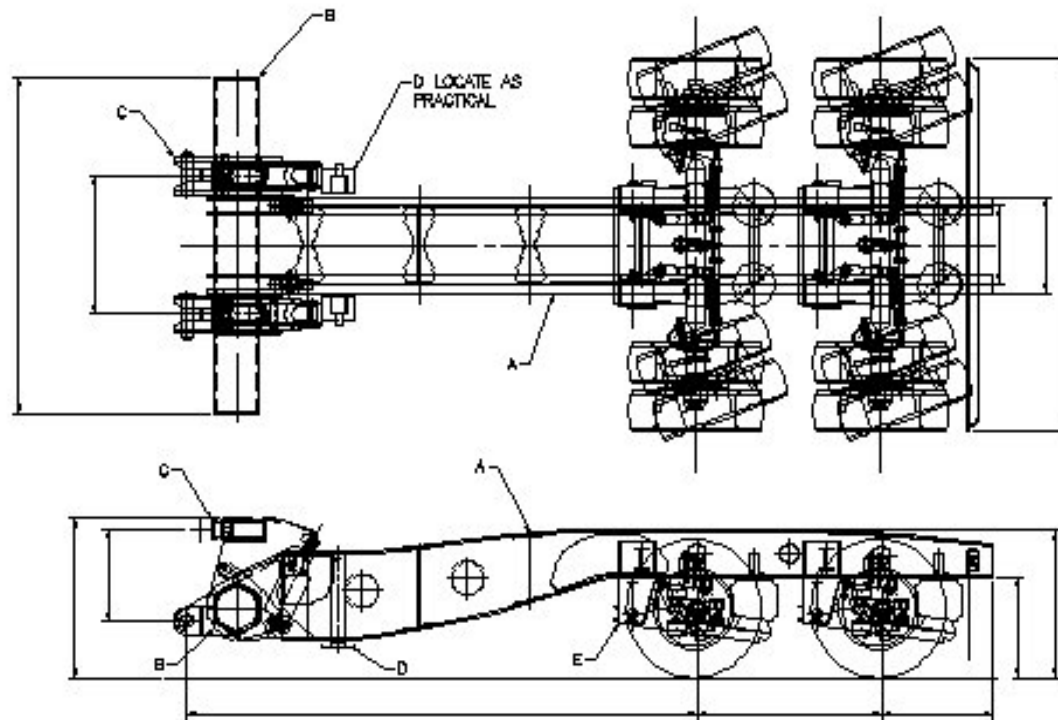
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CHK'D BY	DATE	DATE
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W.D.	W.D.	W.D.

# "INNOVATIVE SOLUTIONS TO SERVE YOU BEST!"

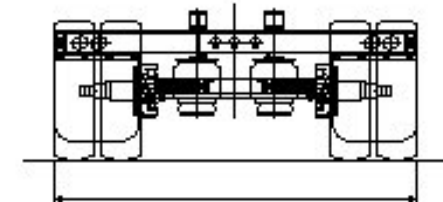


## TANDEM BOOSTER



ITEM	QTY	DESCRIPTION/MATERIALS	LENGTH	WEIGHT	REV
A	-	SEE DWG 81000000000000000000	-	1785	-
B	-	SEE DWG 81000000000000000000	-	840	-
C	-	SEE DWG 81000000000000000000	-	1500	-
D	-	DAILY USE	-	200	-
E	2	AXLE	-	-	-
F	10	TIRE	-	1700	-
F	10	STEEL WHEEL	-	1000	-

TOTAL WEIGHT W/O WELDING, PAINT, AIR/WIRING  
STEERING AXLES, HYDRAULICS APPROX. = 30000 LBS



REFERENCE DRAWING NO. -

PREPARED BY:



ENGINEERING  
MANAGEMENT LTD.

