Modelling the Crusader Tank and its Variants

By

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With contributions from
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Designed and produced by Steven Noble

Supported by Gravesham Military Modelling Society
www.gmms.org.uk

First published 2014

Special thanks to Carl Dennis, Andrew Noble and Gary Norris for their generous provision of additional material for the book. I would also thank staff at Italeri, The Tank Museum at Bovington, The Imperial War Museum and the Canadian Archives and Library in gaining access to photographs and images.

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Cover Photograph

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Dedication

Dedicated to my wife Evelyn whose support and encouragement kept me focused over the two years it took to build the models and write the book.

Introduction

As a modeller, one of the most appealing armoured fighting vehicles for me to build has been the Crusader tank. With its sleek lines it has always held a strong appeal. What always surprised me is the lack of model companies producing models of this tank. Until recently from the 1970's the choice in the popular scales of 1/35th and 1/32nd was limited to the Mark III version of the gun tank from Italeri and Airfix respectively. The limited amount of good reference material did not improve the position.

Recently Italeri has greatly widened the choice of kits in 1/35th scale. A significant number of variants are still not covered. Largely using the Italeri models as the base kit, the book covers the lesser known variants as well as the major variants with the view to increase interest in the Crusader.

A brief history of the development and evolution of the different versions is included along with details of the kits currently available. The majority of the book then follows with the build of the various versions of the Crusader that were produced. Within the appendices are walk around shots of the Crusader gun tank, Mark II.

Chapter

CHAPTER 1

Development of the Cruiser Tank

At the end of World War One most countries were suffering from the financial burden of paying for the war. Expenditure on the Armed Services within the United Kingdom was drastically cut. Proponents of the recently created Tank Corps put forward ideas and philosophies that promoted the mass mechanization of the Army. If implemented, this would have reduced the size and influence or even the existence of some branches of the Army. Tribal rivalries between the various branches of service re-emerged within the Army. A concerted resistance to these ideas emerged with funding on mechanization reduced to a minimum.

In addition to its internal conflict, the Army struggled for funding against strong competition from the Navy (the traditional defender of the country) and the emergent and burgeoning Royal Air Force with its new technologies. Tank development stalled and production was reduced to mainly light tanks and carriers for its armoured force.

The Carden-Lloyd machine gun carrier or tankette was exported and used as the basis for tankette design in a number of countries including Russia, Belgium, Italy and Poland. 270 vehicles were built for the UK

Outside the UK, France and the Low Countries returned to policies adopted during WW1. These countries returned to building strong fixed defenses across the traditional route of attack through the Low Countries. Although taken from a statement made in 1953 by American Major General Orlando Ward, the difference in post-war mind-set between the First World War protagonists can be summed up in the quote below. This was to be reflected in terms of tank design, tactics and the importance of its role.

'The victor tends to prepare to win the next war with the same means and methods with which he won the last. He forgets the difficulty of reaching decisions, the planning problems, his faltering (and) his unpreparedness. The vanquished is wont to search far afield for new and improved methods, means and equipment'.

While development in Britain stagnated, two countries to see the potential of the tank were Russia and Germany. While Germany initially hid its tank development, by 1936 Russia put on a display of its strength. Major General Wavell and the Assistant Director of Mechanisation, Gifford Q Martel attended a military mission to the USSR. Having watched a four day exercise using 1,200 tanks, both were impressed by not only the scale of the exercise but also the distances covered and reliability of the vehicles seen. In particular, the BT (fast tank) tank with the privately designed American Christie suspension had performed well.

The Russian BT tank fitted with the Christie suspension. This would also be used on the highly successful T34 being a major contributing factor to its outstanding performance

With an aging tank force and the rise of Hitler and his expansionist policies, the UK looked to rebuild its armoured forces. The existence of any armoured fighting vehicle (AFV) development and manufacturing capability was largely the result of successful private tank designs within the Vickers-Nuffield and Carden-Lloyd groups. Export order numbers were small but sufficient to support the companies through this lean period.

The Russian T26 was based on the Vickers 6 ton export model with an option for single or twin turrets. Along with other countries, Russia produced their version of the Vickers tank under license.

As the General Staff looked at the requirement for the replacement of the ageing Vickers medium tank, strategic thinking defined the need for tanks to carry out two roles:

- *Heavily armoured tanks to support infantry against fixed defences*
- *Agile medium (later classified as cruiser) tanks for exploitation and protection of the flanks*

Development of the Medium series started during the interwar years. With his company taken over by Vickers-Nuffield, Sir John Carden became one of the new company's key designers. He was key in the design of the Cruiser tanks including the Crusader tank. In response to the above, the Nuffield organization was approached by the Army to produce a design potentially fulfilling both roles being designated the A9 tank.

The A9 key specifications were:

- *2 pounder main gun (the best in its class for this period) with a coaxial Vickers machine gun and 2 other Vickers gun in independent turrets on the front of the hull*
- *Horsham suspension with road speed of 25mph*
- *14mm frontal armour giving poor protection poor with a weight of 10.8 tonnes*

The A9 was limited by an inadequate power plant and drive train and its armour could not be increased without compromising its agility. To meet the requirements of both roles in a single tank with the constraints that existed was impossible. The pilot model was trialed during July. Following review, the role of the A9 was designated as that of a medium tank (Cruiser Mark I) and put into production. In 1937 one hundred and thirty five vehicles were produced. The War Office, still seeking a compromise, requested a heavier armoured version of the A9 to work in the infantry role.

The A9 was modified by bolting on armour plate to a 30mm frontal thickness to produce the A10 (Cruiser Mark II) model. The specification changed to:

- *Main gun remained the 2 pounder now with a coaxial Besa machine gun and another in the front of the hull having dispensed with the auxiliary turrets*
- *The Horsham suspension was retained. The road speed was only marginally reduced as the loss of the turrets compensated in weight for the extra armour*
- *Armour protection - 30mm of frontal armour*

Despite the improvements, it was realized that the A10 was insufficiently armoured for an infantry tank and was designated as a heavy cruiser.

The resemblance between the A9 and A10 (close support version with 3 inch howitzer) can be seen with the key visual change being the elimination of the twin Vickers machine gun turrets. Photograph by Author printed by kind permission of The Tank Museum, Bovington

A proposal was made by the Assistant Director of Mechanisation, Gifford Q Martel, to purchase a Russian BT tank. This was rejected but use of the Christie suspension for the new design cruiser tanks was approved. An attempt to purchase the third prototype of the Christie tank from America was blocked in November by the US government as sale of war material. By stripping off key components the vehicle was purchased as an agricultural tractor and effectively smuggled into Britain.

A new specification was approved in February 1937 by the General Staff for "1940 class" Cruiser tank:

- *A high velocity gun (2 pounder or better with similar weight of shell)*
- *Frontal armour of 30mm*
- *Road speed of 30 mph (20-25mph cross-country).with a range of 200 miles*
- *Weight of approximately 25 tonnes. Power to weight ratio in excess of 20:1*

Examination of the Christie tank showed that the suspension was the only part suitable for development. Being highly effective, it was incorporated into a new medium design, the A13. The A13 still showed its A9/A10 parentage with the first version (Mark 3) being armoured to only 14mm being quickly upgraded to 30mm on the Mark 4.

A13 tank using the Christie suspension
Photograph by Author published with the kind permission of The Tank Museum, Bovington

A15 Covenanter
Photograph by Author published with the kind permision of The Tank Museum, Bovington

To expand tank manufacturing design and production, responsibility for the next Mark of the A13 was handed to London, Midland and Scottish Railways (LMSR). Nuffield Corporation was to provide the turret. Development led to a radical redesign in the form of the A13 Mark III (Cruiser Mark 5) which was to be named the Covenanter.

With improved sloped armour, it was fitted with a horizontally opposed engine produced by Henry Meadows Ltd to give it a low profile. The placement of the engine at the rear with the radiator at the front proved highly unreliable. The problem remained unresolved despite significant and repeated effort. Unable to solve the overheating problem the Covenanter was relegated to a training role along with some specialised roles such as bridge-laying.

The outcome of the interwar activity was that during the first few years of the war, the UK fielded a mix of outdated Cruiser tanks. Tank designers were always playing a game of catch up with their German opponents.

Cruiser Mark 1	A9	135 vehicles
Cruiser Mark 2	A10	171 vehicles
Cruiser Mark 3	A13	65 vehicles
Cruiser Mark 4	A13 Mk II	270 vehicles
Cruiser Mark 5 (Covenanter)	A13 Mk III	1763 vehicles (Training & specialised roles)

Running parallel to the Covenanter design was that of the A15 (Cruiser Mark 6). Named the Crusader and designed by Nuffield, the tank had a conventional layout utilizing the same turret as the Covenanter.

The Crusader, which went into battle untested. It had a chequered history due to poor mechanical reliability arising from sand ingestion in the harsh desert conditions where it served. Despite this, it fulfilled a key role filling the gap in tank numbers at a critical point in the desert war. Its usefulness ended with the arrival of the Lee/Grant and Sherman. The Crusader tank also represented a turning point in design that would lead on to the Cromwell and eventually the Comet, the first and only cruiser tank to get the correct balance of firepower, armour and mobility.

Crusader Mark 2 with 2 pounder gun

The Crusader as a combat tank was produced in three Marks with each being progressively upgraded in terms of armour and firepower.

Mark	weight (tonnes)	Max. Armour mm	Road Speed mph	Primary and secondary armament
1	*19.3*	*40*	*27.5*	*2pdr anti-tank with coaxial Besa mg with a second machine gun in an auxiliary turret.*
2	*19.3*	*49*	*27*	*2pdr anti-tank with coaxial Besa mg with a second machine gun in an auxiliary turret, later dispensed with.*
3	*20*	*51*	*27*	*6pdr with coaxial Besa mg.*

The Mark 1 operated with a crew of five (commander, driver, gunner, loader and gunner in the auxiliary turret). During tests at the Lulworth firing range, the tank was considered to provide a good gun platform.

Seeing combat for the first time during Operation Battle Axe in North Africa in 1941, the 2 pounder was found to be out-ranged by the 50mm gun of the Panzer 3 tanks. It was not until the second battle of El Alamein that the Crusader Mark 3 with its 6 pounder could match the Panzer 3. In fitting the 6 pounder, there was insufficient room in the turret for a loader. This additional duty had to be taken over by the commander. With the crew reduced to three (commander, gunner and driver) they were all overworked. The threat moved from the Panzer 3 to the Panzer 4 fitted with a new long 75mm gun, again leaving the Crusader out gunned and out-ranged.

While proving to be an agile tank, the main complaint from its crews was that it frequently broke down. Using a Liberty engine made up of separate sets of cylinders rather than a single engine block, the rough terrain of the desert resulted in the cylinders working loose. This resulted in fractured lubricant lines and failure due to leaks. The tank, initially fitted with concertina air filters, was prone to allow ingress of sand that would cause erosion of white metal parts and impact on the effectiveness of the cooling fans driven by double roller chains. To go some way to alleviating the problems the cooling fan system was changed to be driven by a drive shaft and the air filters changed to an oil bath type.

Crusader Mark I
(Image courtesy of Italeri)

Filling the desperate need for tanks, without which the desert war could not have been fought, the Crusader was withdrawn from frontline service in mid-1943 before the invasion of Sicily. The arrival of the American designed Lee/Grant and Sherman tank with their high level of reliability, improved armour and firepower facilitated the withdrawal of the Crusader. Used in secondary roles, the Crusader formed the platform for the design of the Cromwell and Comet tanks. The Cromwell was as effective as the American tanks it would fight alongside during the Normandy landings in June 1944.

The Grant gave a massive increase in firepower and armour in comparison to the Crusader

A Sherman II with the increased flexibility of having a 75mm gun in a fully rotating turret

The Cromwell – an improvement on the Crusader and an equal to the Panzer 4 but still under-gunned and with poor armour against the new breed of German tanks

The Comet-the first Cruiser tank to have adequate armour and firepower with a shortened version of the 17 pounder gun capable of taking on the enemy on equal terms

With the production of the Comet tank in 1945 came the first of the Cruiser tanks capable of matching its opponents. By this point in time the war was at an end and thinking had turned towards replacing cruiser and infantry tanks with a main battle tank capable of fulfilling both roles. The first of the series, the Centurion Tank, was to prove highly successful.

Although withdrawn from frontline service, the Crusader and Covenanter were to have a second lease of life. A number of secondary roles were considered for the tanks including:

- *Observation tanks used by Royal Artillery Forward Observation Officers*
- *Command Tanks*
- *Armoured recovery vehicles*
- *Anti-aircraft tanks*
- *Gun tractor for the 17 pounder anti-tank gun*
- *Mine clearance using rollers in front of the tank*
- *Bridge layer*

Chapter 2

Crusader Manufacturing Numbers

Crusader I/II with 2 pounder or 3 inch close support howitzer	*1,999*
Crusader III with 6 pounder	*978*
Hulls intended for mounting 20mm anti-aircraft cannons	*898*
Crusader anti-aircraft tank mounting 40mm Bofors	*214*
Crusader command and observation tanks	*112*
Crusader converted to anti-aircraft tank mounting 20mm Oerilkon guns	*498*
Crusader converted to gun tractors	*600*
Crusader armoured recovery vehicle (ARV) – numbers not confirmed	*1*
Total builds and conversions	*5,300*

Command and Observation tanks had the main gun removed along with ammunition storage to allow room for map tables and extra radios to be fitted. To disguise the purpose of the vehicle a dummy gun barrel was fitted made from wood or tube. However, the additional aerials fitted would often give the vehicle away.

From the summer of 1942 both the Covenanter and Crusader were considered for armoured recovery duties. Both trial vehicles were fitted with a 5 ton portable jib fitted to the front of the hull. They were intended to be fitted with a winch but no suitable winch could be found. One report on their performance put the Covenanter as “unreliable” and the Crusader as “hopeless”. It is unclear if development beyond the pilot stage took place although subsequent members of the Cruiser tank family were used successfully.

The Royal Artillery required a suitable tractor for towing the 17 pounder anti-tank gun. The Crusader was chosen and modified with ammunition bins for the gun placed over the rear of the vehicle. As a tractor the Crusader performed exceptionally well.

Crusader tractor with the 17 pounder in the towing position –photograph by Gary Norris

Chapter 3

Crusader Anti-Aircraft Tanks

Throughout the Blitzkrieg, desert campaigns and the failed Allied raid on Dieppe, one of the key elements that drove German success was the aeroplane. Close cooperation between German ground forces and the Luftwaffe allowed commanders to have 'on call' bombers to quickly hit and destroy targets that put up strong resistance. The Stuka dive bomber was particularly effective in this role and soon became to be feared. The lesson learned by the Allies was that whoever controlled the sky controlled the battlefield.

The Stuka dive bomber was used by German Forces as mobile artillery where a fast response was needed (Courtesy of Italeri)

As early as the First World War, the need to counter the threat to ground forces from the air was recognised. Relying on fighter cover to protect forces from bombers was not a sufficient solution. Development of effective anti-aircraft guns capable of moving alongside the troops to provide an anti-aircraft screen was essential. This led to anti-aircraft guns being mounted on lorry chassis to give mobile support.

World War One mobile 13 pounder AA gun on a Thorneycroft lorry

Following the defeat during 1940 in France, it was proposed that all AFVs should at least carry a light machine gun capable of providing close air defence. Additionally headquarter squadrons of armoured regiments should be further protected with vehicles dedicated to providing air cover. With limited resources, the British response was to modify existing vehicles to act in the anti-aircraft role. A number of Humber Mark 1 armoured cars and Mark VI light tanks were modified to carry a new turret, with a similar design for both, mounting four Besa machine guns for firepower but with a limited range.

