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Animal Cart Programme

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Simple Low-cost Brake for Donkey Carts

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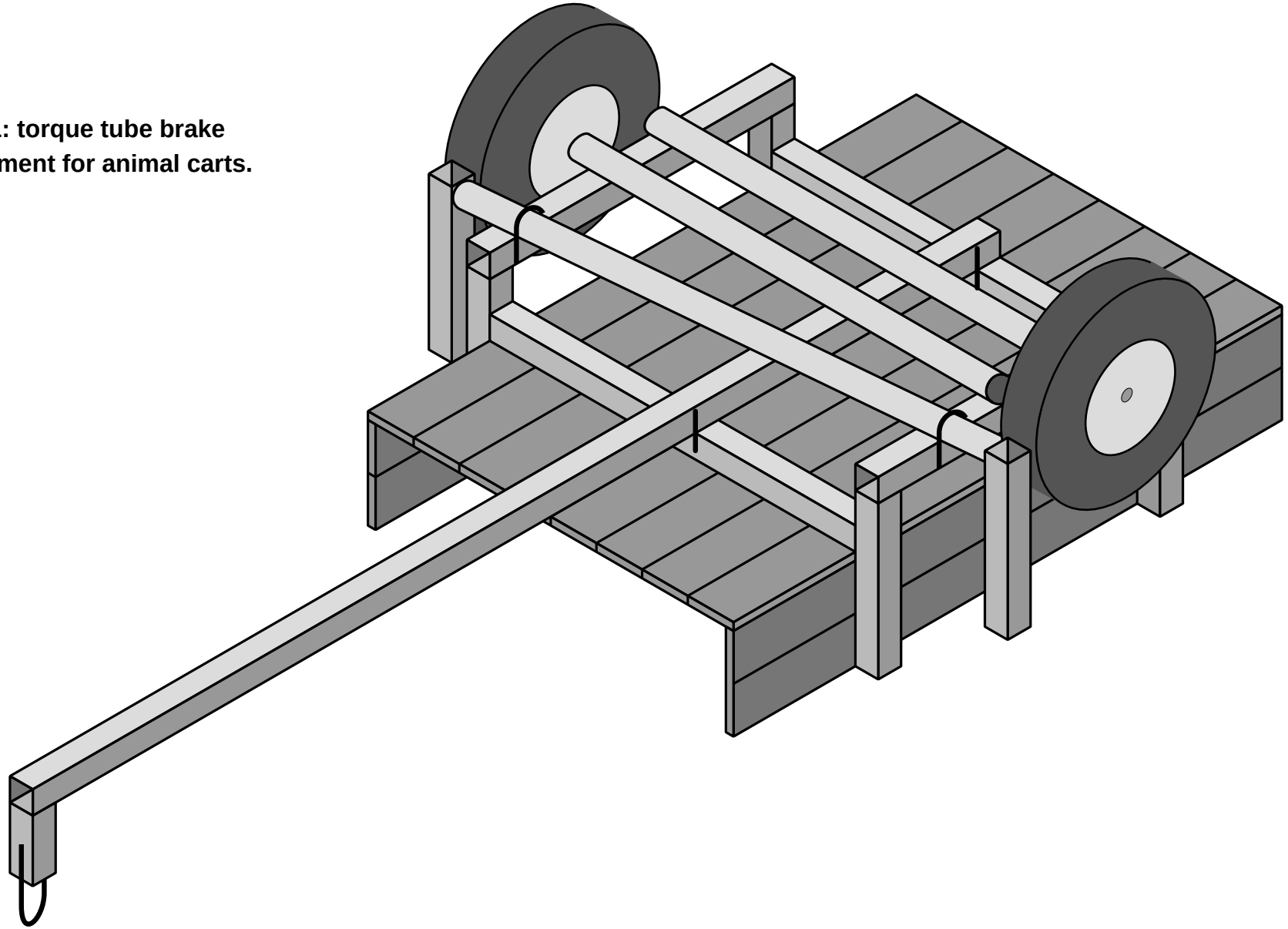
Figure 1: torque tube brake arrangement for animal carts.



Simple low cost torque tube brake for donkey carts.