10400, 10400-175 St  
Edmonton, Alberta  
Ph: (780) 461-8234  
Fax: (780) 461-8924

REV	DATE	DESCRIPTION	BY	CHKD	APP'D
1					

DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE
DATE	DATE	DATE	DATE

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## **Design considerations**

- **Strength (safety factor of 2.2 to 3)**
- **Weight**
- **Cost**
- **Working conditions**
- **Road regulations**
- **Customer requirements**
- **Maintainability**
- **One man operation**



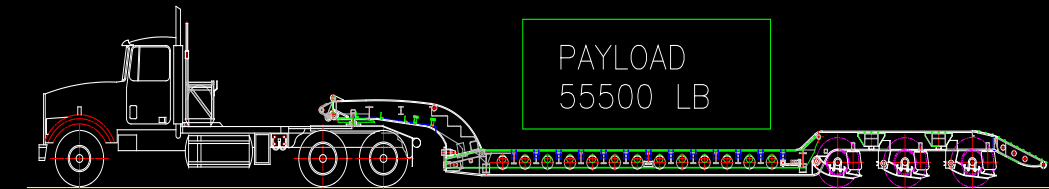
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# Weight distribution example

22000 LB

25000 LB



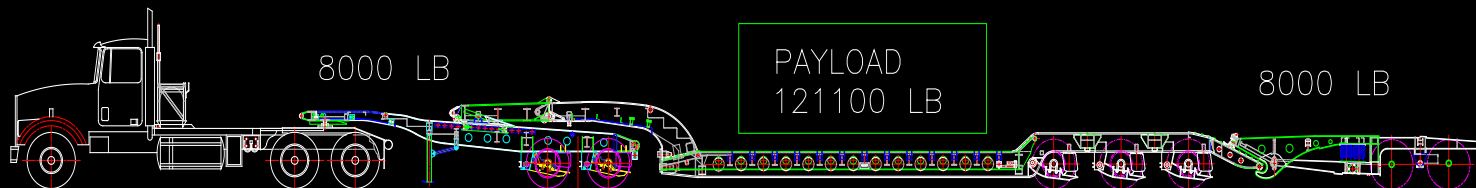
5500 KG  
12100 LB

17000 KG  
37500 LB

24000 KG  
52900 LB

22000 LB

25000 LB



8000 LB

8000 LB

5500 KG  
12100 LB

17000 KG  
37500 LB

17000 KG  
37500 LB

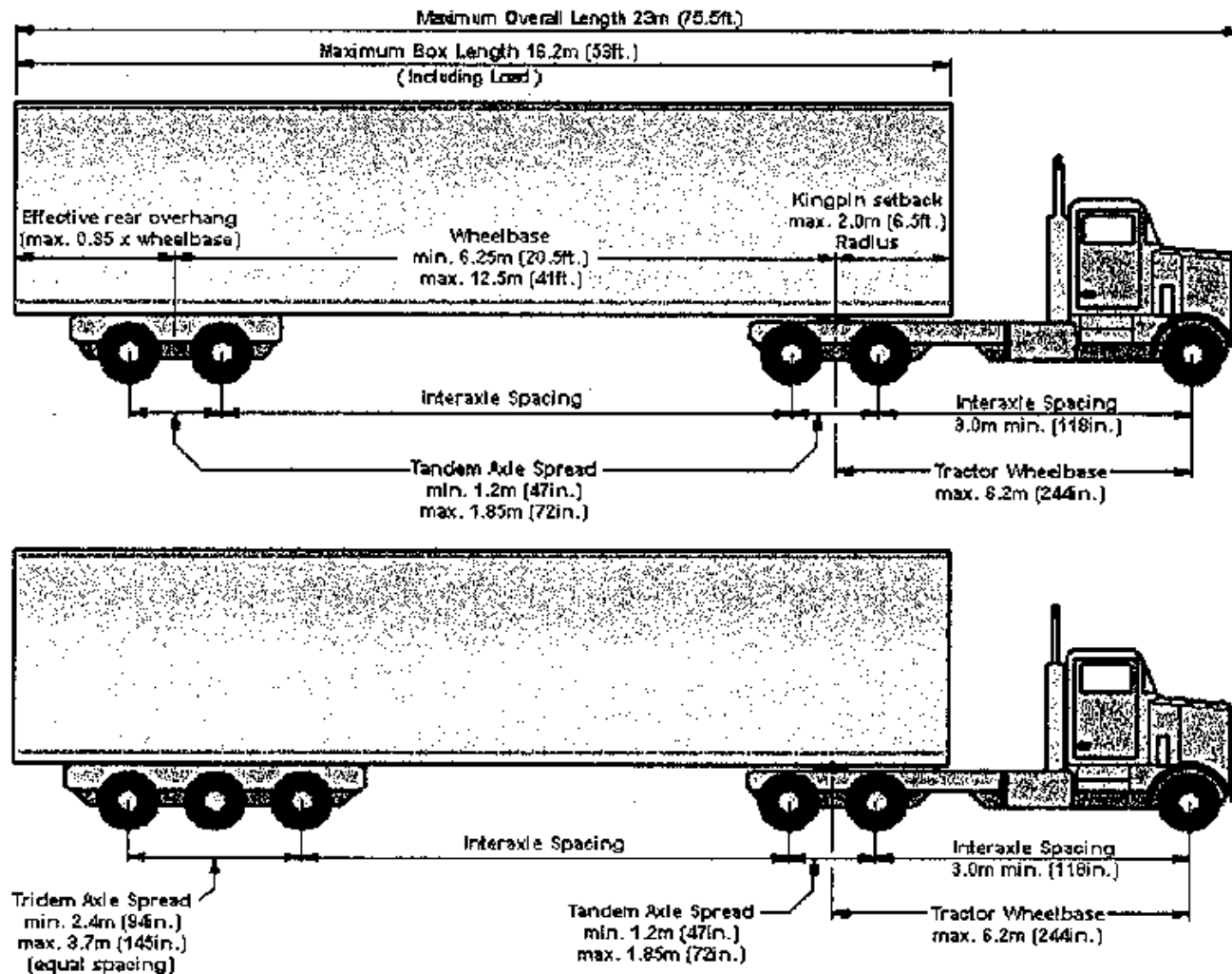
24000 KG  
52900 LB

20000 KG  
44100 LB

