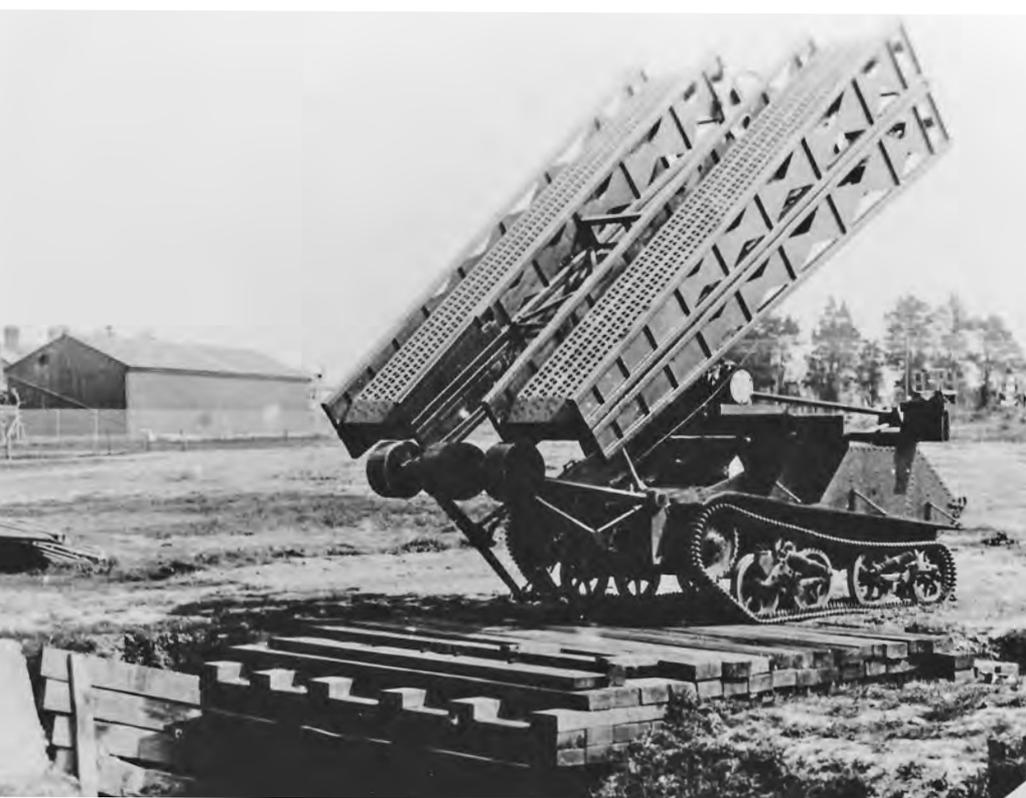




Above: The original experimental scissors bridgelayer mounted on L3E1 at Christchurch and about to start the bridgelaying process.

BUILDING BRIDGES

David Fletcher profiles the clever and versatile WW2 scissors bridgelayer and the tanks that carried them



L3E1 again raising its bridge. You can see the threaded rod extending backwards, the rollers at the front and the brackets attached to the hull that the bridge rests on.

I don't know how true it is but I remember reading somewhere that the original idea of the screw-operated scissors bridge was invented by accident. Apparently, when they were experimenting with tank-launched bridges between the wars at the Experimental Bridging Establishment at Christchurch they were rather obsessed by hydraulics. However, one engineer, wishing to continue experimenting at home, used Meccano parts, including the long threaded rod they used to make, to represent hydraulic action. When he took it into work his superiors were so taken with the threaded rod, which gave infinitely more precise control than hydraulics, they decided to use that instead on the real thing.

CUTTING EDGE DESIGN

The idea behind the scissors bridge was to reduce the length of the unit by folding it in half. At that time a 30ft long bridge was thought to be about the limit of what could be carried on a tank, but in days when a tank was much shorter a bridge 30ft long hung over at both ends, resulting in a rather unwieldy vehicle. If a 30ft bridge could be folded in the middle it was essentially no longer than the tank that was carrying it

and therefore more manoeuvrable. The only drawback was that launching was rather a slow, long-winded process. Additionally, of course, there was a time when the bridge itself was sticking up in the air, and although still folded, it made rather an obvious target. One has heard stories of bridges getting stuck while opening so that the tank had to retire from the front line, a target for every enemy gun that could bear.