Introduction

In this booklet we tell you how to make a brake for a steel framed DTU donkey cart from round and square steel tube. The instructions do not cover how to make the cart or the axle - you will need to read other Technical Releases from us to find out how to make these.

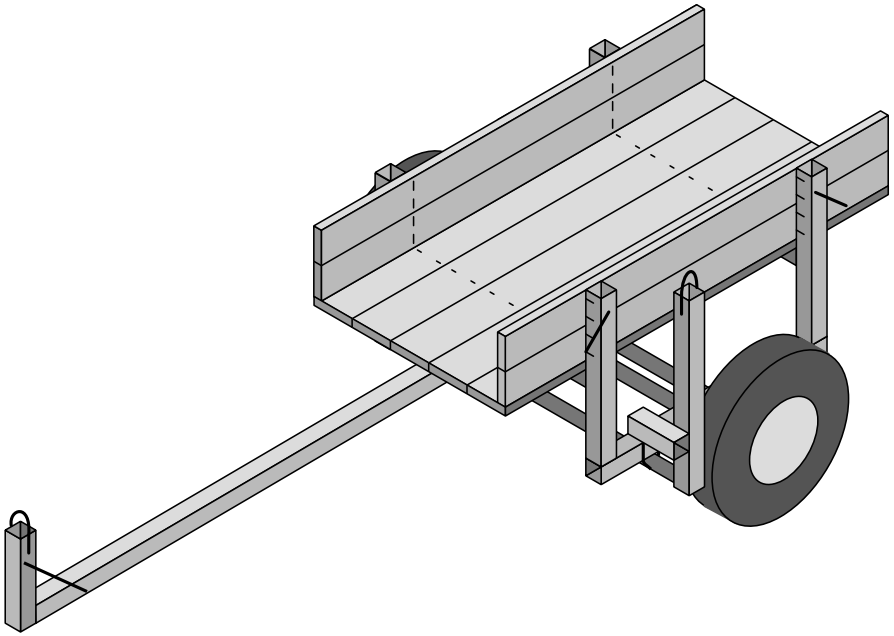


Figure 2: DTU donkey cart fitted with twin axles and simple low-cost brake.

You should find that you can make the brake for about £6. This cost will depend on the cost of the materials and labour. Once you get organised, two men can probably make and fit a brake in an hour.

Easy to make design.

This brake is designed to be constructed without any special tools and jigs, and without any hard-to-get materials. The only tools which you must have are a simple welder, a hacksaw, and a hammer. We have deliberately designed the brake so that drilling is not required.

We have tested these brakes in Kenya and Uganda and we have had only a few criticisms - if the mud is very sticky it jams

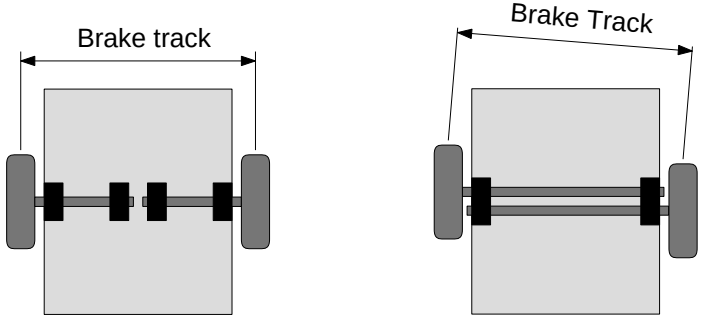


Figure 3: brake track measurement for a conventional half shaft axle and for a twin offset axle.

the brake and makes the cart hard to pull. One modification is to make the brake so it can be removed in bad conditions.

Cutting list and costs

Table 1 shows a cutting list for a brake - Recent prices of materials in Kenya are shown converted into £UK.

Construction step by step

1) The first job, is to get all the material together and clear a space to work. Ideally you will be able to work on a flat area of concrete.

2) Start by measuring the required brake track as shown in Figures 3 and Figure 4.