Humber Mark 1 AA version

The need for a more substantial and harder hitting alternative led in 1942 to the Royal Artillery and Royal Armoured Corps both submitting separate requests for new designs. These were based on the Crusader tank in the process of being withdrawn from frontline service. In the interim a wide variety of vehicles were used for mounting light or medium machine guns and quick firing cannons in the anti-aircraft role.

Twin Bren gun mount for lorry

Used on D-Day, a 20mm Polsten cannon mounted on a CMP 15cwt lorry and a 40mm Bofors gun, the standard wheeled (lorry) mount for the Light anti-aircraft batteries of the Royal Artillery

On 22 June 1941 Germany invaded Russia and Stalin pressed the Allies to open a new front in Northern Europe. Lacking both manpower and resources, Britain knew it could not carry out an invasion but began planning for it. To test the likelihood of success, a raid on Dieppe during August 1942 was carried out. Among the many failures identified was the inadequacy of air cover/protection which had to be addressed.


The 3.7 inch AA gun and 40mm Bofors AA gun provided the mainstay of AA guns for home defence but in a mobile war this required guns to be mounted for speed of action and a good cross country performance which towed guns could not meet

The 1942 requirements for a tracked anti-aircraft vehicle had to provide protection against low flying high speed aircraft. Against such targets, the choice of gun had to have an effective range of engagement within a range of 1 to 2 kilometres. The chassis had to be of a sufficient size to carry the selected gun mount and sufficient speed and power to keep pace with the tanks and troops it had to protect.

By late 1942 most of the Crusader's reliability issues were resolved. Too lightly armed and armoured as a gun tank, it did offer a suitable choice of chassis for anti-aircraft guns and benefited from having its production facilities intact. It was therefore selected by both the RA and the RAC.

In planning for the Normandy landings, the Allies understood to establish and expand the bridgehead within the first 48 hours was essential. Otherwise they risked being pushed back into the sea and could expect a repeat of a Dunkirk style evacuation. Unable to guarantee that suitable beach exits would be clear for wheeled traffic, the supporting AA guns had to be capable of making their own way off the beach. With the necessary agility and speed to move off an unprepared beach a high proportion of Crusader anti-aircraft tanks were deployed with the early assault waves.

The landings were to include a mix of gun types: towed, self-propelled (wheeled) and self-propelled (tracked). The principle duties for the Royal Artillery were set out in WO171/258 (1 Corps Operational Order No.1) and were to protect:

i. *Shipping and craft offloading*
ii. *Beach exits*
iii. *Beach maintenance areas*
iv. *Refuelling and rearming strip*
v. *Bridges (River Orne and Canal)*
vi. *Gun areas (artillery)*

The planners had expected to encounter 3,000 German fighters. On the day, only around 700 German aircraft of all types were available. Against this, the Allies employed nearly 7,000 aircraft and quickly established air superiority.

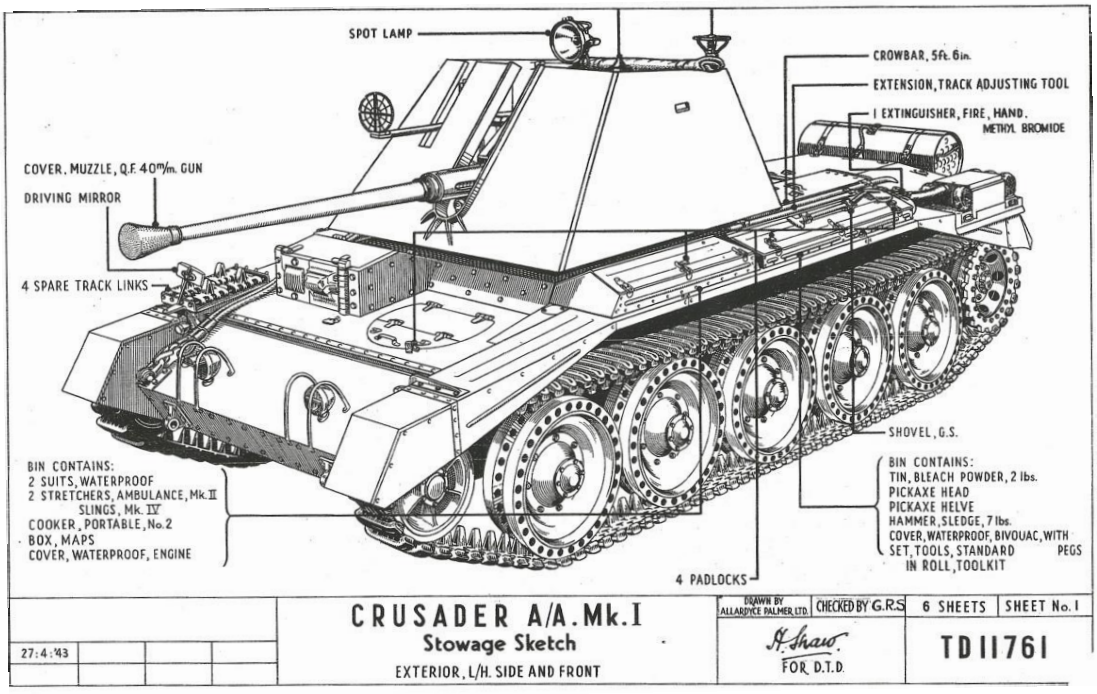
Chapter 4

Royal Artillery AA Tanks

Using the Crusader Mark III chassis, the Royal Artillery's choice of gun was the 40mm quick firing Bofors cannon. To provide protection to the crew, in its original design the gun was to be housed in a four sided turret in the shape of a truncated pyramid. It was expected to move to key targets such as bridges and supply areas then to operate from static positions. For this the RA requirement specified that a separate motor to power the turret. This was to avoid having to continually run the tank's own engine.

Crusader III Mark I anti-aircraft tank (Art work courtesy of Italeri)

During testing, it was found that the gun had difficulty in tracking aircraft and unless it was on level ground would not traverse. Despite this, the development of the vehicle was sufficiently advanced for stowage diagrams to be finalised.



Produced with the kind permission of The Tank Museum

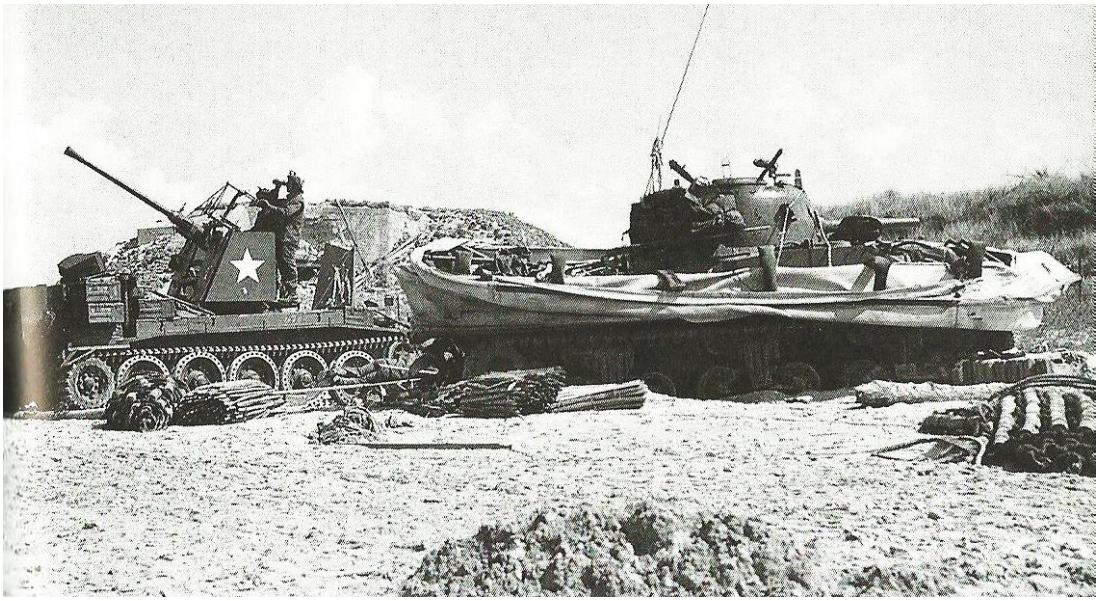
Rather than the official model, the Crusader Bofors tank initially went into production with two modified versions. Photographs exist showing the use of the two modified designs immediately prior to and during D Day but there is no data on the number of each of the variants produced. No photographic evidence of the “official” design being used in action has been evidenced. A production run of 214 vehicles was completed during 1943.

The first modified type employed a variant of the standard field mount shield for crew protection and the Stiff Key gun sight for targeting. An example can be seen in the photograph below taken during Exercise “Fabius” in May 1944. This was an exercise practising disembarking from landing craft. Further evidence can be seen in the photograph showing a Bofors Crusader coming ashore on page 41 of David Fletcher’s Osprey book, ‘Crusader and Covenanter Cruiser tanks 1939-1945.

By kind permission of The Tank Museum reference 4094-D1
The gun mount on the tank employed the shield arrangement seen below

Bofors 40mm gun with standard shield and Stiff Key gun-sight

The second type had a three sided shield giving the crew some additional protection. Photographed on Juno Beach next to an abandoned duplex drive Sherman of the 1st Hussars is one of the Crusaders. Heavily laden, there is a clear view of the shield arrangement. The second photograph, taken as Canadians landed on Juno Beach at Bernières–Sur–Mer, shows another Bofors AA Crusader sitting behind a Churchill AVRE below the sea wall.



Stranded DD Sherman and Bofors anti-aircraft gun at Nan Green Beach
Photograph PA-131505 by Frank Duberville
By kind permission of the Canadian Department of National Defence

Personnel of the 3rd Canadian Infantry Division landing from LCI (L) 299 at Bernieres-sur-Mer
Detail from photograph PA-132897 by Gilbert Milne
By kind permission of the Canadian Department of National Defence

In addition to the three Bofors versions, twenty seven Crusaders were converted in Royal Electrical and Mechanical Engineers workshops, being fitted with triple 20 mm Oerlikon guns. Twenty seven towed mounts to accompany these were also produced. The tracked vehicles and towed guns (see photograph below) served initially with the 93rd Light anti-aircraft Regiment.

Throughout the war the guns were highly regarded for their performance being transferred to lorry mounts towards the end of 1944. On their new mounts, they were used to protect key installations (e.g. bridges) during the crossing of the Rhine.

These gun mount/vehicles were rarely photographed with only a few shots giving clear views from which to draw on. The best two reference photographs are from the Imperial War Museum collection and can be found online:

- Crusader Triple AA gun in a hull down position in Normandy -photograph B7738
- Lorry mounted Triple AA gun of the RA at the Rhine 1945 - photograph BU 4138

Provided with an anti-aircraft gun, these Canadian artillery soldiers are on the lookout for the presence of enemy planes. Photo P004587, courtesy of the Canadian Department of Defense.

Chapter 5

Royal Armoured Corps AA Tanks

The RAC chose a different option which was to mount twin 20mm guns in a multi-facetted turret. The first version was designated Crusader Mark III AA Mark II. The radio was fitted behind the commander/gunner that he had to operate. As a result, he was overloaded with duties while working within a cramped turret space. Another serious design fault was that at full elevation the guns could trap the legs of the loader.

To correct these problems, a new turret was designed. A raised coaming gave better protection to the commander/gunner. The loader's seat lowered to provide clearance from the gun. Most importantly the radio was moved from the rear of the turret to the front of the tank. This was then operated by the assistant driver. The tank was designated as a Crusader Mark III AA Mark III. Outwardly similar, the two versions could be distinguished by the location of the two aerials carried. On the Mark II the aerials were carried on the turret and on the Mark III on the glacis plate.

As the fighting in Normandy progressed, losses amongst gun tank crews rose sharply. With the Luftwaffe effectively defeated, complete allied air superiority was established. The requirement for protection given by anti-aircraft tanks within the Royal Armoured Corps reduced. Crews from these tanks, along with other trained personnel, were transferred to gun tanks or infantry to make up for crew losses in the battle for Caen.

In addition to its normal role, the Royal Artillery Crusader AA tanks also took on the new role of ground defence. Working with forward artillery spotters, the guns were used against ground targets, snipers in particular.

As the twin 20mm Crusader AA tanks began to be withdrawn from the Tank Corps, some were transferred to the Royal Artillery Regiments. Comments from Royal Artillery War Diaries support this. The last entry also reflects the growing issue around losses on the battlefield.

Extracts from War Diaries

Establishment	Date	Comments
15 Lt. AA Regt	29/06/44	Ten men from A troop commence training in Crusader AA tanks fitted with 20mm guns under 22 Armoured Brigade instructors. It is decided that the Regiment will take on establishment of eight Crusader AA tanks to be manned by 20mm personnel on arrival in this country. These tanks and personnel will be attached to NY for all purposes and operations.
15 Lt. AA Regt	06/07/44	Regiment takes on charge 5 AA 20mm Crusader tanks to be manned by W Troop, 41 LAA Battery.
15 Lt. AA Regt	09/07/44	Two further AA 20mm Crusader tanks collected.
15 Lt. AA Regt	10/07/44	One further AA 20mm Crusader tank collected making W Troop up to full strength of eight in all.
58 Lt. AA Regt	18/07/44	3 Crusader tanks fitted with twin Oerlikons allotted to the Regt with 6 more to follow. To be manned by 20mm troops and will act as protection for Forward Recce parties as ground defence i.e. anti-snipers.
58 Lt. AA Regt	25/07/44	During July 23-25 there were discussions between the Battery Commanders and the Commanding Officer (CO) and the CO and the CRA with a view to economising in numbers of men.

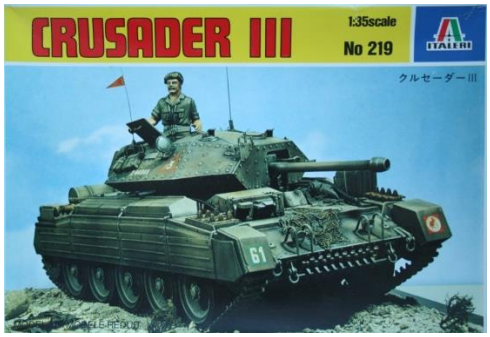
Chapter 6

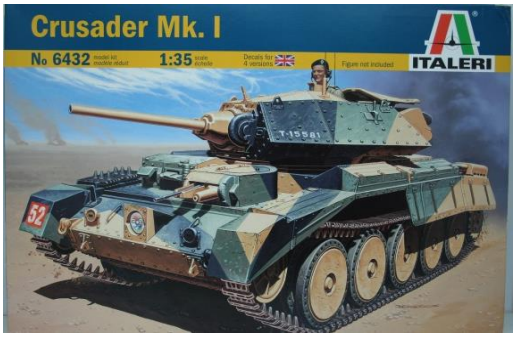
Kits Past and Present

In terms of availability, Italeri produces the widest range of Crusader models being the only manufacturer in the most popular scale of 1/35th. Italeri provides five of the vehicles in the Crusader range which can largely be built straight from the box. All of the versions use the same basic hull and running gear dating from the 1970's with new turrets, sand shields etc. to ring the changes. The kits also form ideal starters for conversions to complete the range of Crusader tanks.

The kits are reasonably priced but have a number of small sink and ejector marks as can be expected from a kit of this age. These however are largely hidden on the finished model. Detail on the kits, while not matching the new cutting edge kits, is still of an good level with the exception of the rubber band tracks and gun barrels which are worth considering replacing. Internal detail is largely absent on the gun tanks. Detail is however adequate in the anti-aircraft versions.

The company normally has at least two of the vehicles on release at any one time and periodically replaces them with others in the range. The range covers all three gun tanks and two of the AA tanks with the kits produced shown below.

