THE EXCITING WORLD OF

PIPING & PLUMBING

Jim May
J. May Equipment/ ATA, Inc.
Arlington, TX

Fluid Fertilizer Foundation

Council Bluffs, IA

POPULAR PIPE MATERIAL

DRISCO --- HDPE

DESIGN FOR TEMPERATURE FLEX

STEEL TRANSITION FITTINGS

FLEX HOSES – STAINLESS OR EPDM

ON GROUND or SUPPORTED

UNDERGROUND * CAUTION*****

STEEL PIPE & FITTINGS

SCH 40 PIPE, 150# ANSI FLANGES
STAINLESS STEEL or CARBON STEEL
CARBON STEEL , COLOR COAT
STAINLESS STEEL, 304 or 316

SCH 80 PVC/CPVC
PIPE & FITTINGS

USE PROPER PRIMER AND CEMENT
CPVC TEMPERATURE UP TO 200° F
PVC TEMPERATURE UP TO 140° F

DO NOT USE SCH 40,

NEVER !! THREAD SCH 80 PIPE NIPPLES.

THREADED SCH 80 BECOMES SCH 40,

"IT'S UNDER YOUR KITCHEN SINK"

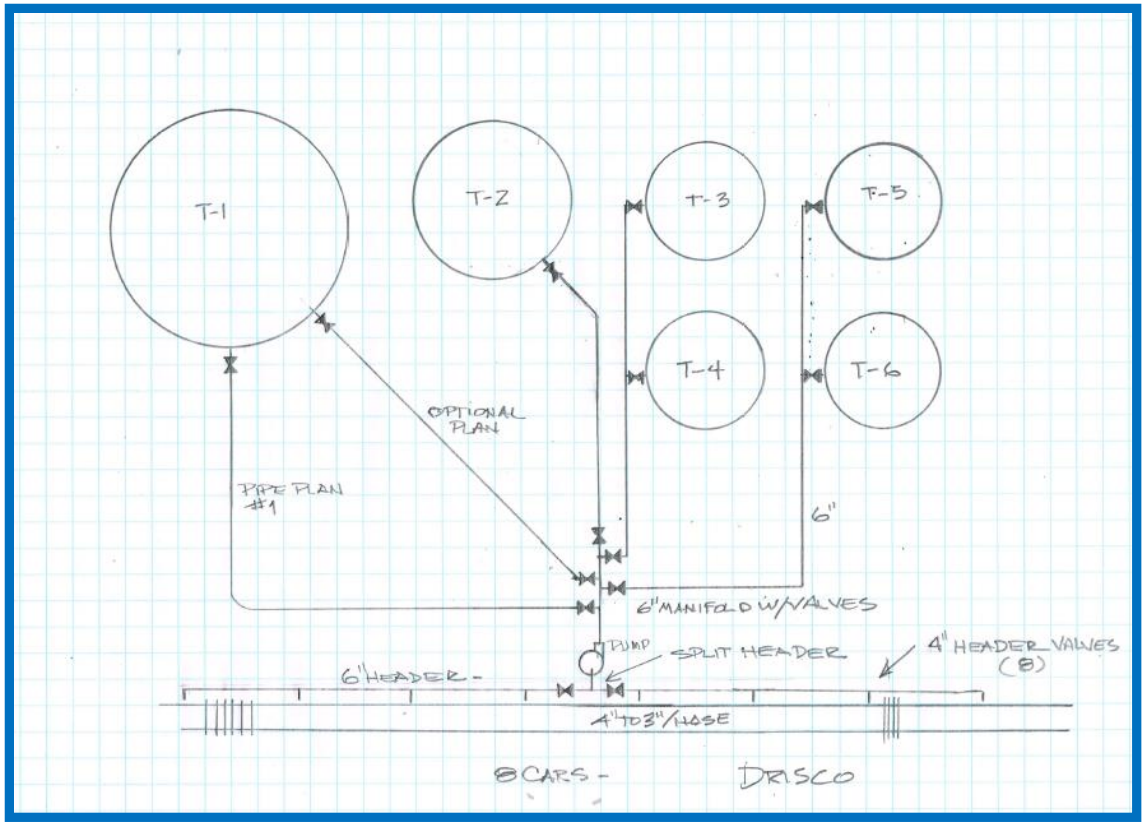
*****IF THREADED FITTINGS, TRANSITION WITH THREADED STAINLESS STEEL NIPPLES**

*****SLIP RING FLANGES MAKE EASY BOLT ALIGNMENT**

*****"PRIME, APPLY CEMENT TO SOCKET AND PIPE, INSERT PIPE INTO FITTING THE FULL DEPTH, TURN A HALF TURN, HOLD TILL CEMENT SETS, ABOUT 1 MINUTE.**

ALWAYS START WITH BASIS FOR DESIGN

- Flow Diagram, no dimensions from where to where with all valves indicated



PUMP FROM WHERE TO WHERE

START WITH WHAT WILL WORK

WWW.FREECALC.COM/FRICFRAM.HTM

ON Line Friction Piping Loss-FreeCalc

“SIZE MATTERS!”

Based on FreeCalc.com

	PRESSURE DROP	*HEAD LOSS*
3” Pipe per 100’ @ 500 GPM	22.5 PSI	52’
4” Pipe per 100’ @ 500 GPM	5.59 PSI	12.9’