3) Cut a piece of 1-½" black pipe to this brake track length **minus 50 mm** so for example if the brake track is 1500 mm

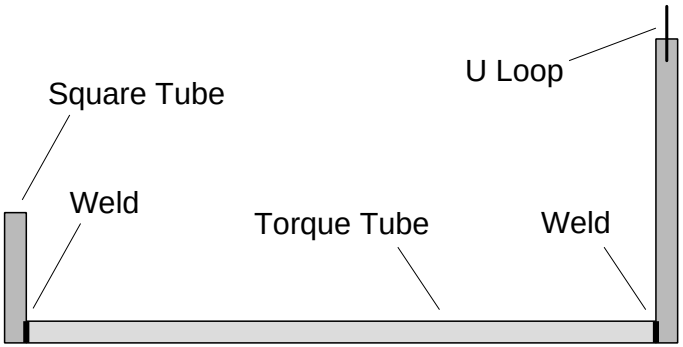


Figure 4: welded brake fabrication.

TABLE 1: materials for torsion tube brake.

component	material	# lengths reqd [#*mm]	total material for one brake [mm]	cost [UK£]
torque tube	1-½"" BSP malleable iron pipe	1 × 1500	1500	3.00
brake pad	50×50 mm square steel tube	1 × 300	300	0.69
brake lever/ pad	50×50 mm square steel tube	1 × 700	700	1.62
brake torque tube loops	R 12 = 12 mm re-bar	4 × 250	1000	0.31
			TOTAL =	5.62

make the pipe 1450 mm long.

4) Cut a piece of 50 mm × 50 mm × 3 mm wall thickness square tube 300 mm long and another about 700 mm long.

5) Weld the pieces of square tube onto the ends of the round pipe as shown in Figure 5. A trysquare will help you get it square.

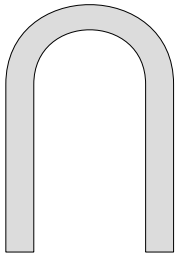


Figure 6: U loop.

6) Make five U shapes from R12 (that is 12 mm round steel bar) each piece 250 mm long as shown in Figure 6.

7) Weld the first U loop onto the end of the 700 mm square tube as shown in Figure 5. A rope tied to this loop can be used to work the brake remotely fo safety.

8) Now turn the cart upside down, put the brake in position and place the remaining four U-loops over the brake torque tube as shown in Figure 7 and Figure 8.

9) Once you have the brake beam in position, tack weld the ends of the loops to the axle support beam, check that the brake can be released clear of the tyres and then weld the loops on properly.

10) Next cut two pieces of R 12 about 25 mm long and weld them to the brake torque tube either side of a support loop so that the brake beam cannot move endwise.

11) You've finished it!

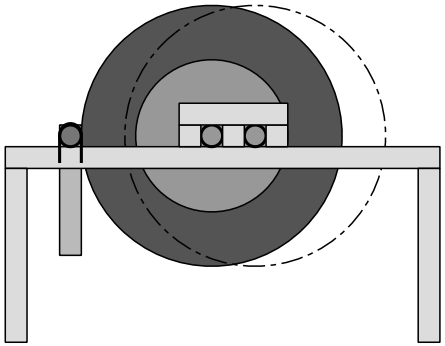


Figure 7: brake beam position.

Other DTU cart developments

The DTU has been working on new designs of carts and all their components to bring down their costs and make things more locally manufacturable. It has designs for bodies, wheels, hubs, bearings and animal harness all available from DTU as Technical Releases.

Drawings

You will find two drawings on the next pages, the first gives a general view of the brake and the second gives a view of the components of the brake itself.

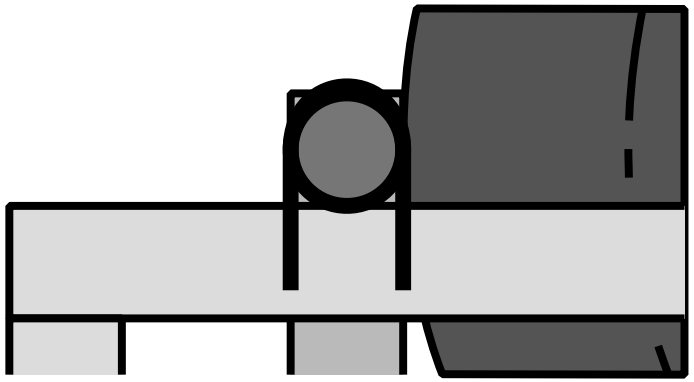


Figure 8: brake beam position - detail.