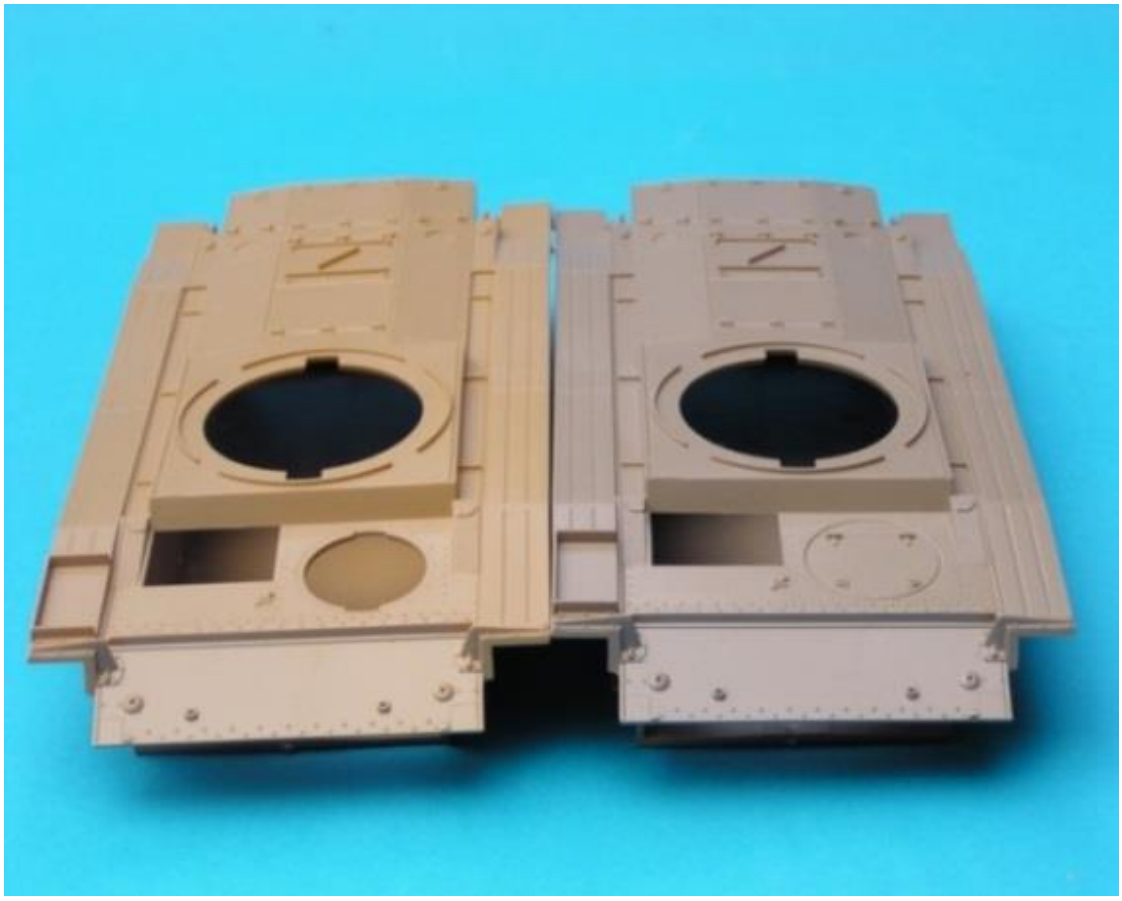




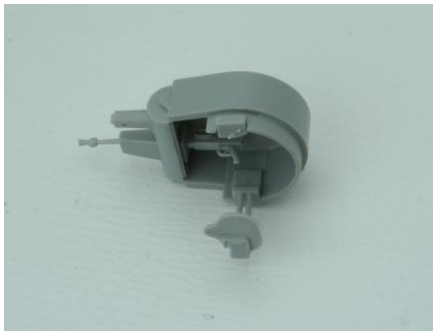
Out of production is the 1/32nd Crusader gun tank from Airfix. With large parts of their range being re-releaesed it may yet come back onto the market but can still be found for sale on the internet.

Most the Crusader versions built and described in the book have used the Italeri 1/35th kits as the base model. Where required, models have been completed using either conversion parts and/or scratch building parts.

To minimise the work during conversions it is best to use any of the versions with a Mark III chassis/hull for the donor kit. The difference between the Mark I/II and the Mark III hulls can be seen below along with the secondary turret that was sed on the Mark I/II gun tanks.



Above is a comparison of the Mark I/ II hull on the left with that of the Mark III. The Mark III already comes with the auxiliary drivers hatch in place while the Mark II has an opening for the auxiliary machine gun turret (shown below) and requiring a replacement hatch to be built. This makes the Mark III hull the preferred choice for conversions



Chapter7

Building the Chassis and Hull

As the hull for each of the vehicles in the book is largely similar, to avoid repetition in the description of the builds, the following chapter applies to the common areas for each build. The kit provides two options for sand shields: the smaller set is needed being used in Europe while the larger set was used in the desert. Easy improvements include replacing the pioneer tools as they show their age and using metal replacement guns to avoid the problem of seams along the length of the barrel.

The kit is simple to assemble with well laid out instructions with the minimum of filler being required. When building the upper hull, the guards around the headlamps and the filling tube from the auxiliary fuel tank are delicate and easily broken. As the hull is handled extensively whilst checking the turret fit these would be best left off until the turret has been mated to the hull.

The soft polythene tracks lack the detail of modern link and length or individual links but still give a reasonable representation of the real thing. These are joined using a hot screwdriver blade on the two short “pins” on one end that fit through two holes in the other end of the track to effectively rivet the ends of the tracks together. This process is clearly indicated in the instructions and the joint should be located below a wheel. The track can then super-glued to the top of the road wheels to ensure they rested on the road-wheels. To help keep the shape while the glue set, damp kitchen tissue was pushed between the hull and the track.

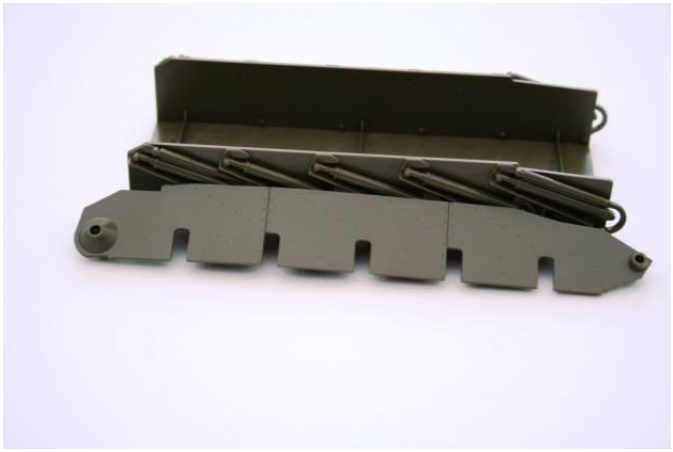
Alternatively Model Klasten or Accurate Armour tracks can be used. The Accurate Armour tracks carry a better level of detail and are the link and length type with a set consisting of a number of individual links and ten straight sections. Conveniently five strips can be formed to make a full track by bending to shape after dipping in hot water causing the track to become malleable. In the kit builds, some were finished with the rubber band track while on others the Accurate Armour tracks were used.

Building the hull starts with fitting the suspension arms to the hull having cleaned any flash or off-cuts left from cutting it away from the sprue. As the suspension arms are hidden cleaning need only be minimal. As the front suspension arms differ from the rest, care must be taken to select the correct ones when fitting in place.

The hull after being cleaned up

The front suspension arm shown on the left

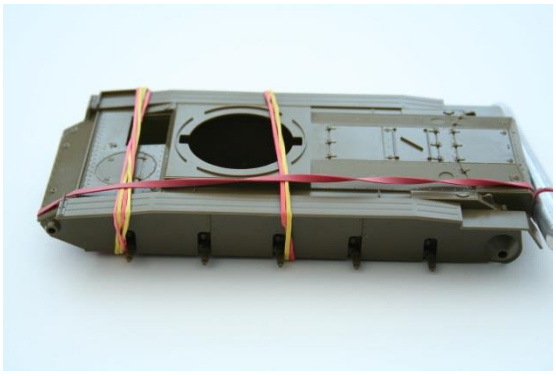
The suspension arms in position

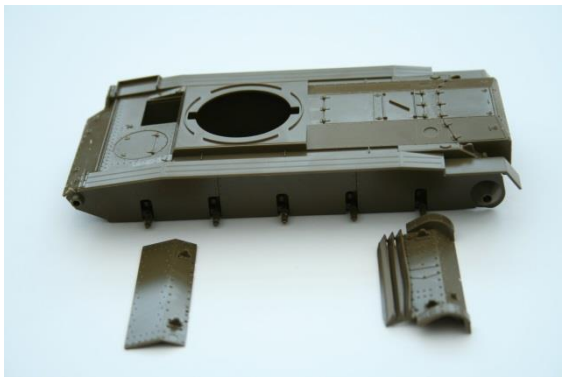


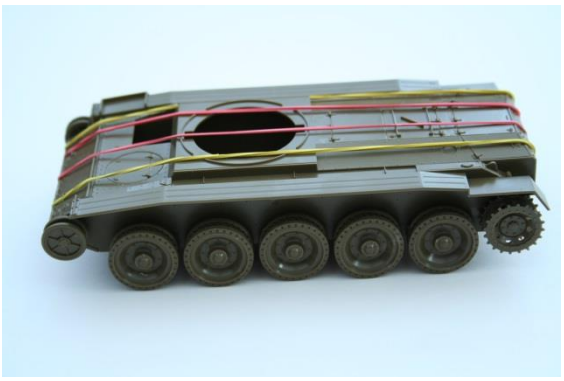
The outer hull plating is attached to the suspension arms enclosing them.

The wheels, drive sprocket and idler wheel are the next stage of assembly. These are left off to be painted separately and added to the model in its final stages of assembly. Follow the instructions carefully and ensure the correct half of the wheel assembly faces outwards before attaching the hub.

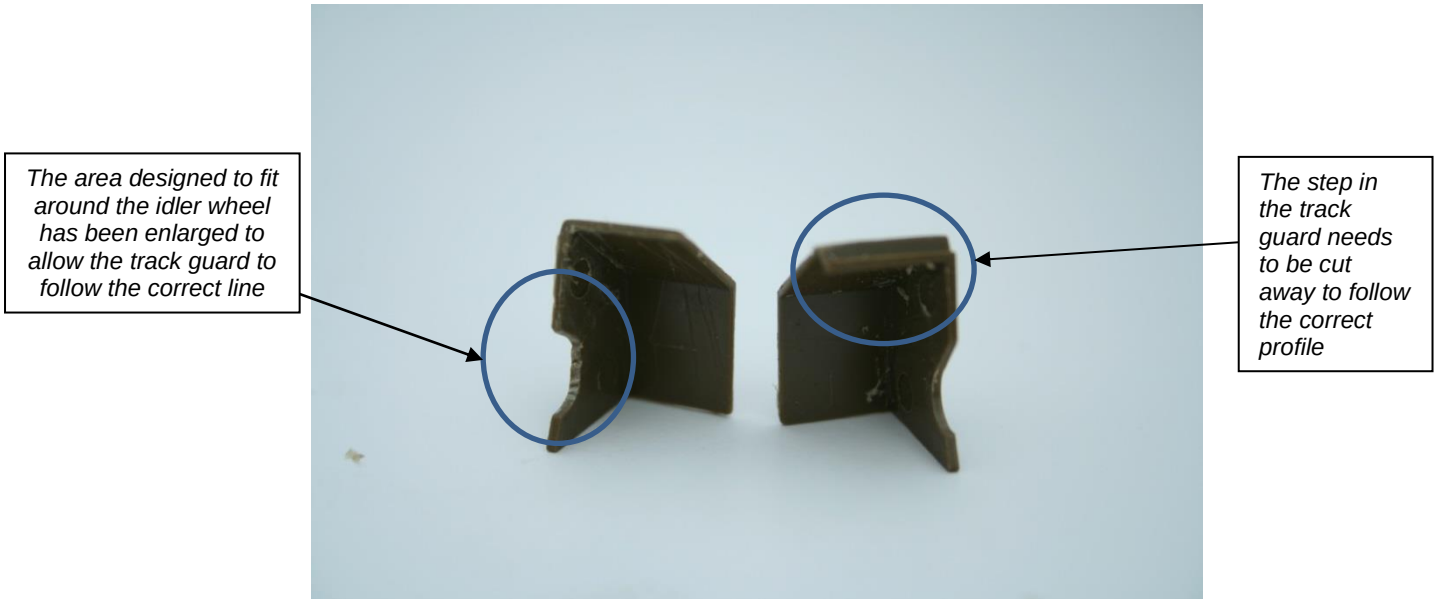
Test fit the upper hull, front and rear plates then secure in place to complete the basic hull shape



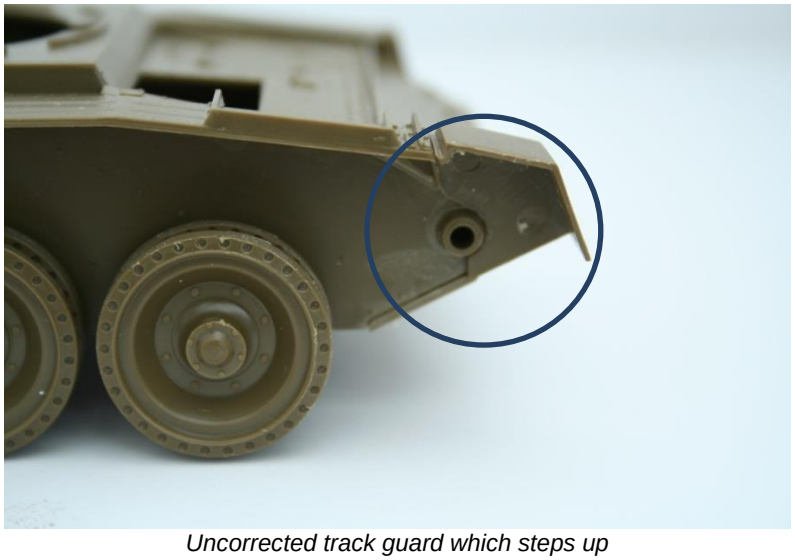




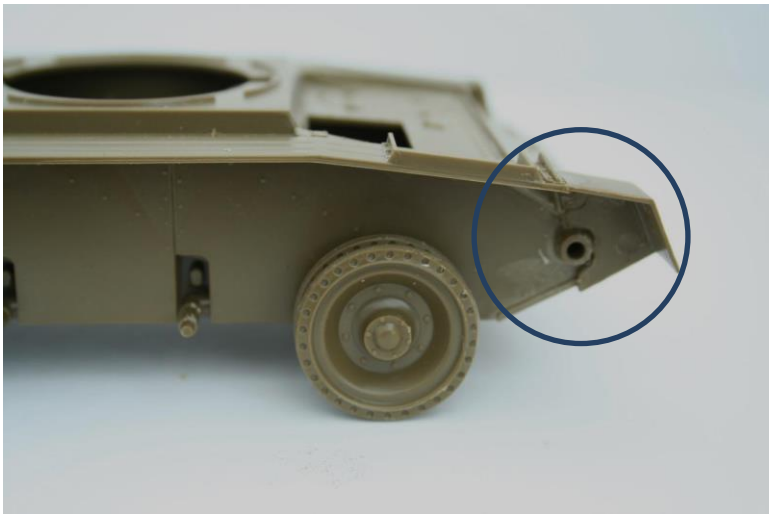
The front track guard should run in line with the rest of the running board but on the kit it has an odd step. The track guard has a circular cut out designed to fit around the idler wheel location. To get a correct fit, the step on the track guard needs to be cut away and the cut out enlarged by gradually cutting away plastic at the top of the cut away until it aligns. This does not need to be too neat as once in place this is hidden by the idler wheel.