# "INNOVATIVE SOLUTIONS TO SERVE YOU BEST!"



## Tractor Semi-Trailer



# "INNOVATIVE SOLUTIONS TO SERVE YOU BEST!"



## Maximum Allowable Axle Group Weight

	<u>Kilograms</u>			<u>Pounds</u>		
	<u>100% Axle Weight</u>	<u>90% Axle Weight</u>	<u>75% Axle Weight</u>	<u>100% Axle Weight</u>	<u>90% Axle Weight</u>	<u>75% Axle Weight</u>
<u>STEERING AXLE</u>						
Single Steer	5,500	5,500	5,500	12,125	12,125	12,125
<u>CARRYING AXLES</u> (Dual Tires)						
Single Axle Group	9,100	8,190	6,825	20,061	18,055	15,046
Tandem Axle Group	17,000	15,300	12,750	37,477	33,729	28,108
<u>TRIDEM AXLE GROUP</u>						
Min. 2.4m Spread	21,000	18,900	15,750	46,296	41,666	34,722
Min. 3.0m Spread	23,000	20,700	17,250	50,705	45,635	38,029
Min. 3.6m - Max. 3.7m Spread	24,000	21,600	18,000	52,910	47,619	39,683

## Maximum Gross Vehicle Weight

Cannot exceed the sum of the maximum allowable axle weights.

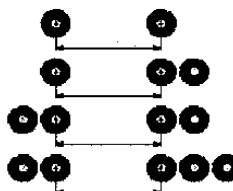
## Interaxle Spacing

Single - Single  
Minimum 3.0m (9.8ft.)