6” Pipe per 100’ @ 500 GPM	0.71 PSI	1.6’
8” Pipe per 100’ @ 500 GPM	0.18 PSI	0.4’
3” Pipe per 100’ @ 1000 GPM	87.99 PSI	203.3’
Basically Impossible		
4” Pipe per 100’ @ 1000 GPM	21.62 PSI	49.5’
6” Pipe per 100’ @ 1000 GPM	2.66 PSI	6.1’
8” Pipe per 100’ @ 1000 GPM	0.67 PSI	1.5’

COMPARE PIPE BY DIAMETER

3” PIPE INTERNAL IS 7.0686 SQUARE INCHES

4” PIPE INTERNAL IS 12.5664 SQUARE INCHES

4” IS 5.4978^{2}” LARGER, 78% LARGER THAN 3”

6” PIPE INTERNAL IS 28.2744 SQUARE INCHES

6” IS 15.708^{2}” LARGER, 2.25 TIMES LARGER THAN 4”

8” PIPE INTERNAL IS 50.2656 SQUARE INCHES

8” IS 21.991^{2}” LARGER, 78% LARGER THAN 6”

IT’S NOT GUESSING,
IT’S ENGINEERING

MOST OFTEN BUILT WRONG

"RAILCAR UNLOADING SYSTEMS"

DESIGNS BASED ON FLOW CALCULATIONS

Flow Capacity desired.

Maximum cars on spur

Volume divided by the elapsed time desired

Flow capacity multiplied by design factor. Such as 110% or 125%

Marginal Systems work at marginal capacity.

BASIS FOR DESIGN

- HOW MANY CARS
- CAR SPACING, CENTER TO CENTER
- RAILROAD REGULATIONS FOR SET BACK OF EQUIPMENT. NOZZLE HEIGHT USUALLY NOT AN ISSUE. KEEP LOW.
- SELECT MATERIALS OF CONSTRUCTION, TYPE PIPE
- PIPE SIZE (From *FreeCalc.Com)*

DESIGN SOMETHING

- BASED ON DESIRED FLOW AND DISTANCE
- SELECT A PUMP
- SELECT A PIPE SIZE
- CALCULATE OVERALL DISTANCE INCLUDING TANK HEIGHT
- COUNT AND ADD FITTINGS, 90° ELBOWS, VALVES AND T's.. Add to length
- CONFIRM WITH FreeCalc.com