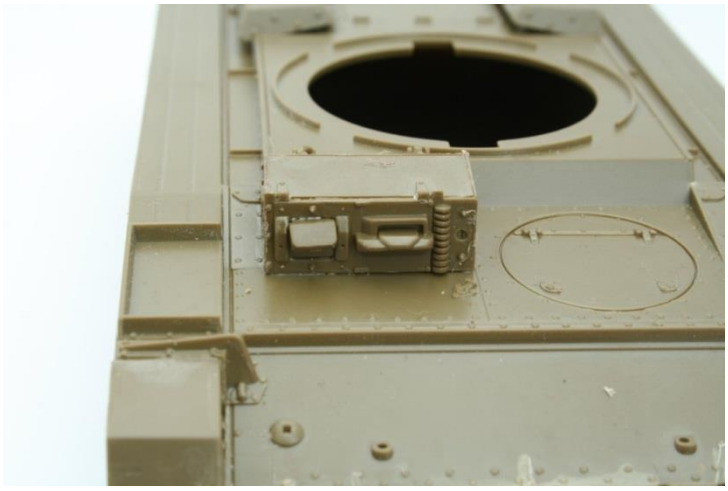
The corrected track guard is shown on the left. Its appearance can be improved by filing the edge of the track guard at a 45 degree angle to half its thickness at the outer edge. See below for the uncorrected fit followed by a photograph showing the correct fit.



Uncorrected track guard which steps up



Corrected track guard following a straight line with the profiled edge thinned with a file



The driver's hood is assembled as per instructions and fitted to the hull.

This completes the basic build common to all of the kit builds. Headlamps, guards and other fine detail have been left off to avoid damage when handling the model.

After painting the wheels and other components, it is important that the track is fitted correctly. It is normal to see sufficient sag in the track that it sits on all of the five road wheels as this was necessary to allow the suspension to move freely without placing a strain on the track. As a minimum, the track should sit solidly on the second, third, and fourth wheels and only just be rising off the first and fifth wheels. An examination of the photographs and illustrations in chapter one will demonstrate the variation in slack seen on tracks used with the Christie suspension.

After painting, to replicate the sag in the track when using the rubber band tracks supplied with the kit, place a drop of super glue on the top edge of the inner tyre and pack between the track guard and wheels with tissue until the track is held down with the desired degree of sag then allow the glue to set.

With resin track (Accurate Armour), soften the track in hot water and form the track around the drive sprocket and idler wheels whist dry fitting the straights sections to make joints without cutting the track. This process can be repeated until the desired fit is obtained (see next page).

Shaping and test fitting the Accurate Armour resin tracks

Dry fit of the tracks ensuring as many joints as possible are supported by a wheel

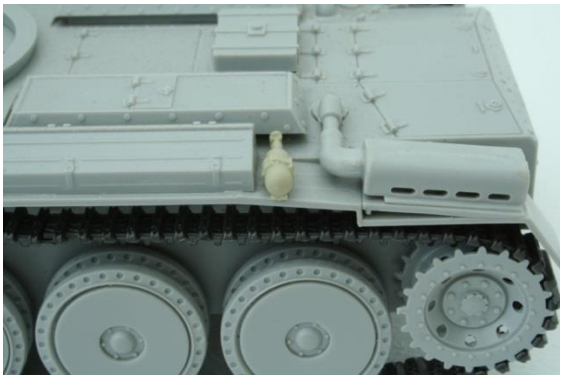
Tracks in place and secure

Chapter 8
Building the Crusader Mark I/II Gun Tank

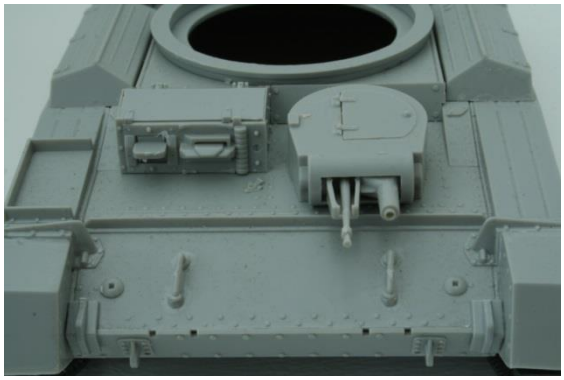
The beginning of the build largely followed the construction of the hull as described in the previous chapter. A number of differences in the build needed take account of the unique features seen on the Mark I version. These are illustrated in the photographs below and include:

- Covers for the road wheels
- Concertina air filters
- Jacking block between air intakes
- Additional machine gun turret
- Grab handles on the glacis plate
- Removal of attachment detail around towing hook

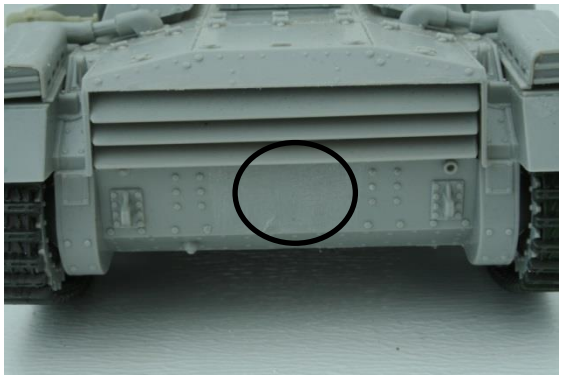
The headlight arrangement on the tank also differs but due to the vulnerability whilst handling were left off until the end of the build. Below can be seen the auxiliary machine gun turret on the nearside of the vehicle and the road wheel covers used on the Mark I tank only. The concertina air filter is noticeably different from the later oil filled filters used on the Marks II and III.

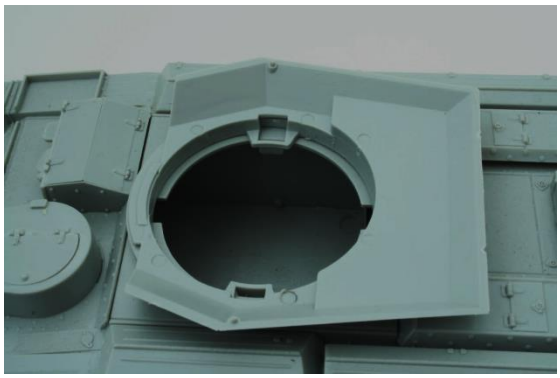



The Besa machine gun in the auxiliary turret had a reasonable level of allowing the turret to be built as per instructions. The kit provides a pair of grab handles as fitted and the early version of the headlamps not fitted until later. These represent differentiating points between the Mark I and II (some of which were still being fitted with the auxiliary turret).




The rear hull plate carries the detail for the towing bracket on the Mark III and required removal, circled below. At this point of the build all other fine detail was left off the hull for ease of handling. All of the running gear was loose for ease of painting being held in place by the kit tracks due to be replaced later.



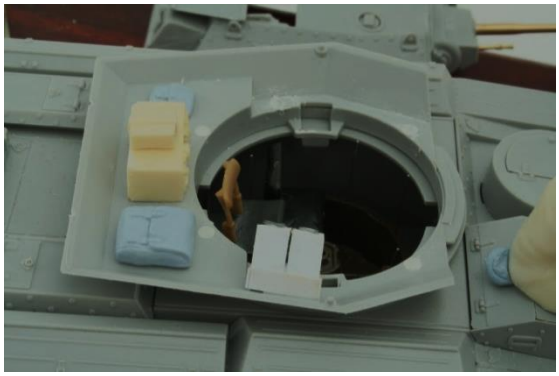


While the outer faces of the kit were largely free from sink holes or ejector marks, the latter were present on the inner faces of the turret. If closed up there are no issues. The model was to be built with the turret roof in the open position. By showing this key feature of the tank, consideration had to be given as to how much internal detail would be on view.

The layout had one of the crew seated in the turret. With the figure in place sufficient of the interior was visible that a rudimentary interior would be required, particularly in the turret bustle.

The key items that would be visible with the model complete would be the number 11 radio and signal satchels in the bustle and the commander and gunner's seat in the turret basket.

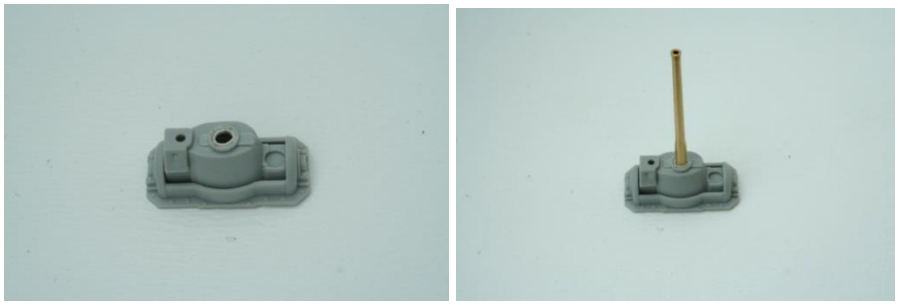
Having filled the ejector marks, two "Airfix" satchels were added from the spares box along with a radio from "Inside the Armour". The turret basket from a Crusader AA Mark II was taken from the spares box and two seats added using cut down sand bags for the cushions. A number of Besa ammunition boxes were built and added in places where they may be visible. Otherwise all other detail was ommitted on the basis of not being seen.



One key area that needed correction was the main gun barrel. It had to be replaced being oversized and closer in diameter and length to that of the 6 pounder gun. A very rudimentary breach block was present in the kit but was not used as it would not be visible.

The decision was therefore taken to replace the gun barrel with a replacement from Passion Models. The early (P35-042) and late (P35-043) versions are available with the early version used on the Mark I tank and the late version used on the Mark II version. The early version can be distinguished by a tapered central section with a slightly flared muzzle while the late version is stepped at both of these locations. In the case of the turret Besa machine gun, the detail is indistinct and was also replaced with a metal equivalent.

Because the kit barrel was oversized a shim of plastic had to be added to the gun mantle being just visible below as a white ring. The recessed “ring” on the right of the gun mantlet needed a small hole drilled in the middle for the gunner’s optics – see later.

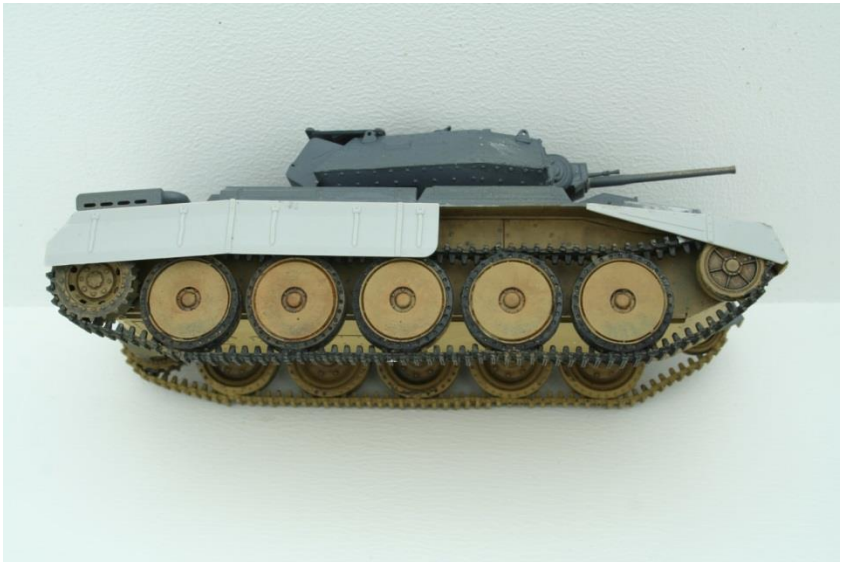


With the interior in place, the inside of the turret was painted white although aluminium was specified but not always used. On completion very little of the turret basket was visible but sufficient of the radio could be seen to make the exercise worthwhile.

Having been given a coat of grey primer, work began on painting the running gear and lower hull. This needs to be completed before the addition of the track shields. A coat of Tamyia Dark Yellow acrylic paint was applied followed by Citadel Miniatures Deluvian Mud wash and weathered with ground yellow ochre pastel chalk to bring it all together. The wheels were painted in the same colours but as the wash had left too intense a contrast they were dry brushed with the Dark Yellow to balance the look.

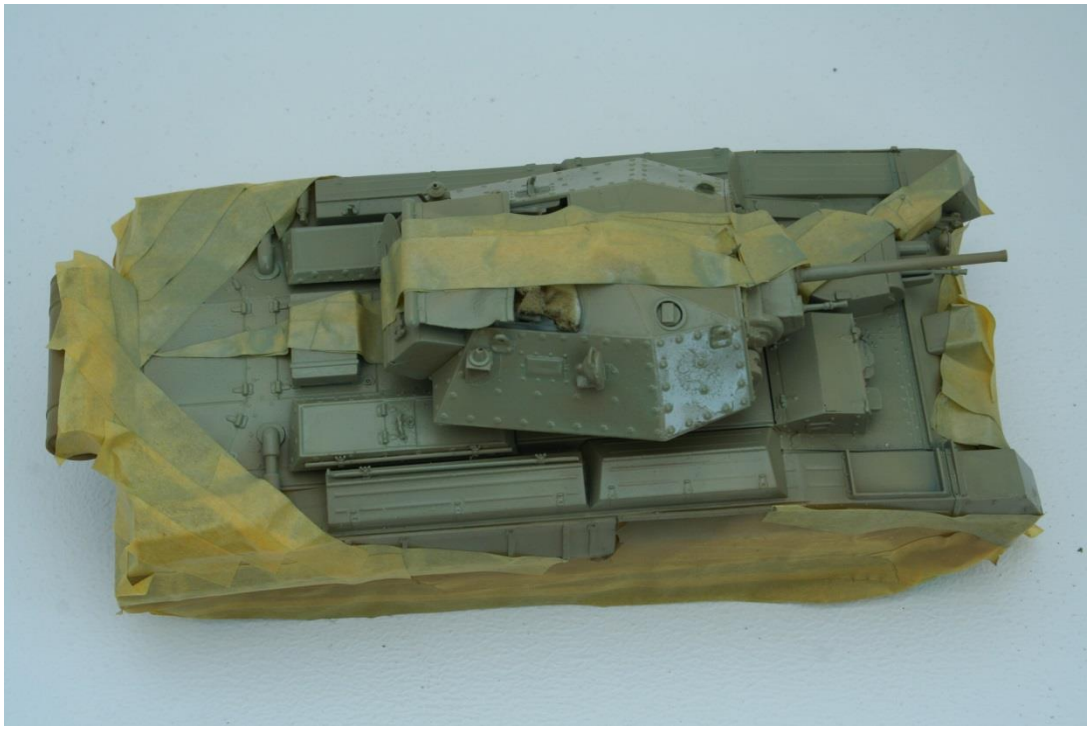
The tyres were painted with Tamiya Rubber Black acrylic paint and the track with Dark Iron. When buffed the process leaves the tracks with a realistic metal sheen. Weathering of the tracks was left until the whole model could be done to ensure a uniformity of effects.

The photograph below shows the track shields in place. The extent to which access to the lower hull and running gear is obscured can be seen. At this stage the shields were tacked in place and the running gear and track was lose as painting the tyres was incomplete and some chipping of paint had to be added.



The colour scheme chosen for the tank was the Caunter three tone camouflage scheme. An IPMS article written by Mike Starmer provided the detail which is incomplete in the Italeri instruction sheet. The paints used were Xtra Color Light Stone, Slate and Silver Grey. The running gear was masked off and two thin layers of light stone applied.

Having masked off the protected area, the model was readied for the application of the second colour, silver grey. The masking exercise was repeated before the final application of slate. Some bleed through of colour was corrected by hand painting areas where the paint had run.