Perhaps I should explain the threaded rod first since that lies at the heart of all the scissors bridge systems we'll be discussing, up to the end of WW2 at any rate. A power take-off from the engine passes upwards into a powered gearbox above the turret ring. A 2in diameter threaded rod passes through that and is driven by it, in either direction. Thus power, when applied, causes the rod to move and in doing so activates the bridge laying system. There's more to it than that of course, such as the frame on the nose of the tank which ultimately rests on the ground and takes the full weight of the bridge, and the cable system that opens the bridge out during the laying process, or folds it up afterwards. The term scissors bridge is, or should be, self-explanatory. It refers to a bridge that folds in half and opens or shuts like the blades of a pair of scissors as it moves.

FIRST TANK TRIALS

The first tank on which this launching system was tried was the turretless first prototype of the Light Tank Mark V, L3E1 (T1097 HX6858). It carried a 30ft bridge, folded in half on top of the tank. Three rollers on the support frame at the front came to rest on the ground at which point the bridge, still folded, was in a vertical position. Further operation of the screw caused a launching frame to continue moving while steel cables, attached to this frame and running over cam wheels attached to the centre of the bridge, caused it to unfold. Once it was unfolded the tank detached itself and backed away, taking the frames with it and leaving the bridge across a 26ft gap, capable of supporting a tank weighing about 7 tons.

It is reported that the same system was employed on a Light Mark VI and that this tank was lost at sea en route to the Middle East but this may have been the prototype, a case of people not being able to identify the differences between the two types.

“although still folded, it made rather an obvious target.”

The first attempt to adapt the system to a larger tank, again carried out at Christchurch, employed a scissors bridge fitted to the hull of an A10 – an older type on the verge of becoming redundant. The tank used was T9229, a Cruiser Mark II and

it had the added advantage of a machine gun position to the right of the driver. Whether this implied a three-man crew, or whether the vehicle commander was moved to the front, is unknown. The normal crew of a scissors bridgelayer was two, a

commander and driver, the latter also operating the bridge-launching machinery. Although the bridgelaying mechanism worked on the

same principle it had to be redesigned in detail to suit the larger hull and it was so arranged that it could lay the bridge even if the far bank was higher or indeed lower than the nearside one. Since it was possible to carry a heavier bridge this was also



Above: A10 with the bridge at roughly the same angle. Notice how, with all the weight shifted to the front it pushes the nose of the tank down. Below: A10 viewed from behind, with the bridge nearly laid. The WD number is painted across the back so you can clearly see it, but notice how the threaded rod has moved through the gearbox.





A Covenanter Bridgelayer on a training exercise in Britain with the threaded rod showing up clearly.

developed at Christchurch. It was the 30ft No. 1 Tank Bridge which was actually 34ft long to bridge a 30ft gap. It was of welded construction with each portion made from steel and had trackways 2ft 11in wide. It was originally rated as Class 24, later upgraded to Class 30. This meant that it could cope with any British service tank except the Churchill, and could also, just support the ubiquitous Sherman. However, the A10 was in rather short supply, having been used on active service and was going out of fashion, being essentially a pre-war design so emphasis switched to the Cruiser Mark V, the Covenanter.

COVENANTER CARRIER

In about 1940 Christchurch started to develop a new model on the hull of

the Cruiser Mark V Covenanter tank; probably because the Covenanter, being deemed useless as a fighting tank due to unreliability, was therefore available in quite substantial numbers. Why otherwise the unreliable Covenanter should be selected is difficult to imagine. In fact, we have it on record that a Covenanter T15295 was supplied by English Electric Ltd of

“There are at least two Covenanter scissor Bridgelayers preserved in Australia.”

Stafford, one of the manufacturers, to the Experimental Bridging Establishment, probably early in 1940. It was delivered without a turret so we think it was intended for completion as a bridgelayer. The launching mechanism was essentially the same as the first device fitted to the A10 although some redesign was required. As a bridgelayer the tank carried a crew of