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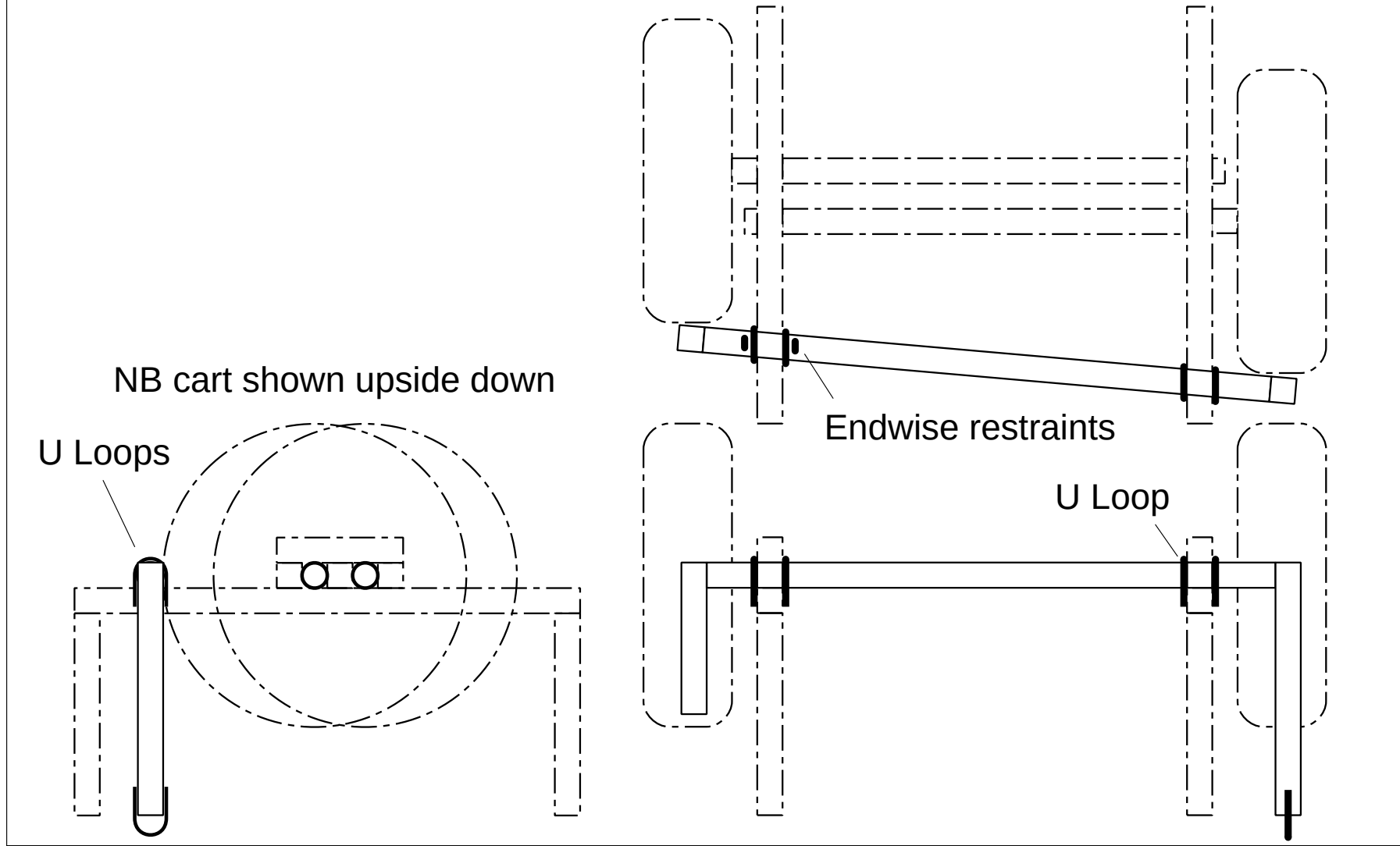