The decals were applied using Humbrol Decal Cote 1(set) and Decal Cote 2 (sol) and consisted of the tank registration number and divisional number only.

The vehicle was given two coats of a glaze using German Grey to soften the distinction between the colour contrasts followed by a pin wash around detailed parts such as rivets. The vehicle was then ready for weathering.

Note that the front sand shields had to be reshaped to match the corrected contour. The rivets on the front edges were lost in the process. Absorbent beads from a water filter cartridge were used to provide replacements.

The model was placed in a diorama entitled “Desert Encounter” with the chance meeting between a tank crew re-arming and a nomadic Arab mounted on a camel. Exchange of information on enemy locations/movement was a valuable source of intelligence that could be picked up from nomadic tribesmen.The figures were sourced from the Wolf/Sovereign 2000 range and from the Masterbox Commonwealth AFV Crew, set MB3564.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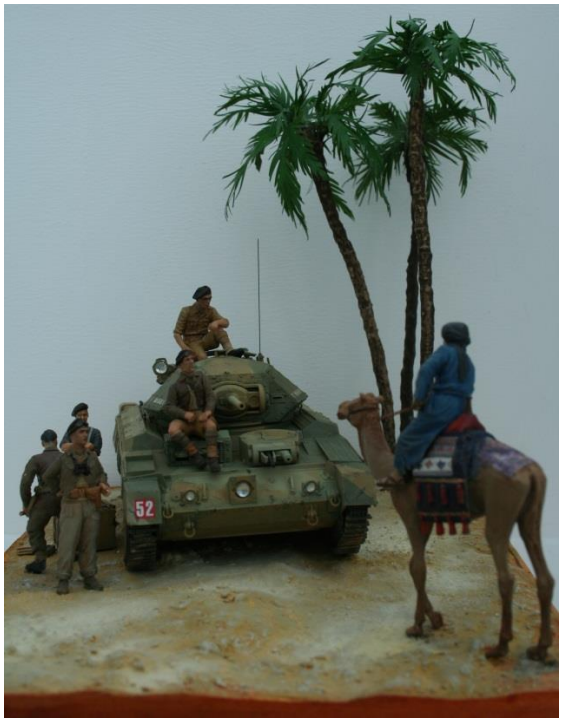
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Chapter 9

Airfix's 1/32 Scale Crusader Mark III Tank (Build by Andrew Noble)

In addition to the Italeri version, the other large scale version produced in 1975 by Airfix was a 1/32nd scale model of the Mark III gun tank armed with the 6 pounder gun. Being of the same generation of kits as the Italeri version, it is of a similar standard of quality and follows a similar procedure for assembly. The choice of scale normally means the kit is overlooked by most modellers.

The kit has been out of production for some years but with Airfix releasing some of its classic kits it may be re-released. It is still available through web sites such as ebay and still turns up on the odd occasion on a trader's stall at shows. Built over 10 years ago, the photographs below have been included to give a comparison with the Italeri kits.

The barbed wire used in the base was made by trimming a plastic net bag used to hold fruit along a either side of a long strip. Supports for the wire were formed from fuse wire twisted around the point of a needle file to form two loops through which the wire could be passed.

Itaeri's 1/35 Scale Crusader Mark III Tank
(Build by Gary Norris)

The kit below is the Italeri version of the Mark III gun tank built and finished by Gary Norris. The model is in the plain desert yellow commonly over-painted on the green finish from the factory finish used in the UK.

To increase the range of the tank, an additional fuel drop tank was fitted on the rear hull which could be released when going into combat. The replacement of the two pounder gun with the six pounder resulted in a new gun mantlet seen in the photographs below.

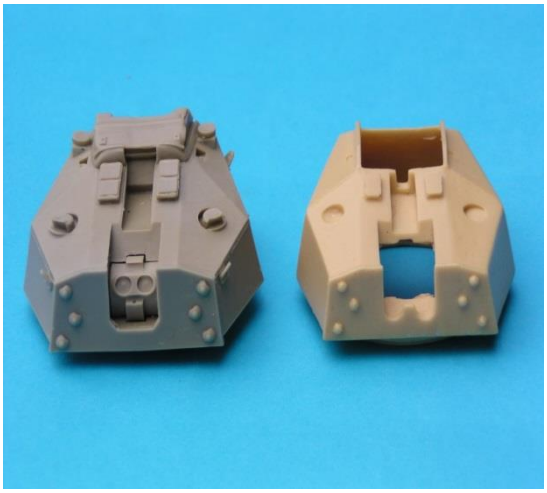
A key improvement in the tank's reliability was the change to oil bath air filters seen on the rear of the tank. The weathering on the tank shows the typical dusty condition found in the desert and the wear on the paint. The abrasive nature of sand eroded the top coat allowing the original base coat to show through.

Chapter 10

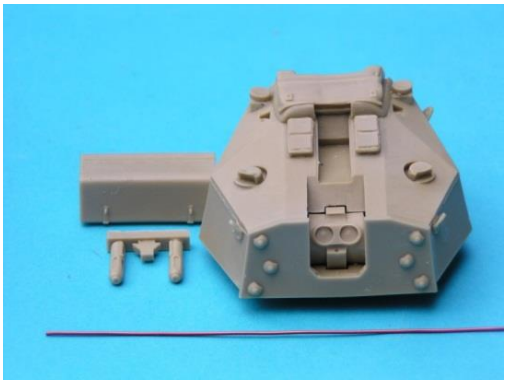
Building the Royal Armoured Corps Crusader Mark III AA Mark II and III Tanks

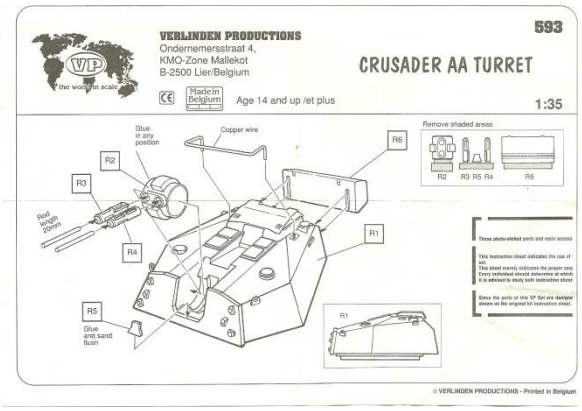
While Italeri has produced a good number of the Crusader variants, the Crusader III Mark II AA tank is missing from the range. The Crusader III AA Mark II and Crusader III AA Mark III AA tanks are very similar and used the same hull but had different turrets for the reasons previously explained. Conversion turrets for the Crusader III Mark II were produced by Verlinden and Miniature Armour Conversions (Tyresmoke Productions). Both are out of production but can sometimes be picked up on E-bay or at model shows.

The Verlinden turret is shown on the left with the Tyresmoke Productions version on the right. The latter has the advantage of being hollow but lacks the sharpness of detail and looks too narrow. Internal detail can be added with a Number 19 radio from *"Inside the Armour"* or *"Resicast"* placed in the turret bustle along with the turret basket from the Italeri kit to provide a rudimentary interior. Noted after the build of the Mark II, the lower of the two rectangular blocks near the turret opening on the Verlinden kit should have been removed and match that shown on the Tyresmoke kit.



For beginners using resin, almost all castings will come with a casting block or carrier of excess resin that needs to be removed. Always bear in mind that dust from cutting resin is toxic and must not be breathed in. Wear a dust mask and keep the resin wetted to minimise dust. Also before starting to cut, ensure you are not cutting off part of the casting.

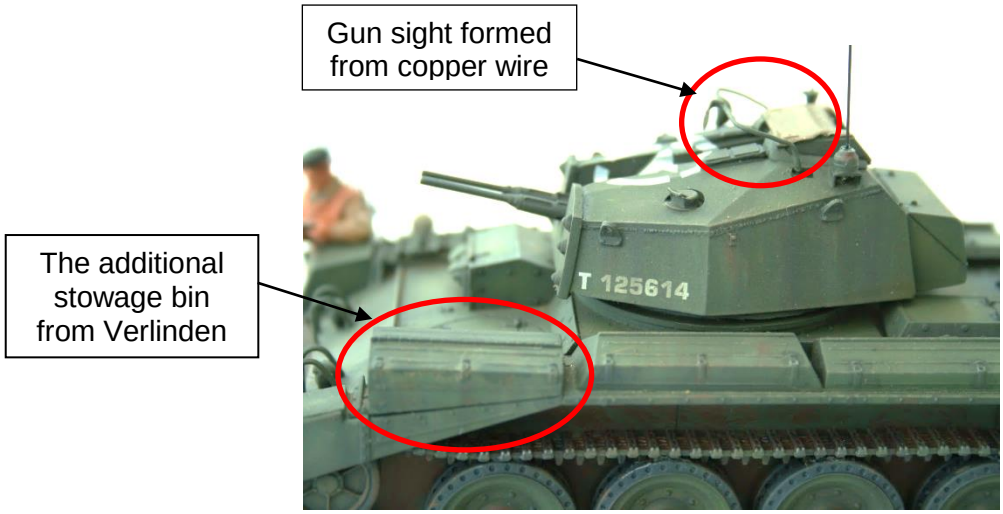




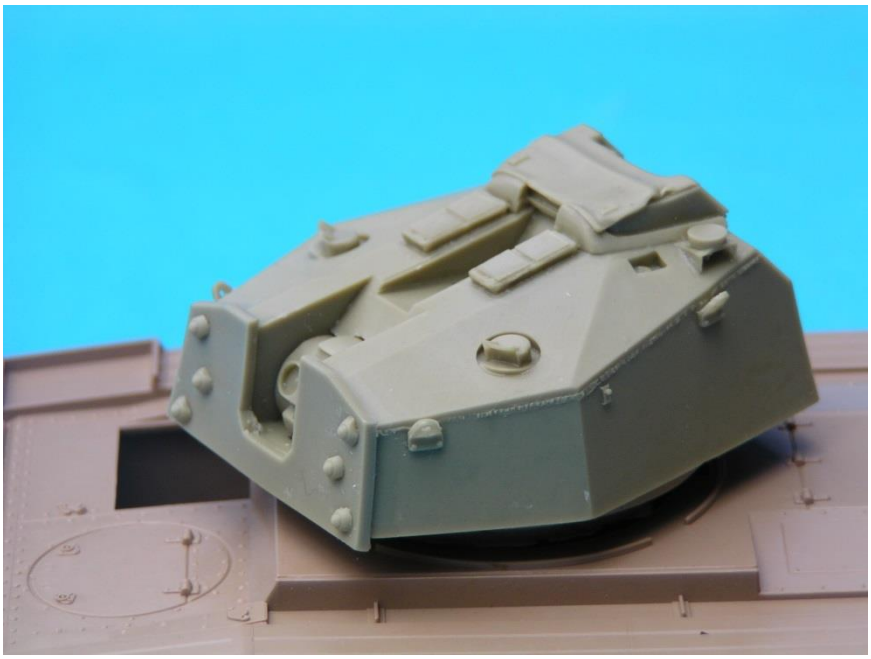
Instructions come in the form of an easily understood assembly diagram. The turret kit from Verlinden consists of the turret, gun mount, lower sections of the guns housing the recoil springs and for the barrels a section of tubing is supplied that needs to be cut to length. Also provided is a turret stowage bin along with an additional hull bin and a length of copper wire to form the gun sight support. The ring sight for the gun was taken from the spares box originally belonging to a Scale Link Lewis gun. All parts were removed from their carriers and cleaned up prior to assembly. Care has to be

taken that not too much material is removed from the gun mount as it push-fits neatly into the turret. Once cleaned up, the parts were assembled with superglue.

The hull uses the standard stowage bins that come with the kit and these were added along with all the smaller parts such as towing rings, stowage boxes, pioneer tools, headlamps and brush guards along with the extra stowage bin to the front left track guard.



The turret can be fitted directly to the hull and glued in place. In order to be able to position the turret after assembly the turret ring and lugs from the base of the Italieri turret were removed and refitted to the Verlinden kit.



Aerials were cut from carbon fibre rod and using the mounts from the spares box fitted to the model. For identification purposes, the location of the aerials is the easiest way of determining whether a vehicle is an AA Mark II (turret mounted) or AA Mark III (hull mounted. The spotlight and bracket from the Italieri kit were attached to the left hand side of the turret. The fine parts such a brush guards for the lights and brackets were

fitted along with the pioneer tools. A clear lens, originally intended for decorating greeting cards, was added on completion of the painting. At £3 for 100 these were a bargain but difficult to come by. With assembly complete the model was set aside for painting.

Painting and Finishing

Humbrol and Citadel acrylic paints were used throughout all of the painting process. The model was first sprayed with a coat of Citadel Chaos Black for a base coat. This undercoat is used to provide a residual shadow to emphasise the profile by when over-painted.

Using the cloud pattern technique, Humbrol Olive Drab was lightly sprayed onto individual panels avoiding fully covering the outer edges allowing a hint of the black undercoat to show through. A mix of 50:50 olive drab and olive green was sprayed onto the panel avoiding covering the entire olive drab coat. This was repeated using olive green only. A 75:25 mixture of olive green and desert yellow followed and finally a 50:50 mixture of olive green and desert yellow.

As each lighter coat was applied the amount of panel away from the outer edge left exposed was increased to graduate the lighter colours towards the centre. Once reaching the desired effect the rubber tyres on the road wheels were painted with Panzer Grey mixed with 75:25 black and then lightly dry brushed with dark earth colour. To deepen shadows a black pin wash with 90:10 dilution of water to paint was run into the recesses and around raised detail.

Turret details with the aerials clearly visible and the canvas cover providing weather protection

The main Allied star mounted on the roof of the turret was taken from an Italeri Crusader III Mark III anti-aircraft kit whose hull had been used on another project. The decal comes in three sections that must be matched at the edges. Although it appears daunting, the sections dipped in Micro sol solution and positioned with a moist paint brush slid together quite readily. Other markings came from the spares box with the divisional signs for the 7th Armoured Division coming from an Accurate Armour decal sheet. Once in place a coat of Newton and Windsor matt varnish was applied over the decals to give a matt finish.

Weathering of the vehicle was begun by streaking the vertical surfaces of the vehicle to represent water marks and staining with a series of diluted washes. Four different colours were used: black, desert sand, burnt earth and light earth. By heavily diluting washes, these were applied with a fine tipped brush. The staining was gradually built up with a good degree of over-painting to either increase the depth of colour or break up an area of colour that was too wide or vivid. Stowage for the vehicle was painted separately and added to the vehicle.

The next stage of weathering was to prepare an earth colour from artist pastels ground up to “dust” onto the vehicle. The mixture was made from ochre and burnt umber. The ground pastels were applied to the surfaces (mainly lower horizontal surfaces and the rear of the vehicle) where dust or mud would collect. Once applied, the weathering can be “fixed” by a coat of Windsor and Newton matt acrylic varnish.

The Base and Groundwork

The model was mounted on a simple MDF base painted with an earth tone in with the groundwork. The roadway was made from polystyrene food packaging (a pizza base), cleaned and then scribed with a pencil to represent cobblestones. The wall was built from the same material, scribed and the capped with ‘slabs’ cut form the polystyrene. To prevent paint dissolving the polystyrene, white glue was used to coat all the surfaces forming a protective barrier prior to painting. Static grass was sprinkled onto the verge of the road and lightly dry brushed with Humbrol Park Green paint to give a more natural appearance.

The overall effect of the weathering process gives a "heavily used" appearance to the model

Photographic evidence is lacking for the AA Mark II operating outside of the United Kingdom so the setting was kept simple and non-specific. With the vehicle carrying the markings for the 7th Armoured Division, two of the vehicles crew of four (with appropriate insignia) were added with the lance corporal chatting to a sergeant from the Royal Armoured Corps. To complete the diorama, an etched metal gate from Verlinden was added along with a wooden shrine from Historex.

