



Steel Tank Erection and Repair

The BYGGING-UDDEMANN method was introduced at the end of the 1950s to rationalize the erection of steel cisterns for various storage purposes.

The method is used for cisterns of various design off all sizes. The erection and welding work is carried out entirely on the ground. This gives a high degree of safety and precision in the workmanship and facilitates the inspections required.

All work takes place under adequate protection and safety for the workmen. Most of the welding work is carried out inside the cistern, independently of the weather conditions.

The method reduces construction time.

Replacing a cistern base or foundation repairs

The base of an old cistern may have to be replaced. In this case, jacking units are erected externally. When the base plate has been cut free from the shell ring, the cistern is lifted to a sufficient height and the base plate is replaced. The cistern can then be lowered exactly in position again.

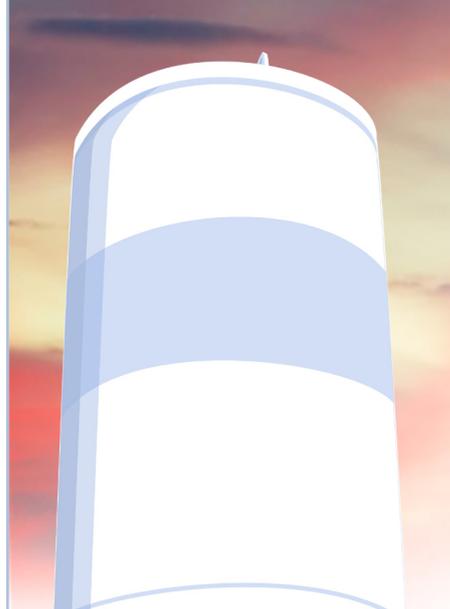
This method is also used to lift cisterns in order to repair or reinforce the foundation. Cisterns, which tilts as a result of uneven settling can also be lifted in this manner and straightened.



The lifting trestles must be provided with a stable base for all of these operations. The steel tank construction method, like Bygging-Uddemann's other systems, has been in use all over the world for many years.

True or false

Is the Bygging-Uddemann method for Steel Tank Erection and Repair cheaper than other conventional methods?



True

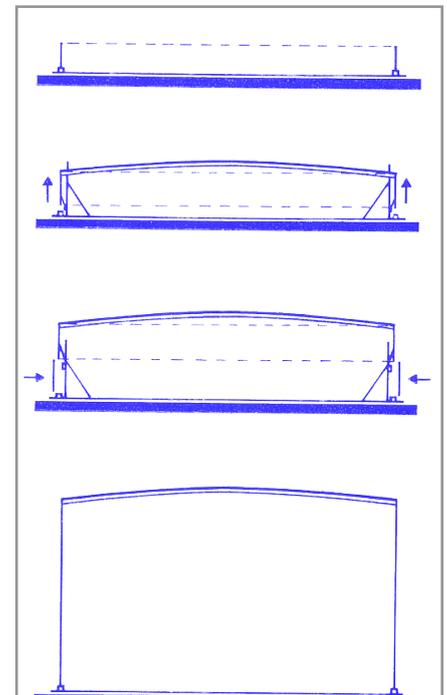
Since the Welding work takes place on the ground, the welds are easily accessible for inspection and work carried out on the ground level provides the greatest safety.

www. bygging-uddemann.se	Project: STEEL CONSTRUCTION 2M LITRE UNITS	Client: OSL OIL SALVAGE	Advantage: FASTER, MORE ECONOMICAL AND SAFER	Result: -12% COST AND FASTER CON- STRUCTION (HAPPY CLIENT!)
	Building Method: JACK SYSTEM BUXX123	Date: 15/02 - 08 COMPLETED 11/01 - 09		



The BYGGING-UDDEMANN method facilitates and simplifies cistern erection

1. The foundation is made ready.
2. The based plate is laid out and welded.
3. The periphery of the steel tank is marked out on the base plate.
4. Guide trestles for the shell plates are erected.
5. The top shell plates are erected and welded vertically.
6. The roof trusses are assembled and joined to the top shell plate.
7. Lifting trestles with hydraulic jacks are fitted internally along the periphery of the steel tank.
8. Lifting lugs and guides are welded to the shell plate.
9. The top shell plate and the roof constructions are lifted one plate height.
10. The roof plate is fitted and welded in place. At the same time, the next shell plate is fitted and welded.
11. The lifting lugs and guides are removed from the top shell plate and new lugs and guides are welded to the next shell plate. The hydraulic jacks are lowered to the original lifting position.
12. The steel tank is lifted again to allow the continued erections of shell plates until the full height of the steel tank has been reached.
13. When the last shell plate is fitted and welded in place, the finished steel tank is lifted slightly so that the guide trestles can be dismantled.
14. The steel tank is lowered and the shell plates and base plate are welded together.
15. The jacking equipment is dismantled.