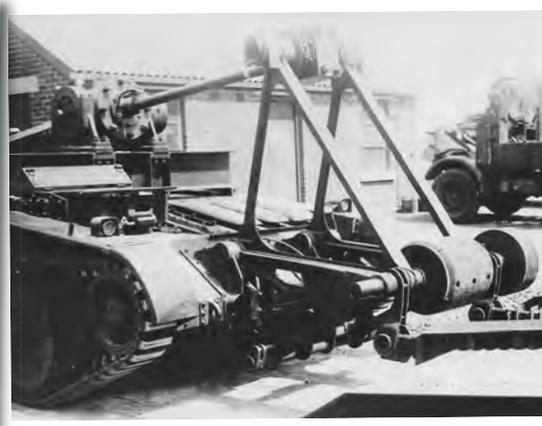
two, a commander and driver, although neither had any contact with the other. The Covenanter was powered by a Meadows type DAV flat-12 engine rated at about 300hp. It rode on four wheels each side with Christie style suspension. It had a low, streamlined hull and as a bridgelayer it weighed 19 tons, a bit heavier than it was as a gun tank and a good deal taller (10ft 11in) with the folded bridge in place. Don't be fooled by claims that it had a complex drive system, it didn't. Although when it was first planned the full Wilson transmission was considered, and latterly the new Merritt-Brown system. However, in practice, when the Covenanter entered production, it had a conventional Meadows crash gearbox with Wilson steering epicyclics attached to the output shafts. If Covenanter had a problem, it was the water-cooling system. This was overcome in the end but by then the tank had such an awful reputation that nothing could redeem it. So, in Britain, the Covenanter tank was only ever used for training and the same thing applied to the bridgelayer. Neither was used on active service; a few of these however were sent over to Australia and New Zealand and the Australians used them occasionally on Bougainville, Labuan and Balikpapan in the Pacific. The very first occasion was on 2 June 1945, on Bougainville where, we are told, a crew member had to dismount to guide the bridge into place. That crew member must have been the vehicle commander since the driver also operated the bridge

launching gear. The only occasions Covenanters of any type

were ever used in action. There are at least two Covenanter scissor Bridgelayers preserved in Australia.

VALENTINE'S DAY

The last one, in this survey of scissors bridgelayers is the Valentine. The problem here is that we don't know for sure which Marks of tank were used as the base



Above: The Covenanter Bridgelayer at Christchurch, showing how it hooked on to the bridge. Left: At the Australian Tank Museum in about 1970; the first Covenanter of any kind that I had seen.

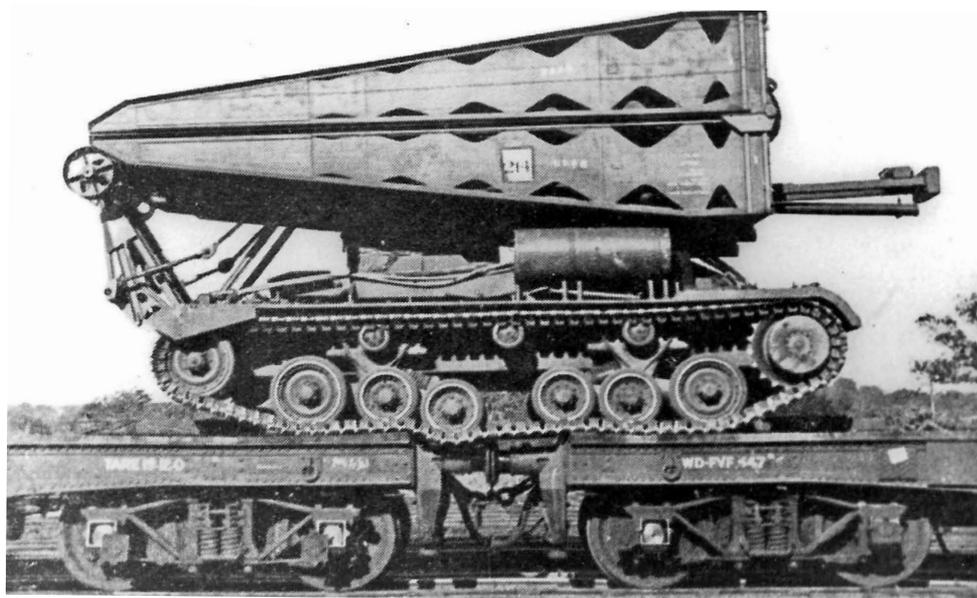


Above: A Valentine Bridgelayer in Burma attracts an audience as it goes through the laying process. Right: A Covenanter Scissors Bridgelayer serving with the 2/4th Australian Armoured Regiment bridges a stream on Bouganville in July 1945.



vehicle; all we know for sure is that the first one (T16278) was a Mark I, powered by an AEC petrol engine. We know this because this tank is now an exhibit at the Tank Museum and a Mark I can be easily identified by having a single opening hatch at the back. Incidentally, this tank is described as a pilot, not a prototype, since in this case no prototype as such was necessary and no development was carried out at Christchurch; it carried the same launching apparatus and the same bridge as the Covenanter, with only some detail changes to suit the new hull. One of the main contractors for the conversion was the Southern Railway Workshops at Eastleigh in Hampshire and it is said that the turrets, removed from these tanks, were fitted to the hulls of AEC Mark I armoured cars (*CMV* May 2007). However, we also know from photographs that T16278 spent some time at Lulworth Camp during the war, although what it was doing there is anyone's guess. Lulworth was the place where tanks were sent to have their guns tested and since the Valentine bridgelayer mounts no weapons at all it seems an unlikely venue. It may have gone down there to be photographed, we can think of no other explanation.