Single - Tandem  
Minimum 3.0m (9.8ft.)

Tandem - Tandem  
Minimum 5.0m (16.4ft.)

Tandem - Tridem  
Minimum 5.5m (18.0ft.)

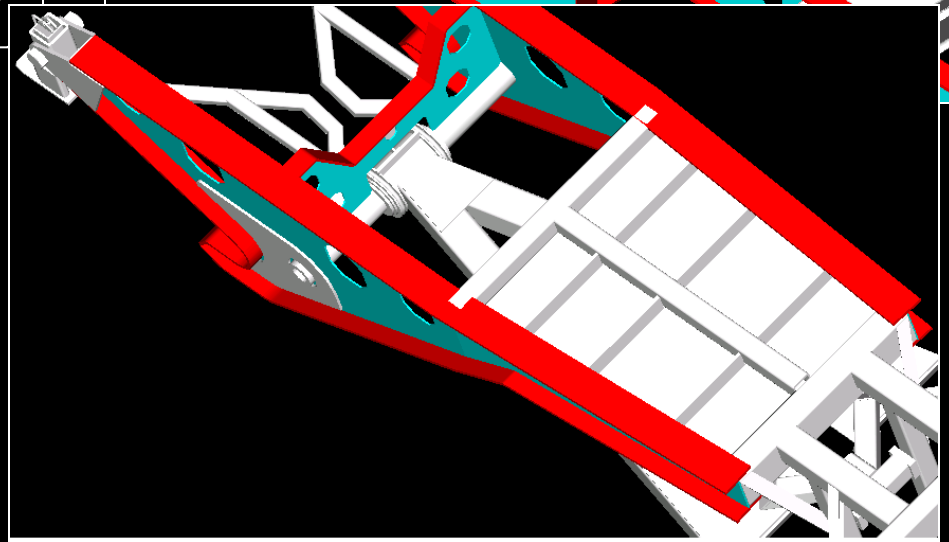
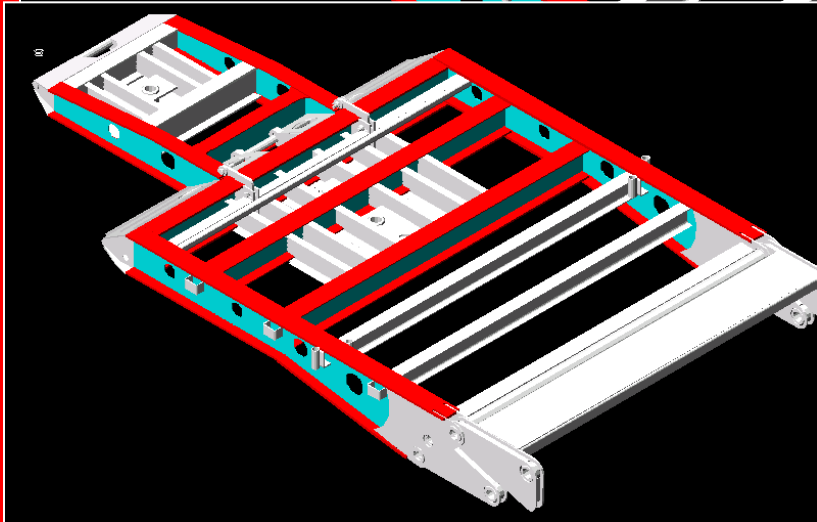
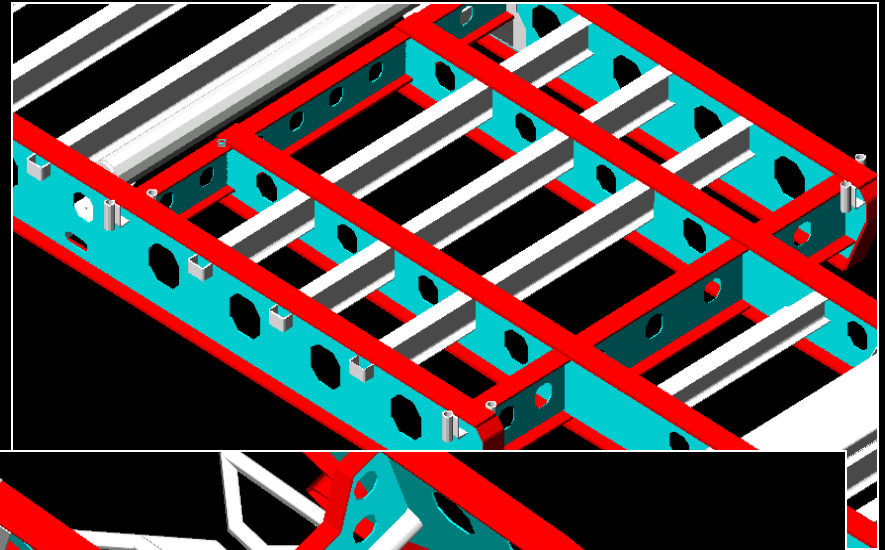
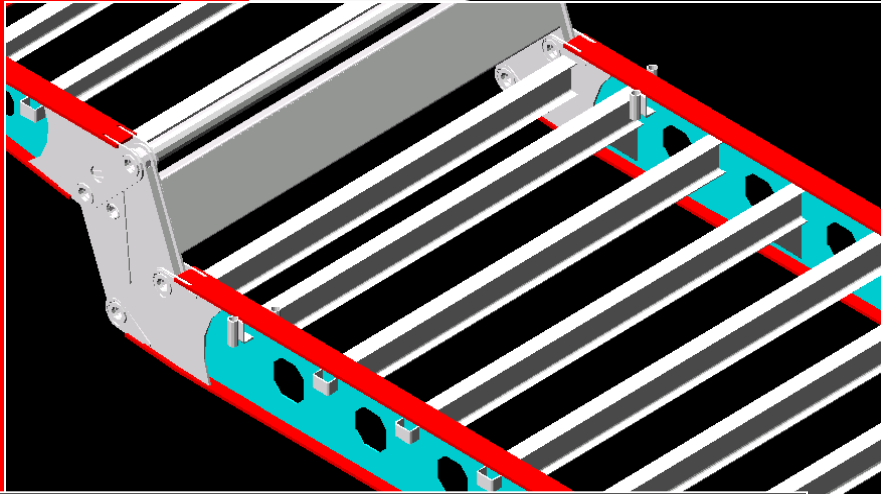