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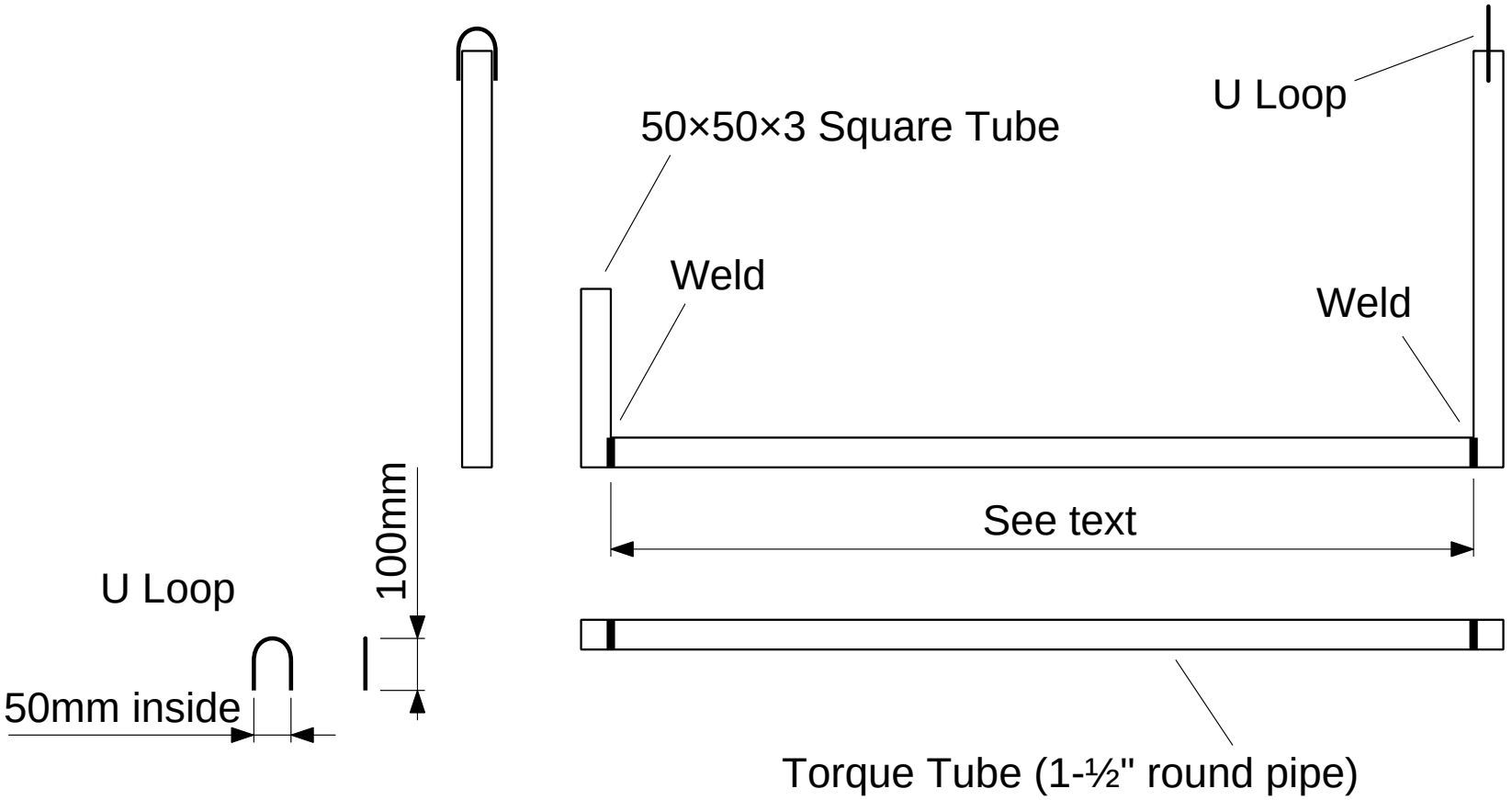
		Date	2-4-99		Dwg No.	1/2



	Brake Components	Scale	10mm	Title	Drawn by	CEO
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