Most of the Valentine scissor bridgelayers appear to have been built on the Mark II hull, which was powered by an AEC diesel engine. The others were fitted with a General Motors diesel and some of these could have been turned into bridgelayers but since it's difficult to tell from the outside, because the type of



A Valentine Bridgelayer moving along a train of Rectank wagons, seen here in travelling mode.

engine fitted makes no other difference, we cannot be sure. The Valentine bridgelayer also had a crew of two, a commander and a driver, and with the bridge stowed was 11ft 3in high, making it a little bit taller than the Covenanter. At an all-up weight, with the bridge, of 19.25 tons it was a bit heavier as well. Being a reliable tank Valentine bridgelayers were produced in greater numbers. Twenty five were sent to the Soviet Union, 11 to New Zealand and just one to Australia. They saw active service in Burma, in Italy and, of course, in North West Europe.

At the end of the war the EBE produced the No. 4 tank bridge to fit the Valentine. It was built from riveted panels of aluminium alloy instead of steel but was precisely the same size and span as the No. 1 bridge. We don't know whether it was registered to take the same weight but since it did not appear until 1945 there was only ever the one example and the project was taken no further. Even so, some of the Valentine bridgelayers remained 'on the books' and theoretically available for active service for some years after the war.

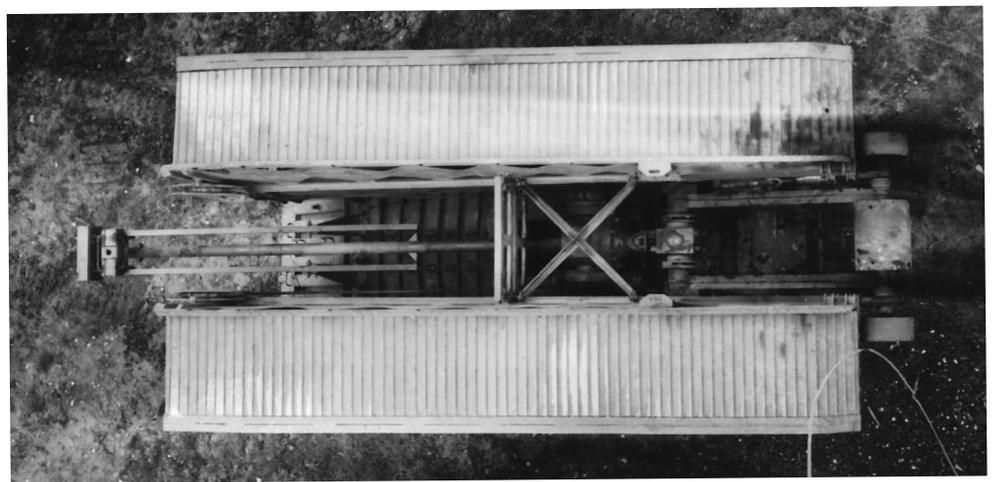
There are a number of Valentine



Above: T16278 is now in the Tank Museum. Here it is seen being inspected by two young soldiers. There were no markings on it when this photo was taken. Left: A Valentine scissor bridgelaying tank emplacing its bridge over a broken bridge in Burma.

bridgelayers on display in various parts of the world. In addition to the one at Bovington there is one in the Russian tank museum at Kubinka, another at Overloon in Holland with its bridge displayed in the process of opening, another in Rome and yet another, without its bridge, in the museum at Ahmednagar in India.

Of course this isn't the end of the story of the scissors bridge in the British Army. A No.8 bridge was produced and fitted to the FV4025 Chieftain Bridgelaying (CMV March 2008) and now we have Titan Bridgelaying, based on the Challenger 2 Main Battle Tank. Titan can carry and launch the 26m No. 10 scissor bridge, styled as a close-support bridge in the BR90 bridging system and said to launch much faster than the wartime versions. Of course hydraulics are used now, the threaded rod is long gone.



Above: Viewed from above, at the tower in Lulworth this bridgelaying tank is facing right but you get a good view of the threaded rod, running down the middle. Below: T16278 on a Mark 1 hull at Lulworth. This is said to be the pilot model of the Valentine Scissor Bridgelaying.