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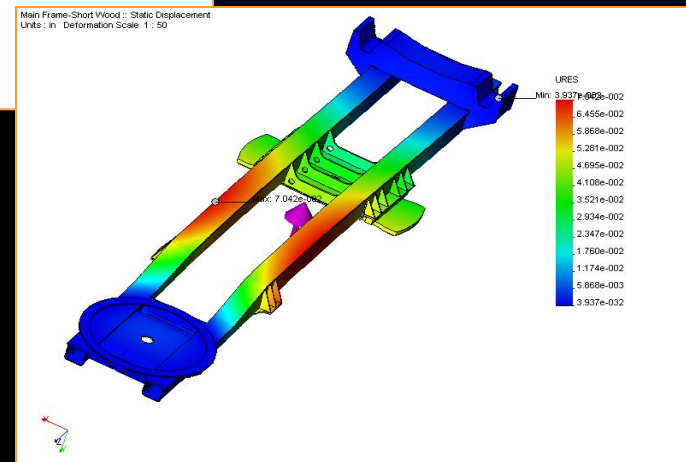
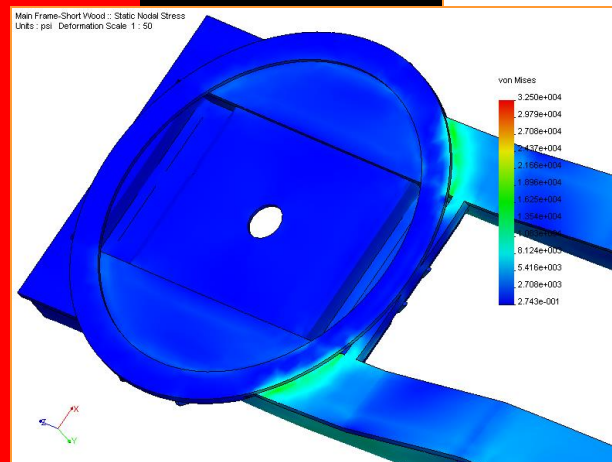
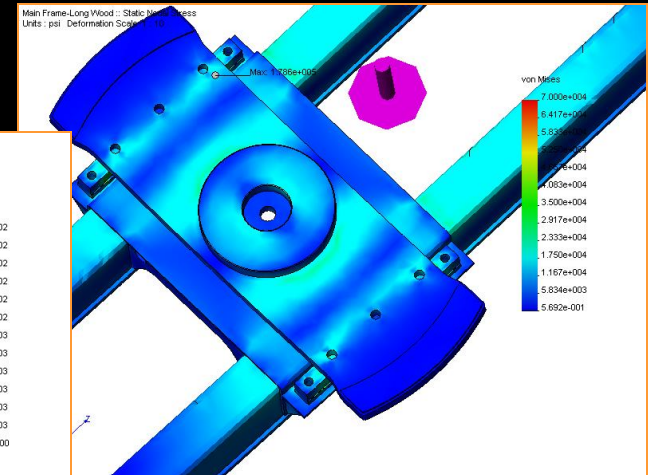
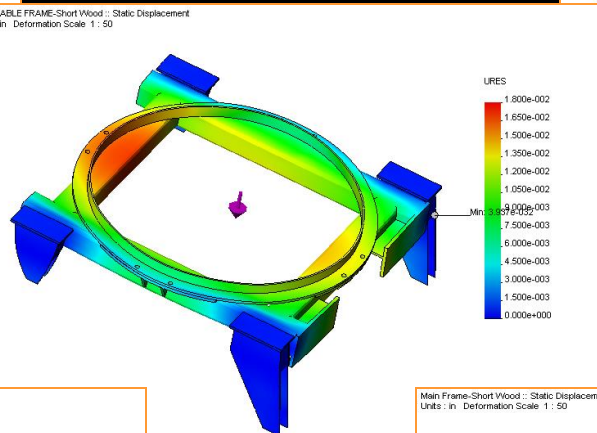
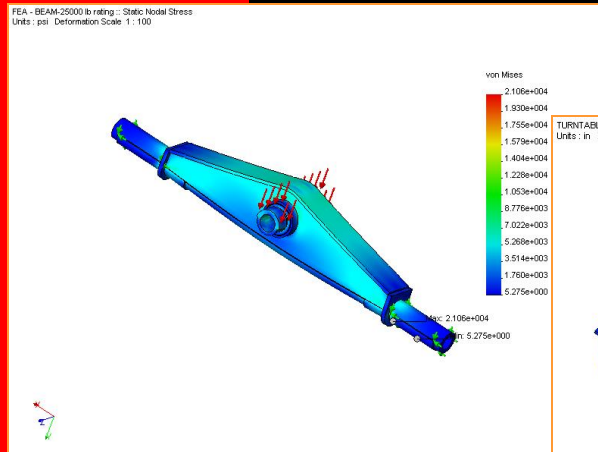
## **3D solid modeling**