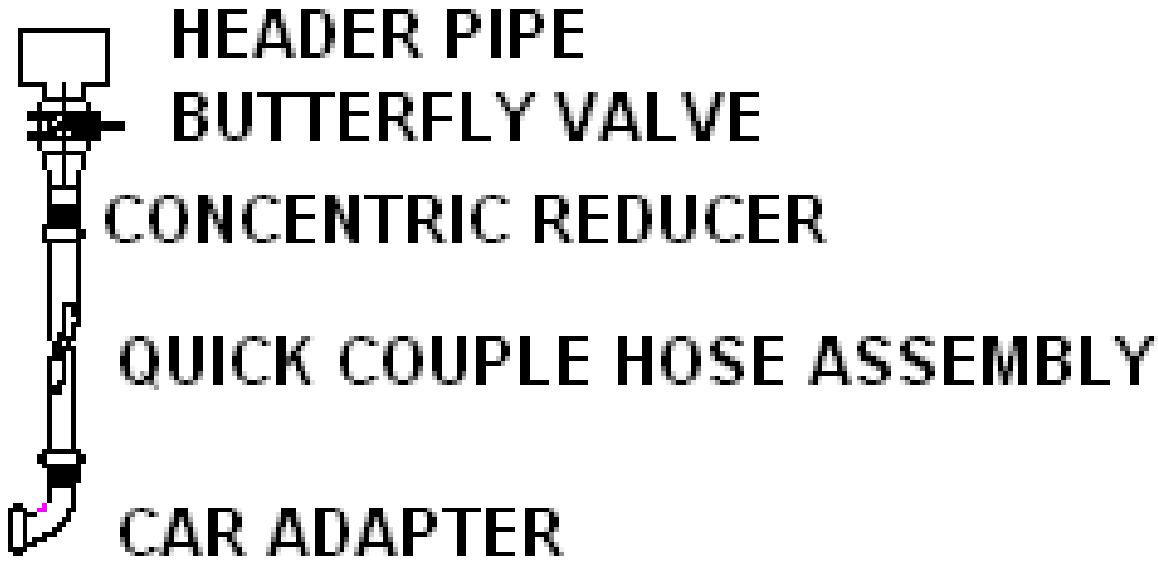
The Less Feet The Less Friction

Item	3"	4"	6"	8"
90 Elbow	7.9	11.4	16.7	21.0'
45 Elbow	4.0	5.1	8.0	10.6'
T - Branch	16.4	22.0	32.7	49.0'
T - Run	6.1	7.9	12.3	14.0'

Fittings add to the overall length. They must be calculated in the flow capacity.