Close up of the crew with the tank displaying the Desert Rats formation sign and the additional stowage box. The clear lens on the searchlight is just visible

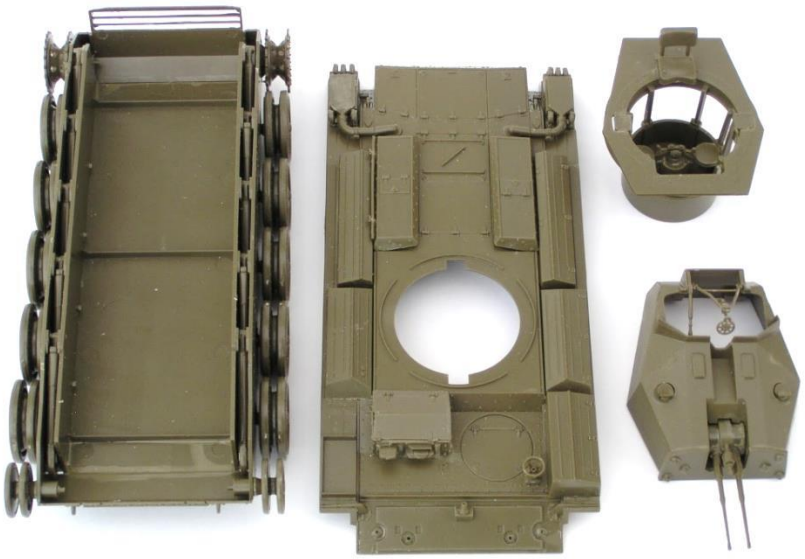
Note the sag on the tracks, typical of all vehicles using the Christie Suspension and necessary to allow for the high degree of movement experienced

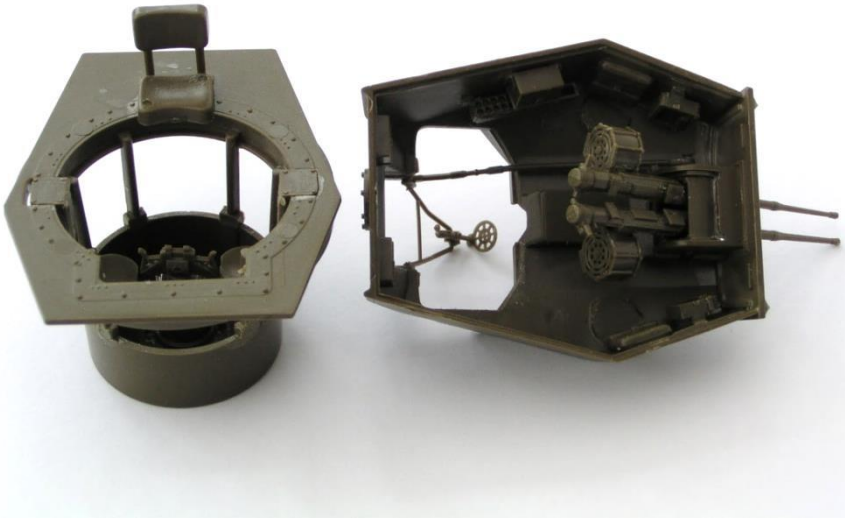
Front view – note that with the combined formation flash there is no marking on the right hand fender

The auxiliary fuel tank can be seen on the rear of the tank

Moving on to the build of the Crusader Mark III AA Mark III, the Italeri kit was a straightforward build with an adequate turret interior when viewed via the commander/gunners position. One of the drawbacks with the kit is that the driver's position lacks detail therefore was modelled in the closed position. As period photographs viewed seem to indicate that only this version of the twin 20mm gun versions landed and used on D Day the build was set in a combat role.

Built straight from the box as sub-assemblies, detail was reasonable but could have been improved by having added replacement metal gun barrels and a finer finish to the gun-sight. Since building the kit, a set of high quality of replacement metal barrels have been released and are well worth the investment.





Having painted the interior of the turret and assembled it with the turret basket in place, the rest of the model was ready to be painted. This followed the same method described on the previous model. The vehicle was displayed in use in the ground support role for forward observers as shown overleaf. The wall section in the scene was a Warhammer item repainted and shaded to improve its look. The forward observer on the tank and the military

policeman were from the Verlinden range and the wounded soldier returning to his lines was a Wolf figure.

The aerials relocated to the hull of the Mark III AA tank are clearly visible

The MP diverts traffic while the tank carries out its role of ground support

The forward observation officer uses the hull deck as a viewing platform

Close up of the "Tommy" slogging his way past the tank

The tank is seen focusing on its target, the barn in the near distance

An overview of the diorama showing the addition of some stowage on the vehicle

Chapter 11
Building the Crusader Mark III AA Mark I

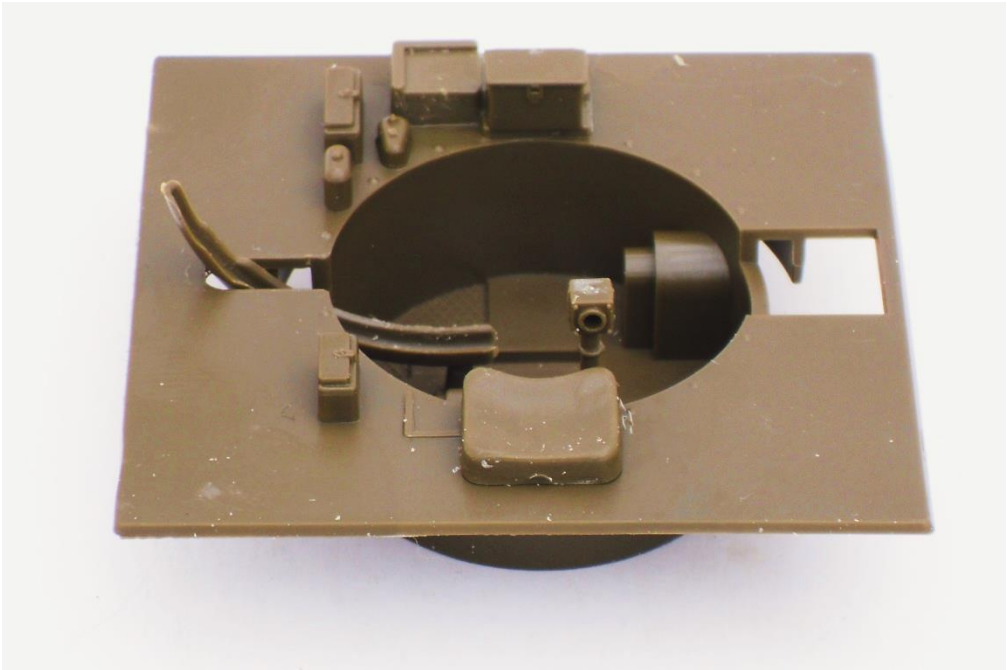
The above version is produced by Italeri as one of their standard kits. The detail is sufficient that it can be built straight from the box. In terms of improvements (other than those common throughout the range), the barrel of the Bofors gun has some fine line seams running along its length that are easily removed but many modellers will replace this with one of the after-market metal barrels available.

From the art work above, the turret projects a spacious appearance. However, once the interior is viewed, a large amount of ancillary equipment has been stowed in bins with the result that it cramped. In terms of assembly, the interior and its components need to be painted before the four sides of the turret are assembled.

The hull assembly was straight forward and follows the procedure described in the earlier chapter. Having decided not to place mud guards on the vehicle, the running boards were thinned down by tapering the edge with a craft knife and removing approximately half of the thickness. If the mud guards are to be used, this would not be necessary as a maximum contact area between the guards and the hull is desirable.

The Italeri gun lacks the refinement of the Bronco version but has the advantage that assembly is straightforward with the exception of the two piston rods loose fitted in order to allow the gun to elevate freely. The temptation to glue the rods in place must be avoided in order to fit the gun shields over the barrel when assembling the turret.

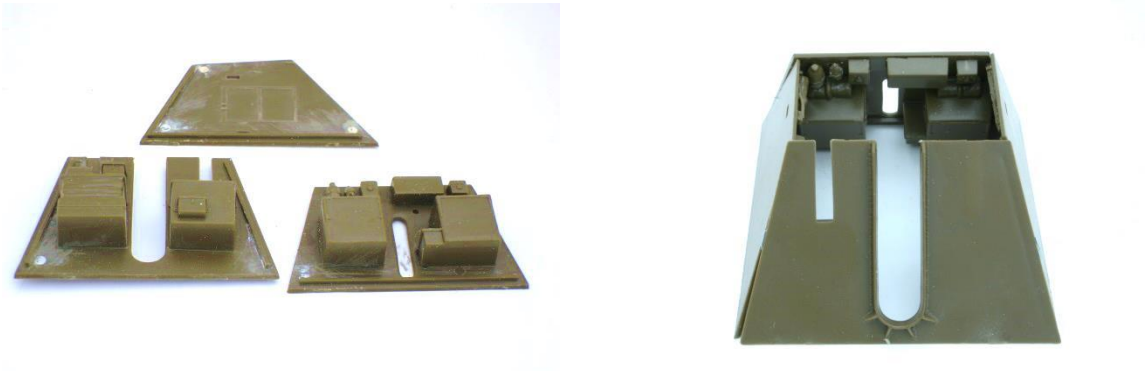
Although the gun lacks detail, once the turret is fully assembled there is only a limited view of the gun therefore there was little incentive to change it out for a replacement. The barrel had two fine seam lines running along its length but these were fine enough to remove with a light sanding. More crucially the barrel was not distorted being circular and straight along its length. The flash suppressor at the end of the gun was thin enough to be fitted without change therefore the kit parts were used. The next step was assembly of the turret base again being a straightforward procedure.



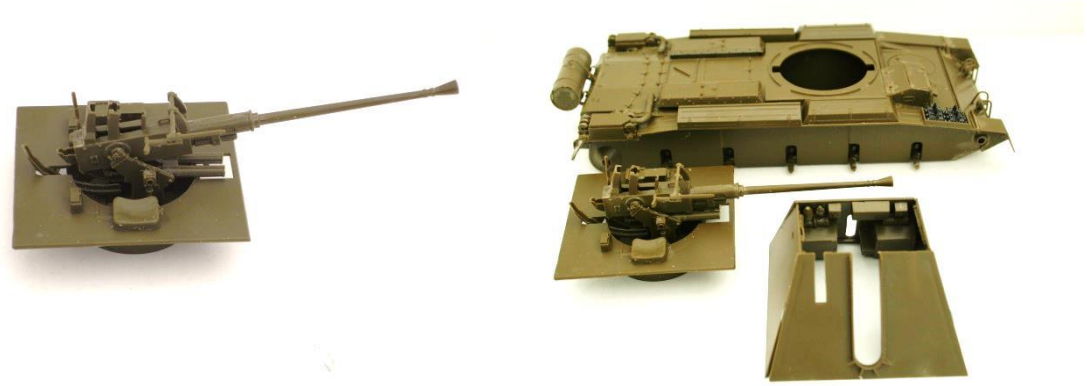
The detail in the turret base is fairly basic but is sufficient for the limited view available when the turret is fully assembled as can be evidenced in the next photograph.

Moving on to the turret sides, there are a number of ejection marks that would be visible on completion that require filling and sanding. The large lockers used for storage of ancillary

equipment gives an immediate impression of how crowded the turret will become when assembled. Having test fitted the parts, all sub-assemblies were primed with paint.



Three of the turret sides showing ejection marks requiring filling before proceeding with the assembly with a dry fit of the turret sides to check alignment with the sub-assemblies set out below.



With the gun mount in place, very little of the detail in the gun well/base is visible. The mount and base when it came time to be painted were treated as two different sub-assemblies.

Test fit of parts using Blue Tack with all of the parts set out below awaiting painting

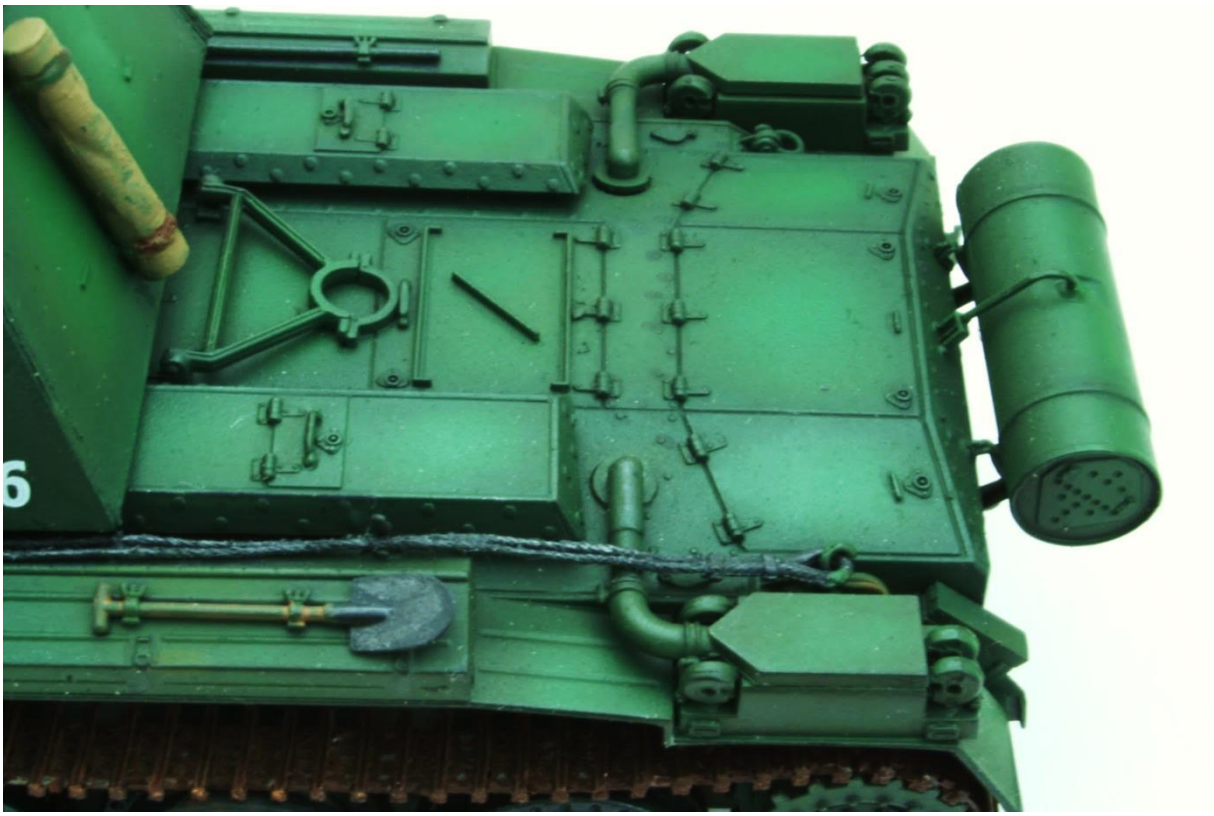
Being a test vehicle and new, the wear and weathering was kept to a minimum with dust applied to the floor areas only. In terms of changes the fire extinguisher, which lacked detail, was replaced with a Resicast item.

During assembly of the turret shields, weld beads were added by softening stretched sprue with glue and when soft using a craft knife blade to work in the detail into the beads. Having assembled the vehicle using Accurate Armour resin tracks, the vehicle was painted in acrylics using the "cloud" technique as described previously using:

- Citadel Chaos Black as a primer and pre-shade
- Humbrol JAN green
- H Humbrol olive green
- Humbrol JAN green and olive green mixed in equal proportions
- Humbrol olive green and park green mixed in equal proportions
- Tyres on road wheels were painted with Humbrol rubber black
- Tracks were painted with Humbrol neutral brown with steel highlights using a HB graphite pencil
- A pin-wash of a mixture: one part black, one part neutral brown and 12 parts water was used to emphasise the areas around seams and rivets. No external weathering was applied.