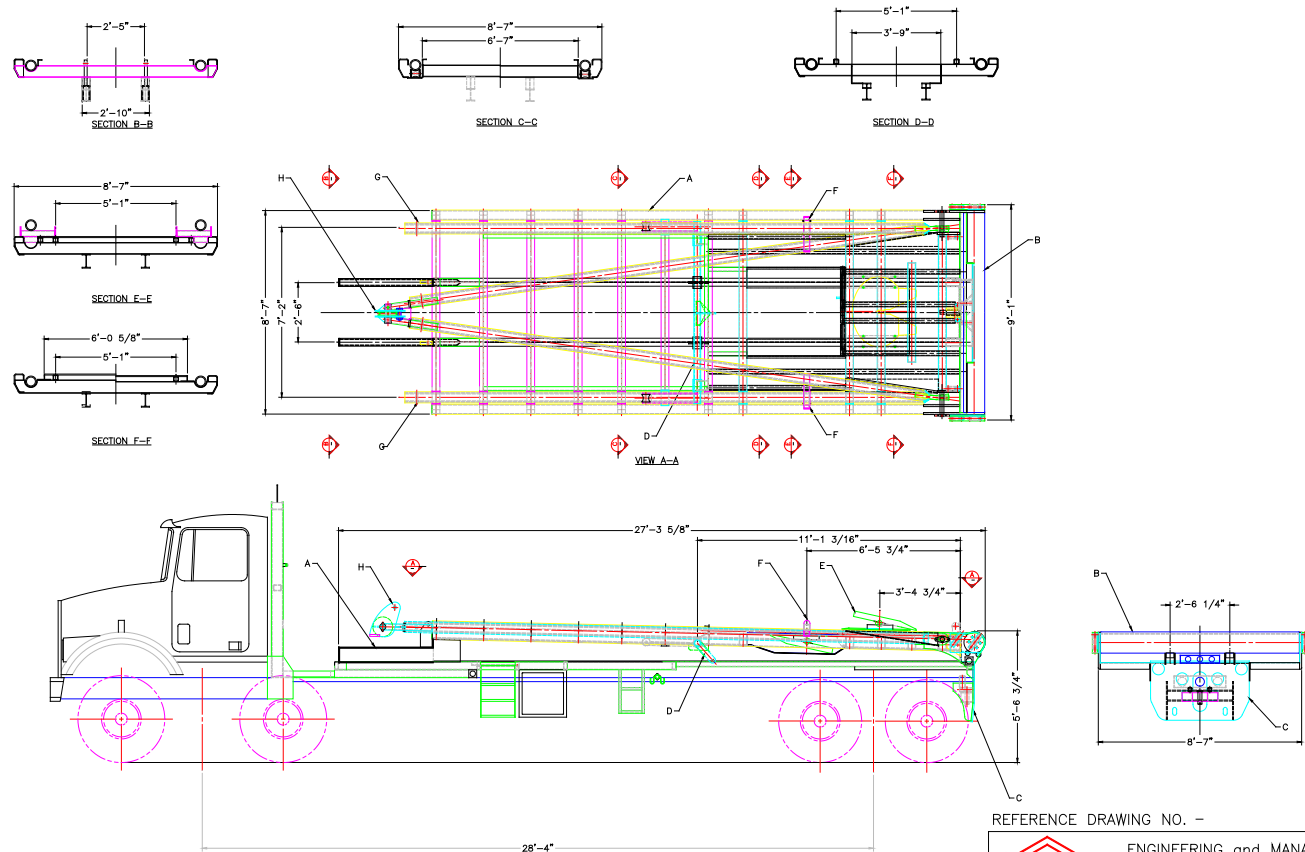
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## F.E.A. on trailer structure