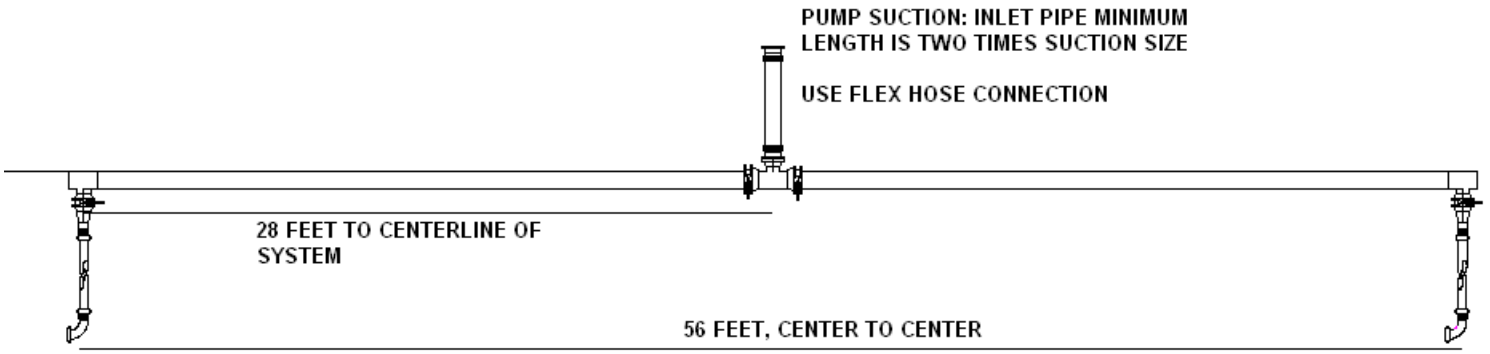
DESIGN SOMETHING

- INDIVIDUAL CAR CONNECTIONS
- SELECT VALVE SIZE



Wrong & Right

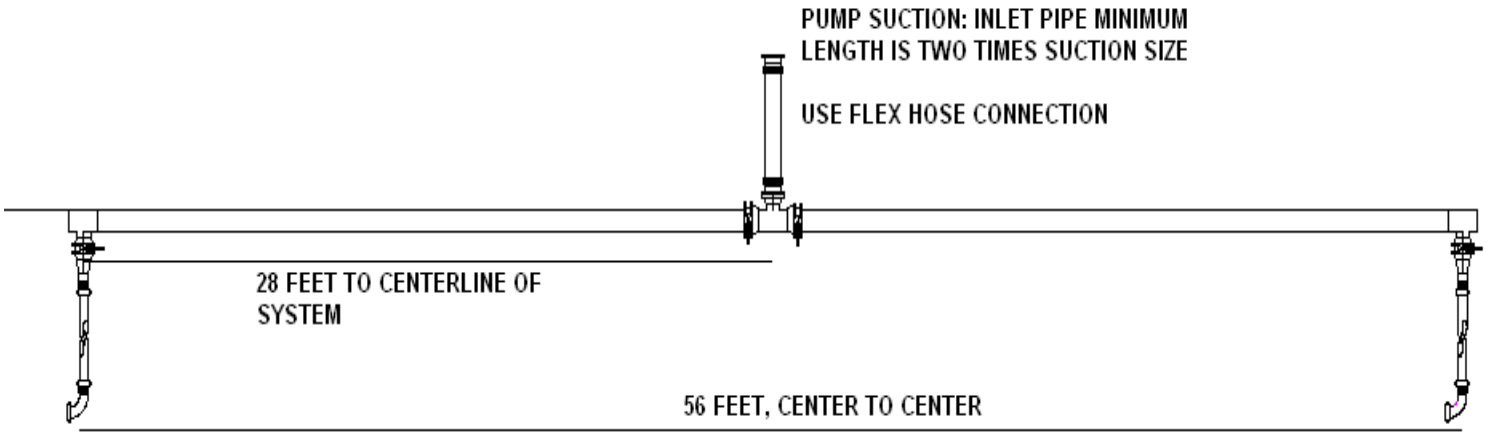
CENTER TO CENTER



•Confirm Car Sizes with Local RR representative

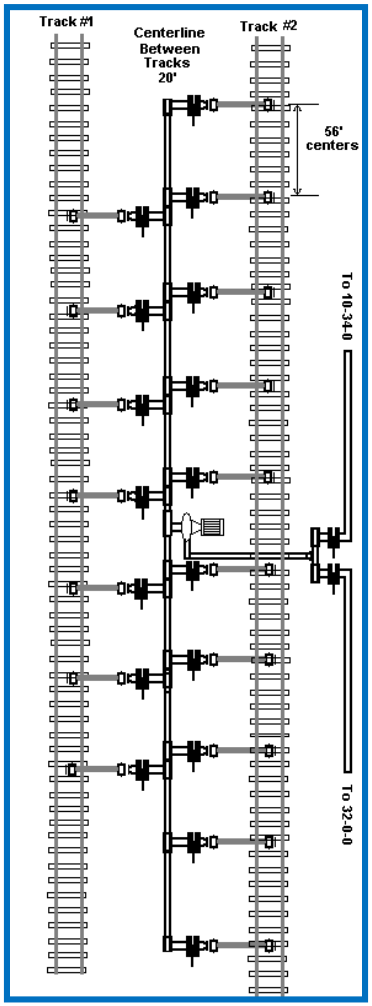
OTHER LITTLE THINGS

*Separate the header at the pump,
    Allows isolation of less than full number of cars
*Add and air elimination valve at the pump suction
*Add hose racks to minimize spill from hoses
*Drip Pans under cars