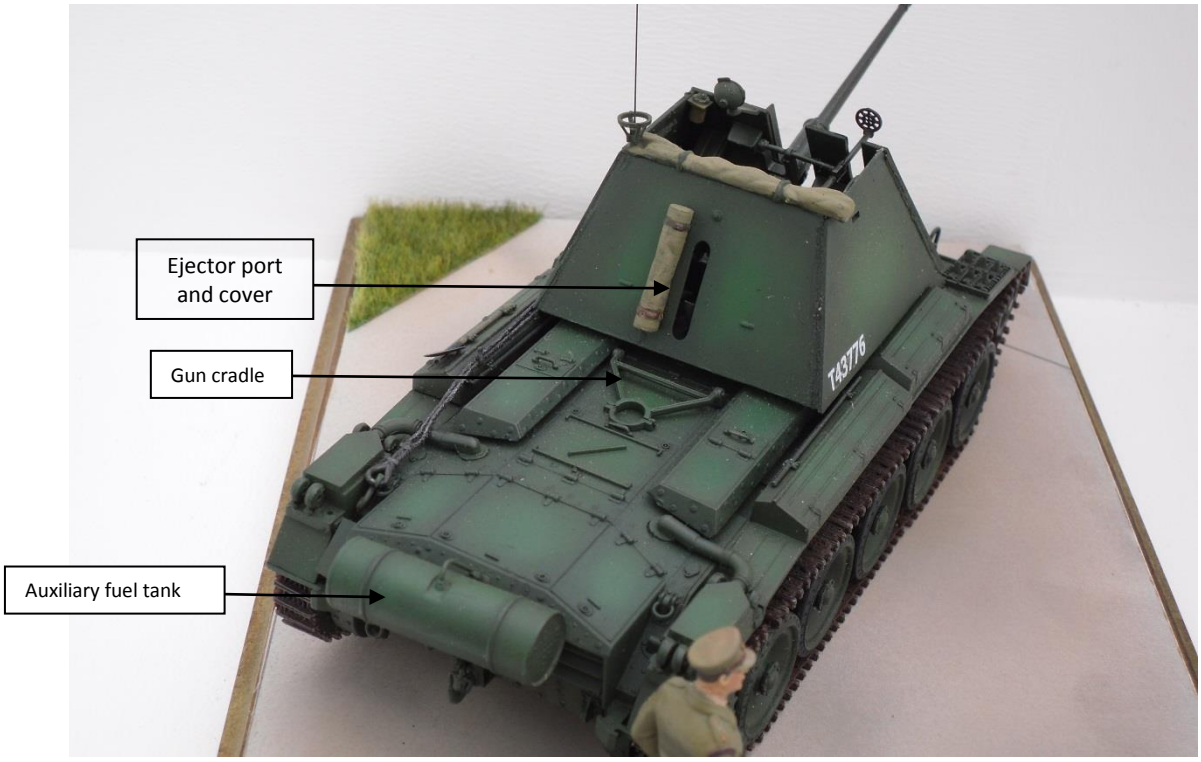
Note the sag on the tracks across all of the road wheels using the Accurate Armour tracks. The tracks were softened in hot water and gently bent and shaped to fit the wheels. The tracks lose their pliability quite quickly and repeated treatments were needed to get a good fit. The subtleness of the paint shading on the vehicle produced by the "cloud technique" can be seen.

Below are various photographs giving an all-round view of the vehicle.



Overhead shot showing the variation in tone on each panel

With the vehicle being an experimental model, the base and groundwork was kept simple limited to a hard stand for firing trials. Set in a diorama “The Inspection” includes three figures including an old “Cheshire Volunteers” figure with a new Hornet head added. Additionally is a Brigadier from Hornet and a toy figure of Winston Churchill.



Rear of the showing the external fuel tank which could be jettisoned when entering combat, the ejector port for used rounds with its canvas cover and the gun cradle


T43776
T43776

Chapter 12

Another “Bofors” Crusader

As indicated earlier, despite there being the “official” design for the Royal Artillery mounted Bofors described above, the actual vehicles were much more basic using the standard gun shield seen on the towed version or with a gun shield similar to the wheeled mount for the gun.

The model is based on the first version which employed the standard shield used on the towed gun. The vehicle opposite was photographed during “Exercise Fabius” (a trial for D-Day). It differed from the “official” AA Mark I, not only in its shield arrangement, but also in the stowage box design. The model was built as waterproofed for sea landings.

The conversion offered a relatively simple conversion by marrying a Bofors 40 mm gun to the hull of a Crusader tank. Also needed was the scratch-building of new stowage boxes and waterproofing kit for the air intakes and exhaust system.

Choosing your Kit

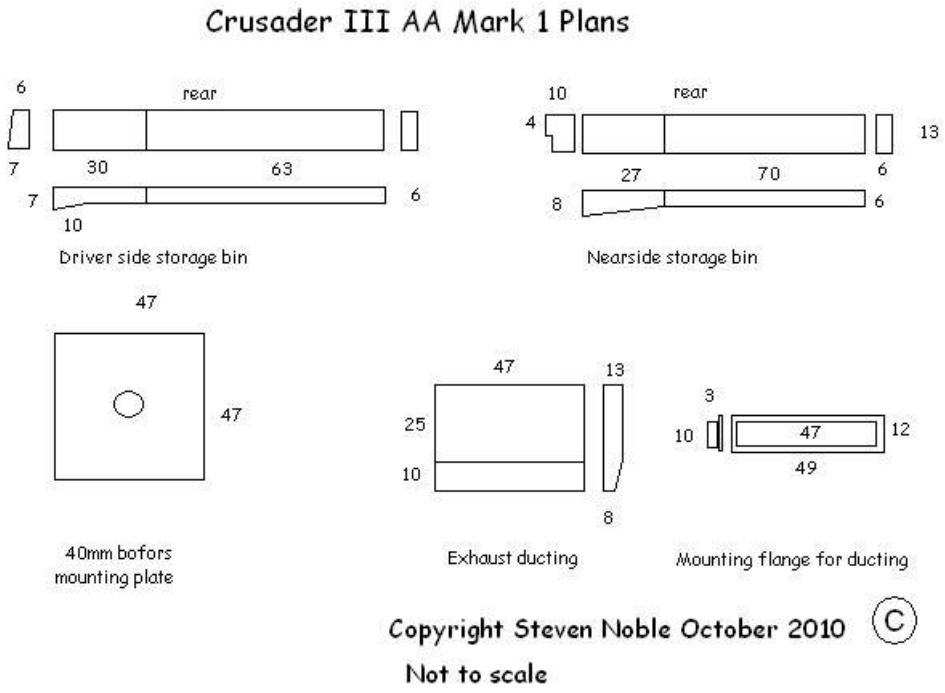
The Italeri Crusader Mark III AA Mark II kit was chosen to act as the donor kit for the chassis and hull. While the Crusader Mark III AA mark I may seem the logical choice, the 40 mm gun in the kit the gun has a different mount to what is required.

However, there are a number of 40mm Bofors kits that could be used including the towed versions from Italeri, Bronco or a white metal kit from Lead Sled. Both the Bronco and Lead Sled kits provide the correct splinter shield and good renditions of the complex “Stiffkey” gun sight arrangement while the Italeri kit provides the basic gun and platform with a simple gun sight but no shield but at a lower cost than the other kits. The conversion also needs at least one 40mm ammunition box which, while not included in the Italeri kit, is included in the Bronco kit.

Led Sled produces an etched brass set at around £10 with both the Stiffkey sight and gun shields with a thickness more appropriate to scale. Compared to the Bronco kit which has a tapered edge to give a thinner appearance, the Lead Sled etched brass set appears finer. The preferred choice was the Italeri kit 40 mm Bofors towed gun mated to the gun shield and sight from Lead Sled kit.

Drawing up a Plan

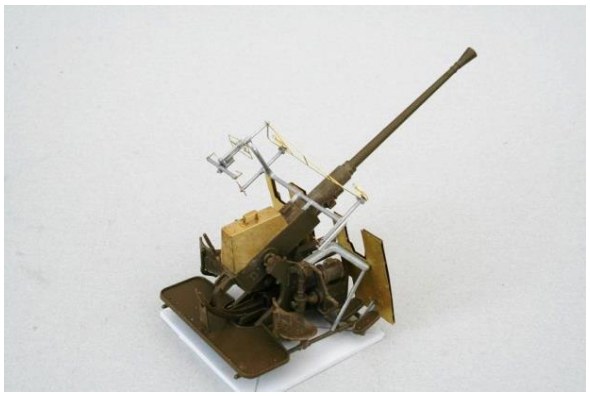
Without plans, a study of photographs was used to produce the plan for construction of the stowage boxes and waterproofing equipment given below. As the majority of the photographs studied showed vehicles heavily stowed, the detail was always partially obscured. The model is therefore based on a composite view and does have an element of educated guesswork in it. The plan below gives the dimensions used (in mm) for the new parts that need to be built.



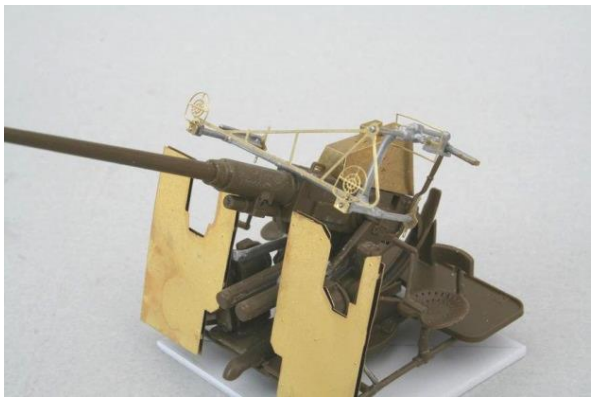
Starting Construction

The photographs studied did not give a clear view of the gun platform or mount so it was built the gun assuming it would employ powered traverse. The build started by completing the Bofors gun as per the instructions and adding the sights and shield arrangements from the Lead Sled kit.

The gun was mounted on a simple square plate sized to cover the upper hull in place of the tank's turret. The gun should fit onto a mounting bearing but it is not visible in any photograph. To keep construction simple a hole was cut using compass cutters, tight enough to "grip" the gun and keep it stable when the gun is placed in it.



The Bofors gun on its mount

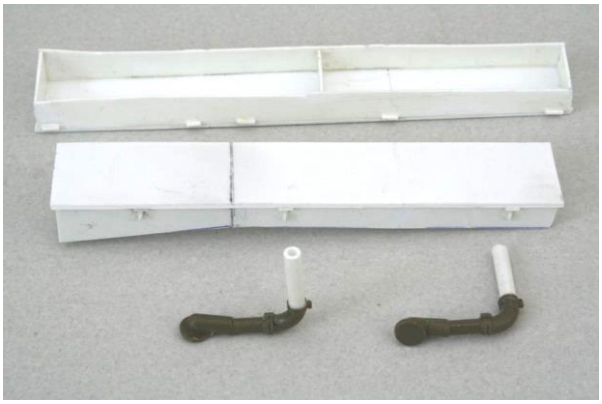


The shield and the "Stiffkey" gun sight in place

The next stage was to build the stowage boxes. Both boxes are simple shapes and were marked out on a sheet of plastic card. The lids were sized 1 mm larger than shown to ensure an overlap when assembled.

Using a sharp craft knife to follow the outline, the card was cut to at least half its thickness. The card was then flexed carefully in order to allow the part to snap off. This is often easier than trying to cut all the way through. Each "box" was then glued together with the overlap of

the lid at the outer edge of the box. A piece of plastic card was added to the interior to act as a brace and make the structure more rigid. The lid was scored with a scalpel to represent where the boxes had joins. Hinges and hasps to close the lids were made from plastic card and rod.

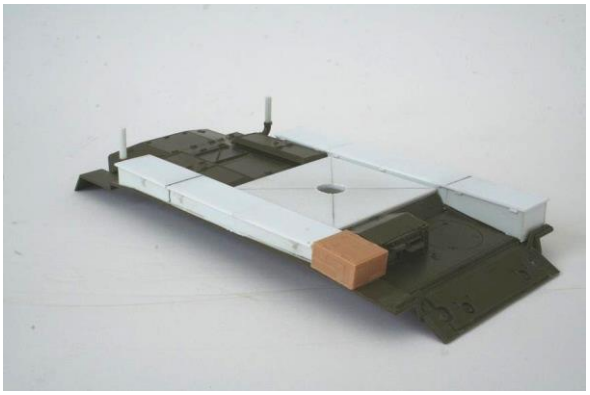


The stowage boxes and air inlets

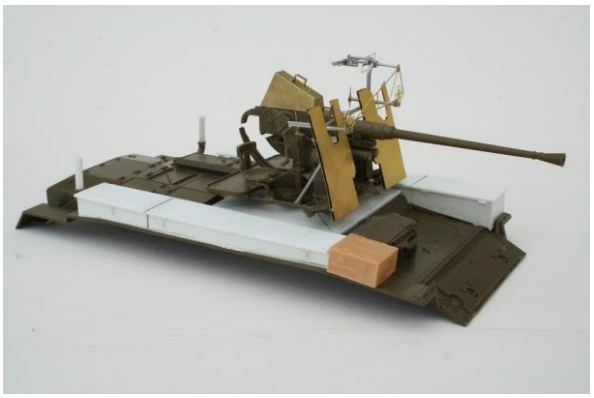
The air inlets for waterproofing with top hat in place

The air intakes for waterproofing were disconnected from their filter box and turned into the vertical position terminating in a top hat. The above photographs show the intake pipes cut and turned to the vertical position and with the top hat added. The top hat assembly was made by using thin plastic card cut with a hole punch to produce the circular flange while the top hat was a piece of tube slightly larger than the pipe sealed at one end.

On the reference photos studied, all show an ammunition box mounted on the right side of the driver's hatch. This came from the Bronco kit which had been purchased for another project but a set of boxes can be obtained from SB Models as an alternative.

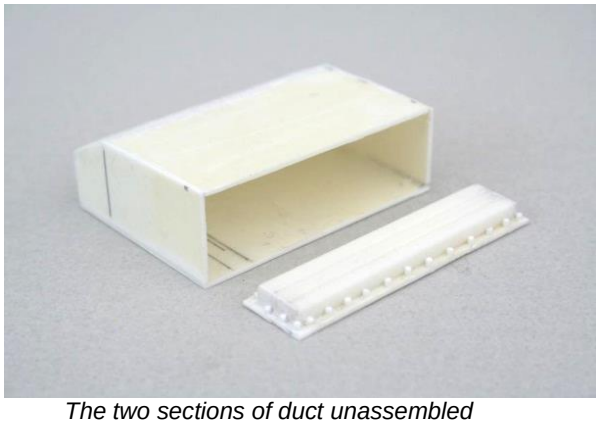


Stowage boxes and ammunition box in place

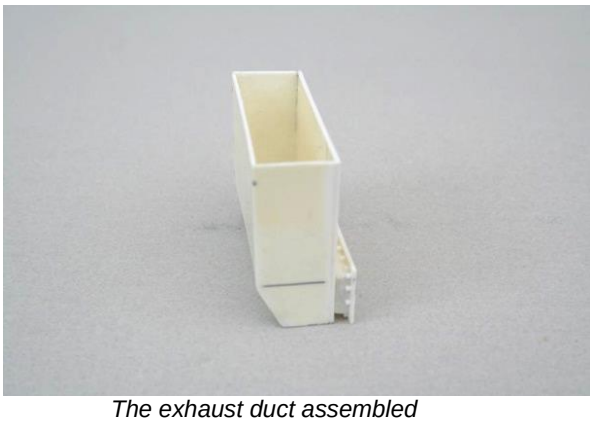


The gun added and in place

The next stage of construction was to build the exhaust ducting for waterproofing. Again the ducting is a relatively simple box arrangement. The mounting flange was drilled to accept a series of bolts made by pushing a plastic rod through the holes and trimming it off either side of the flange. As the bottom of the ducting cannot be seen when in place, the section of ducting feeding directly off the flange was made from three strips of rod cut to length rather than build it in hollow section as this provides a stronger joint.