The advantages of the BYGGING-UDDEMANN method

1. Welding work takes place at ground level.
2. Welds are easily accessible for inspection.
3. Since the roof construction is fixed to the top shell plate from the beginning, the entire cistern is provided with wind load stability throughout the erection work.
4. The guide trestles stabilize the cistern at the bottom and keep it circular.
5. No erection scaffolding is required.
6. Work carried out at ground level provides the greatest safety.

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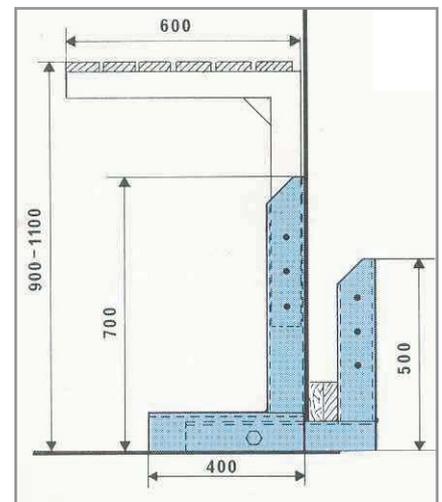
Detailed description of complete jacking unit and assembly of liting trestles

A jacking unit as illustrated in the adjacent figure, consists of the following components:

1. RHS section 100 x 100 mm. Height 3500 mm.
2. Adjustable stay.
3. Base plate with attachments for RHS Section
4. Jack Rod 35 x 35 mm
5. Hydraulic Jack
6. Slipper
7. Lifting arm.
8. Lifting Lug (welded to steel plate)
9. Guide (welded to shell plate)
10. Shut-off cock with coupling for high-pressure hose.
11. Shell plate.
12. Stay lug (welded to base plate)

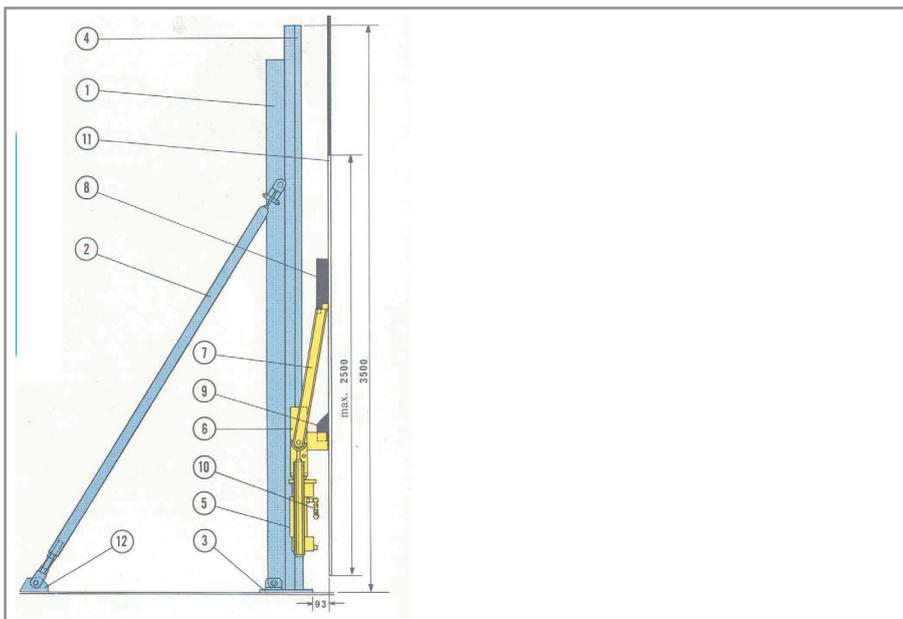


The number of jacks required is determined by the size and weight of the cistern. There is no minimum or maximum size.



Guide Trestles

The guide trestle fix the shell plate in the exact correct position and serve as supports during the welding. The guide trestles are spaced at approximately 2 m. The guide trestles can be provided with adjustable brackets for a work platform.



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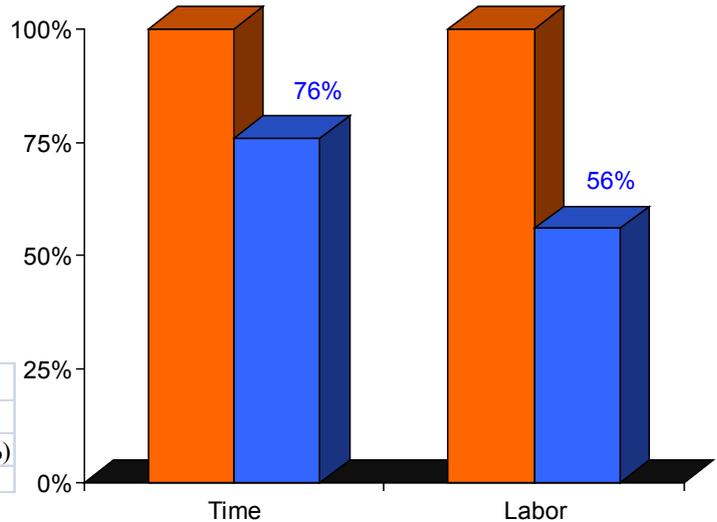