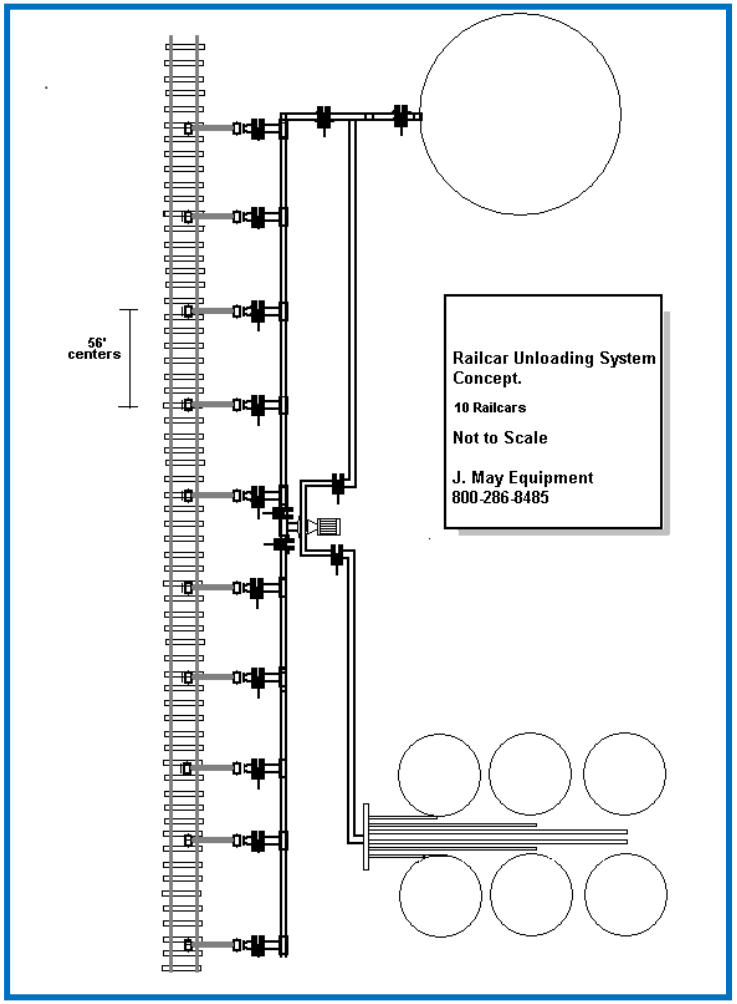


More Things

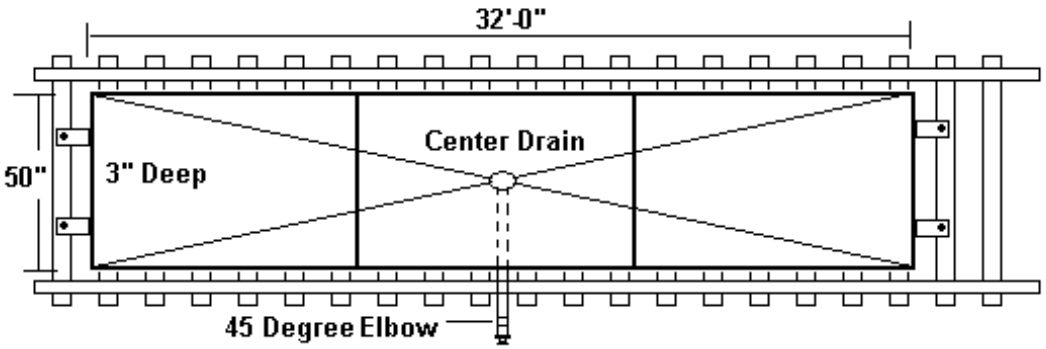
- Two Rail System



- Move From Big Tank to Small Tanks

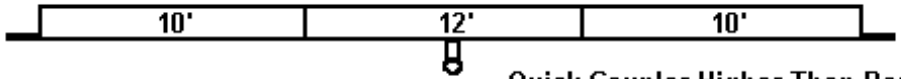


One More



4" pipe with Quick Coupler

304 Stainless Steel Construction
built in 3 sections, bolt together with gasket. Lag bolt to the crosstie at each end.



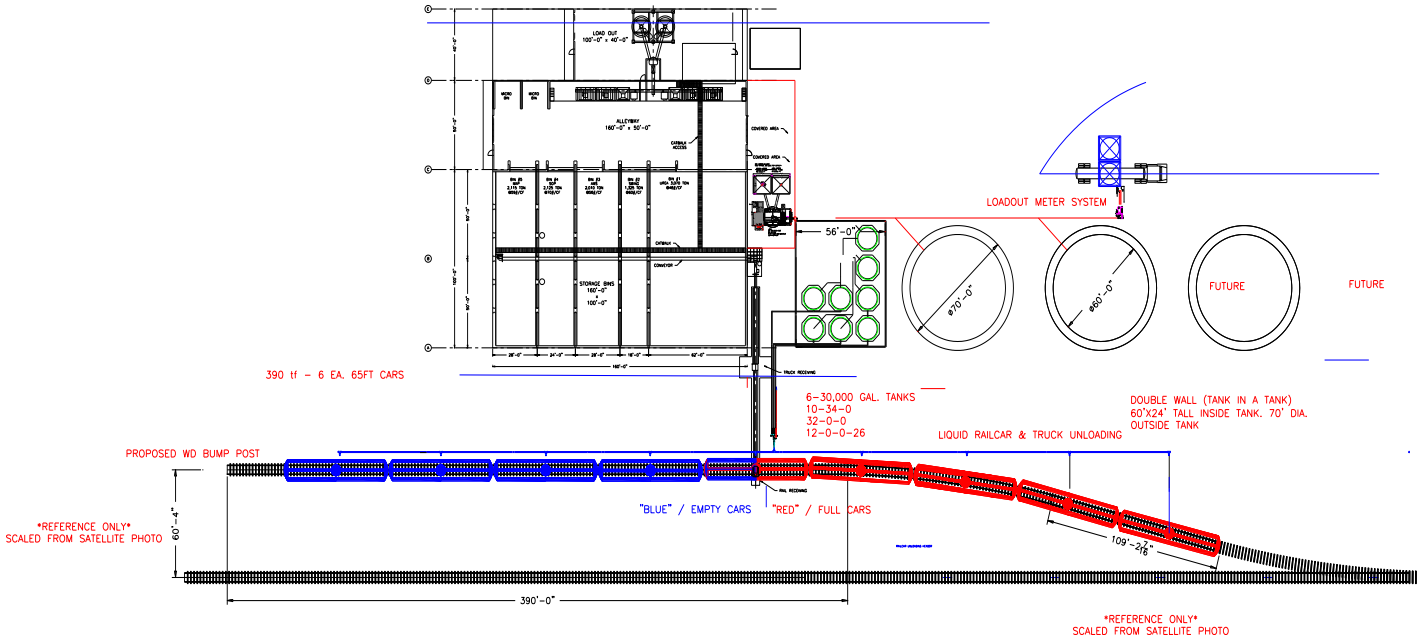
Quick Coupler Higher Than Pan.

Empty Pan with Railcar System Pump

J. May Equipment Group 800-286-8485	250 Gallon Railcar Drip Pan

SPUR MANAGEMENT

- Car Position, Full & Empty, Liquid or Dry



DRISCO, It Grows

- Drisco Pipe, Polyethylene
- www.performancepipe.com
- Approximately 1” per 10°F per 100 feet
- 600’ Pipe and a 30°F Temp Rise = 18” Increase in Length
- It has to go Somewhere. Stress on Pipe, Pump and Fittings

OTHER OPTIONS

- Add suction valves to unload trucks
- Add discharge valves to load trucks direct from the railcar
- **Air Blowout will clear lines…. And blow up the system. Use Extreme Caution with air blowout, anywhere, anytime**
- **Place air blowout where air cannot be trapped**

RUBBER LINED TANKS
INLET STRAINER

Top Load or Bottom

Discharge manifolds should be compact and expandable

THINGS TO REMEMBER

- Center to Center of cars
- Your design factors
- How fast you want to go is highly determined by your pocket book
- Check with tank Manufacturer for tank vent calculations. Don’t blow or collapse a tank
- Labor Costs more than good equipment

PIPE

EVERY LIQUID PLANT HAS SOME

- NOT JUST A PUMP & PIPE
- REQUIRES DESIGN AND PLANNING
- WORK WITH A COMPETENT COMPANY AND EQUIPMENT SUPPLIER
- ***"Don't plan vast projects with half vast equipment"***

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