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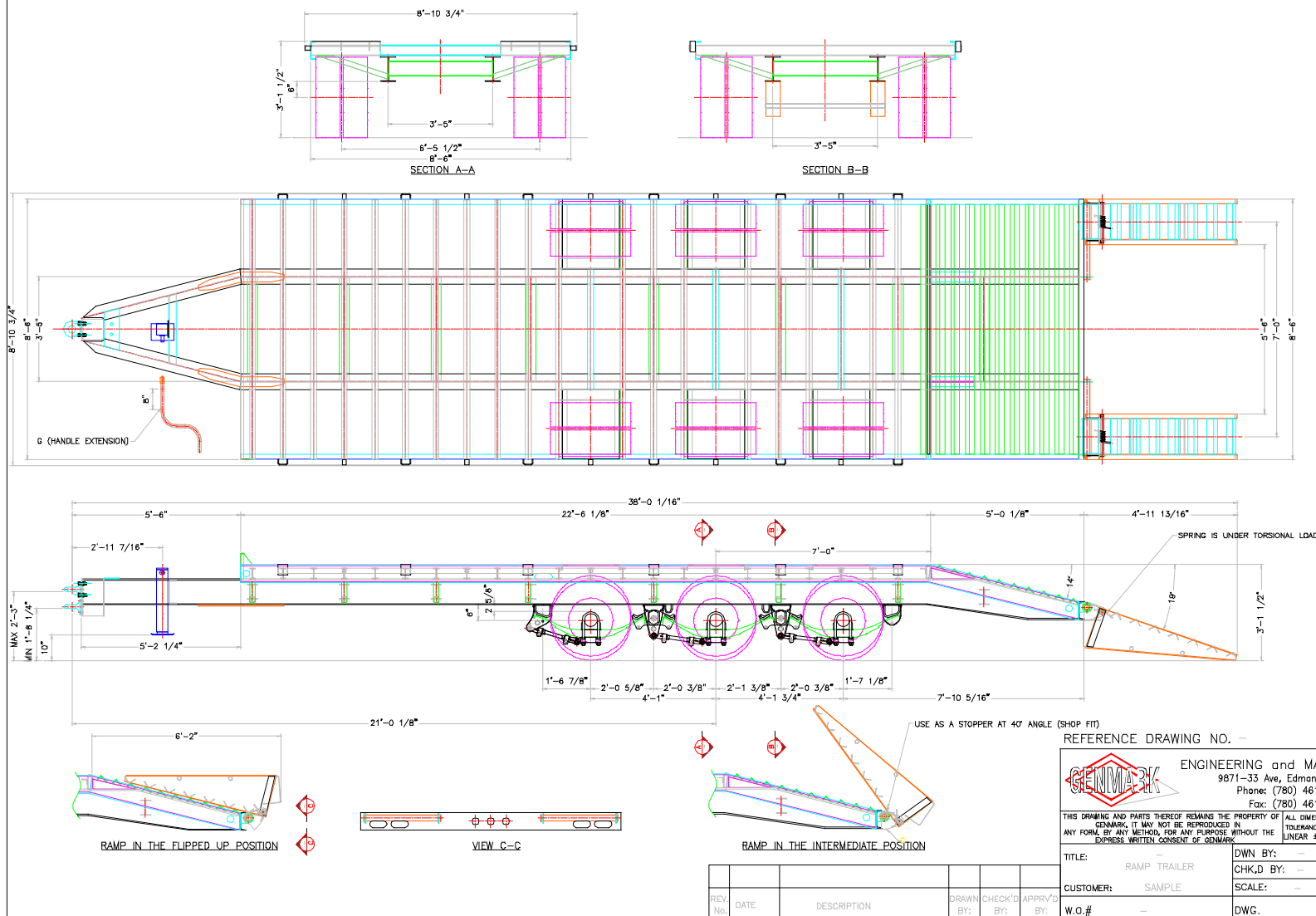
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CUSTOMER: SAMPLE		SCALE: -	CADD GENERATED DRAWINGS NO MANUAL REVISION ALLOWED
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## **Future considerations**

- **New materials**
- **New engineering ideas**
- **3D solid modeling and FEA**
- **New manufacturing procedures**



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