Comparison, time and labour

1 Nos typical tank

- Volume 35.000m³
- Dia 48 m
- Height 20 m
- Weight 600 ton (lifted weight 500 ton)
- 42 Nos tank jacking units

	BYUM method	Conv. method
Construction time	14 weeks (76%)	17 weeks (100%)
Manpower	7300 hours (56%)	12.900 hours (100%)



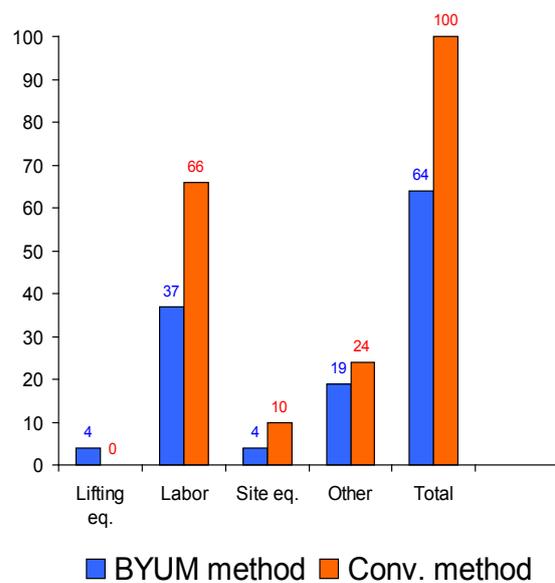
■ Conv. method ■ BYUM method

Construction time and manpower based on European standard 40 hours/week

Cost comparison

	Construction method		Remarks
	BYUM	Conventional	
Lifting equipment			Based on depreciation after 6 tanks with a 40% residual value
—freight	3	-	
—supervision	1	-	
	4	0	
Labor cost	37	66	
Equipment cost			
—scaffolding	-	1	
—welding	3	3	
—plate handling	1	6	
	4	10	
Other costs			
Jig and tool	3	5	
Machining	3	3	
Non destructive test	2	2	
Consumable materials	3	5	
Field expenses	4	4	
Overhead charge	4	5	
	19	24	
Total per tank	64	100	

Excluded: material, welding, paint



■ BYUM method ■ Conv. method

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2M LITRE UNITS
Building Method:
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Client:
OSL OIL SALVAGE
Date: 15/02 - 08
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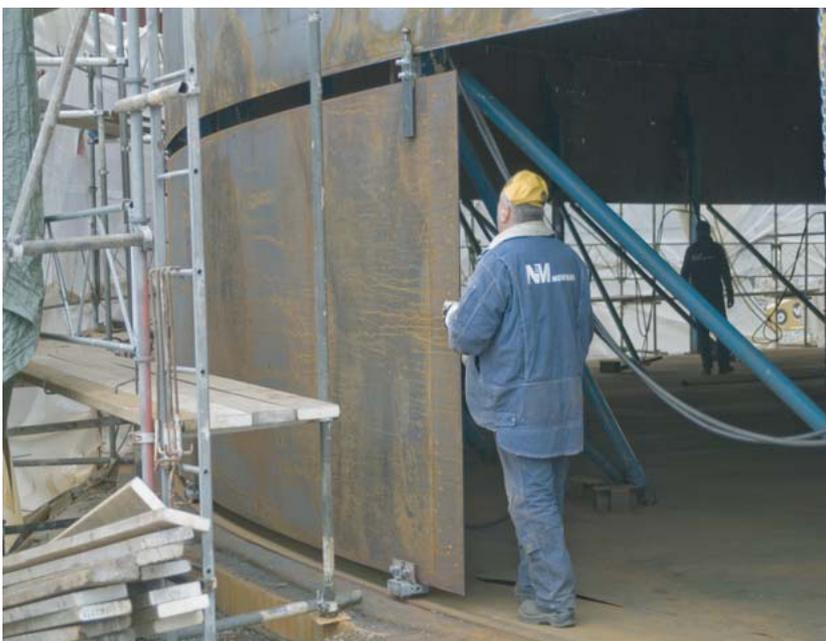


Maximum size of Tanks and Manpower



Our experience shows that the limit for constructing Steel Tanks is where the height of the tank exceeds three times the diameter. At these heights the foundation can no longer handle the pressure from the base plates on the lifting trestles.

MAXIMUM SIZE OF STEEL TANK: $H = 3 \times D$



Our most recent Steel Tank project is a tank of 6000 kbm, 20 meters in diameter. It took 2 months to construct by 5 welders Steel sheets of thickness 8, 10, 12...to 18 mm thick.

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