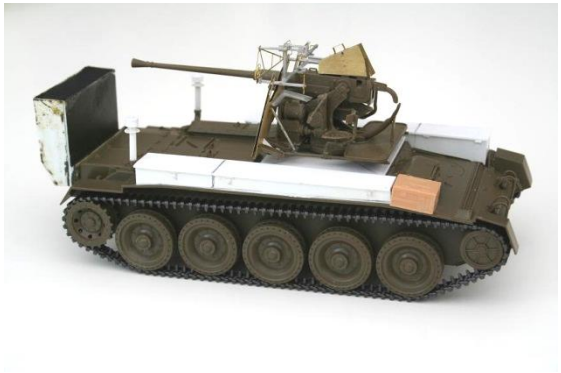


The two sections of duct unassembled



The exhaust duct assembled

Construction of the rest of the hull followed the kit instructions. The running gear was assembled but not glued in place as this allowed for painting the wheels separately and allows ease of fitting the tank tracks when completing the model.



The assembled model

Close up of the waterproof ducting

Finishing

To show the vehicle in preparation for Exercise Fabius within the UK, weathering was kept to a minimum in line with photographs of vehicles driving on roads. The model was undercoated with Citadel black paint then a light coating of Tamiya olive green applied. The definition of each panel was improved by spraying heavily diluted coats of olive green lightened by the addition of sand. As each coat was applied, the colour had more sand added to it and the area sprayed reduced in size towards the centre of the panel.

Unit markings for the vehicle were homemade or hand painted while the tank registration number was a spare from a previous Italeri kit. Once the markings were in place, a pin wash of heavily diluted black was applied to all panel lines and recesses to further bring out detail. A limited amount of wear was given using graphite and a pencil to simulate bare metal.

Having painted the wheels and tracks separately, they were then added and glued in place. The sag on the track (very important with a Christie designed suspension) was achieved by packing the gap between the track and the fenders with tissue paper having first applied super glue to between the wheels and track. With the vehicle complete a stack of equipment waiting to be loaded was placed in front of the vehicle while the maintenance crew of a sergeant and a member of the ATS (Auxiliary Territorial Service) stop for a cup of tea. The ATS and other women's branches played a vital role in the war by taking over non-combat roles to free men to fight. Given the numbers involved, they should be better represented.

A chat and a cup of tea, what could be better?

Off side view of the vehicle with the fender ammunition box in view

Close up of the figures. The sergeant is a Hornet figure in a relaxed pose with the ATS figure coming from the excellent SKP range

Chapter 13
Crusader Triple AA Conversion

Parts and Resources

Building this version of the Crusader had been a back burner project for the last twenty years. When Resicast were kind enough to sell me a set of 20mm Polsten cannon as accessory parts, this provided the incentive to start to build a replica of the vehicle.

Information and photographs of the Crusader triple 20mm AA tank are rare with the best source of information on the vehicle's history being a MAFVA article published by Nick Perry. Photographic references were drawn mainly from the now excellent Imperial War Museum library website. Of the photographs available, only three gave enough detail to be used to draw together a plan of the gun mount. The only published photo of the Crusader triple AA is B 7738 while in Normandy with the vehicle in the hull down position. Photo H 31130 shows an early version of the towed gun being trialled in 1943. Photo BU 4138 shows a lorry mounted gun protecting a Bailey bridge at the time of the Rhine crossing. My thanks go to Stuart Wheeler of the Tank Museum who was kind enough to check my sources and confirm that they were all that was available.

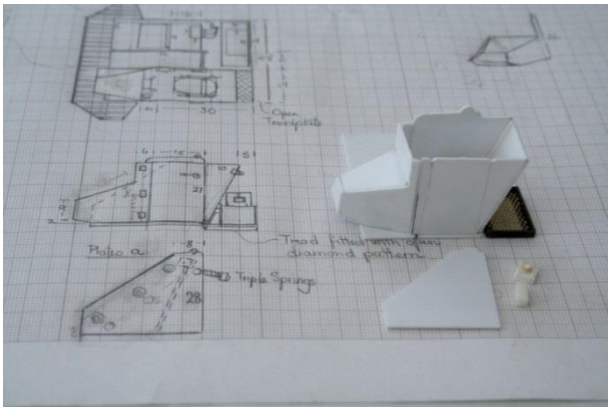
There is one surviving example of the lorry mount in the Belgium tank museum at Kapellen. It differs significantly in layout from all other photographs available and carries an identification plate with a 1946 date therefore seemingly modified post war. Photos of this vehicle taken by Hanno Spoelestra found on the web provided a guide to details inside the gunner's cab.

The Build

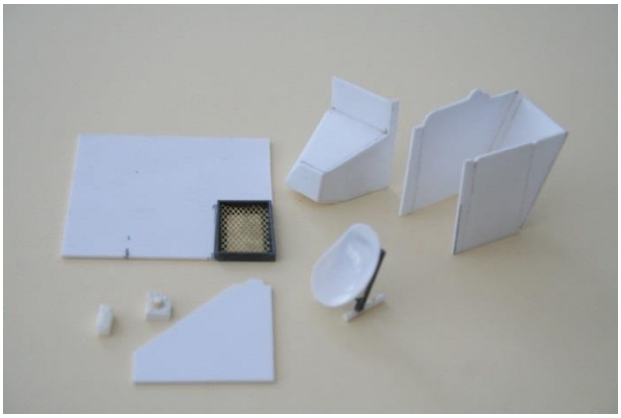
The model used Italeri kit 6444 of the Mark II AA Crusader as the donor for the hull. With the exception of the Polsten guns and a left over etched brass gun-site, most of the additions were built from plastic card, tube, rod and a variety of wire including narrow gauge florist wire which has a good rigidity, with a few pieces coming from the spares box. As this is essentially a build project, I have not described the painting sequence favouring instead for space for photographs.

From the photographs the turret shape and size was estimated and a plan was drawn up. On completing the build, the vehicle has the look of the original.

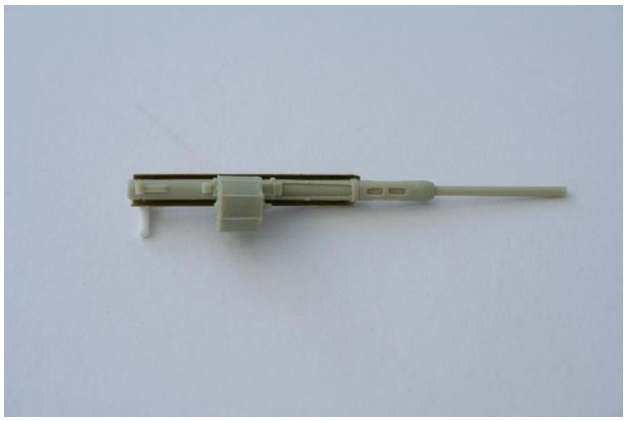
The gun platform consists of a square platform with the guns mounted between a mounting plate and one wall of the gunner's cab. An extended platform is attached at the front for the loaders while the gun is directed from a mesh platform at the rear of the cab. The plan is the best interpretation of the three reference photos.



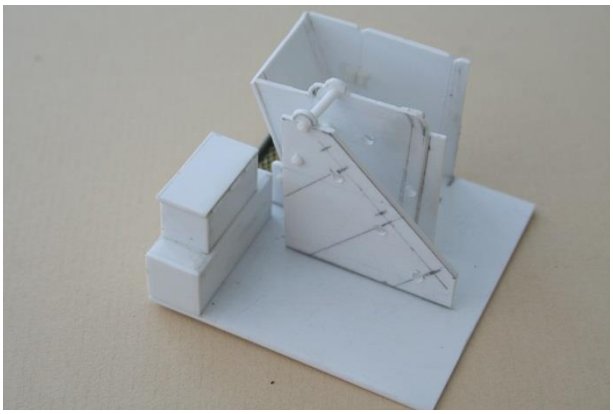
The Gunner's cab was assembled as a two piece structure with the bucket seat formed from a cut down plastic spoon.



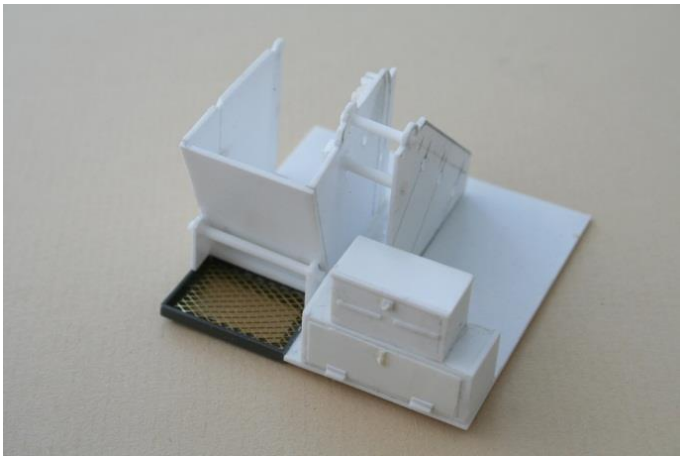
Resicast's mouldings of the Polsten gun were sharp, free from flash with the receiver and magazine fitting snuggly together. The mount for the gun was formed using an Etch-mate with each of the 3 faces angled at 45^{o} to each other. A section of plastic rod was attached to act as the pivot mount for the assembly.



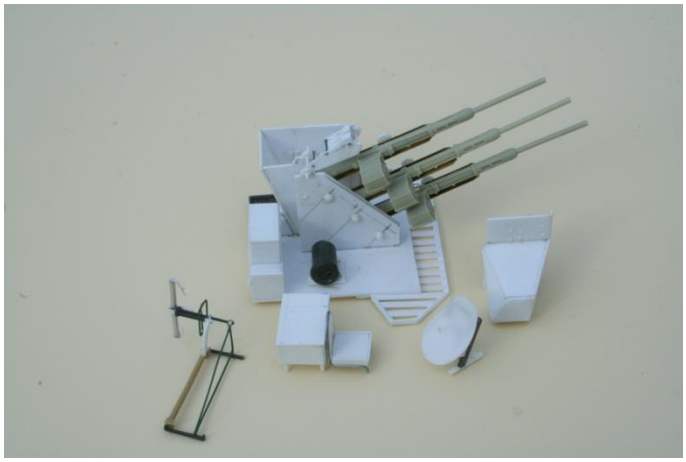
The relationship between the mounting plate and the gunner's cab can be seen here. The plate was placed against the cab and location points for the gun pivots drilled as a single piece to ensure they lined up. Some of the ancillary equipment /boxes are in place.



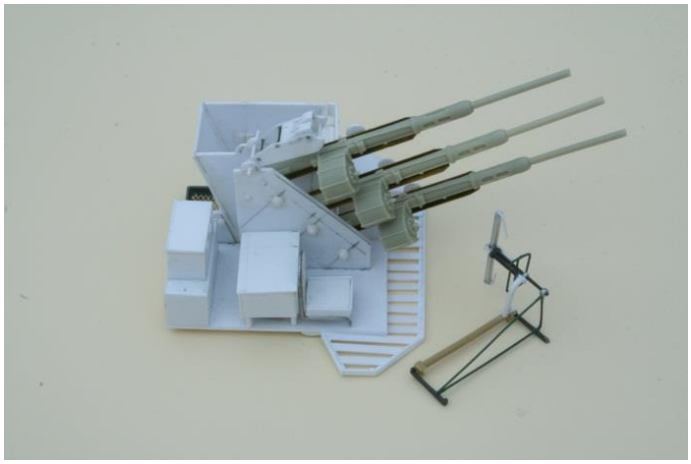
The rear view of the assembly shows the mesh platform and detail on the boxes.



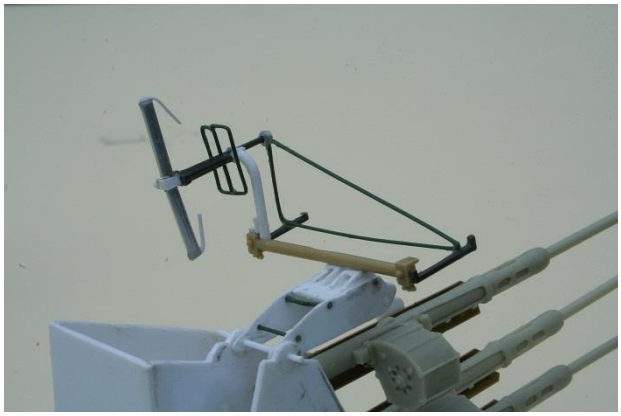
A motor/pump (in green) was made from a spare wheel for the fan/drive and attached to a cylinder from the spares box. This will be covered and largely hidden by the cover attached to the loader's seat. The guns have been mounted and detailed, with rivet detail added to the gunner's cab.



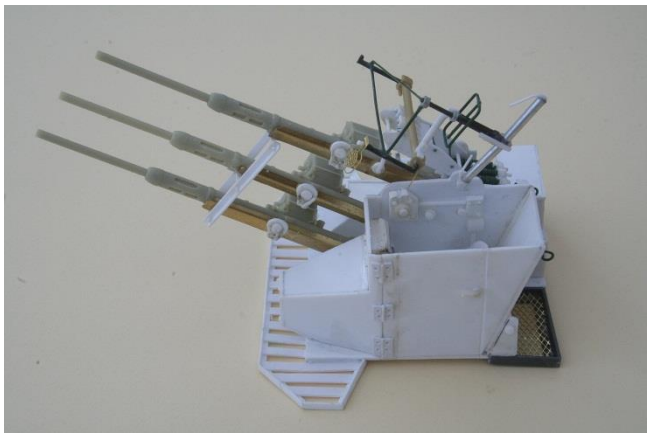
The gun-sight mount has been made from a variety of rod/wire, being a cut-down version of the "Stiffkey" sight seen on 40mm Bofors Guns. The extended platform has also been added using a frame constructed from right angle rod with strips of plastic spaced across it.



The detail of the gun-sight mount can be seen in more detail.

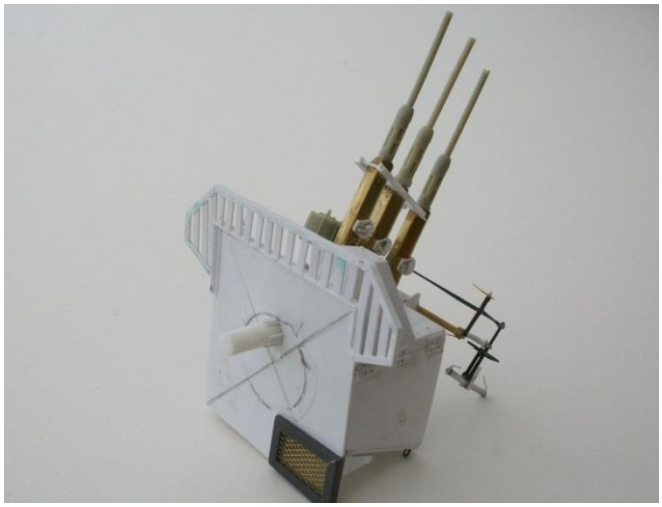


The nose of the cab is in place along with the loader's seat assembly. The gun-sight mount can be viewed from a different angle. The linkage for the guns has been added with some of the interior detail of the cab visible.

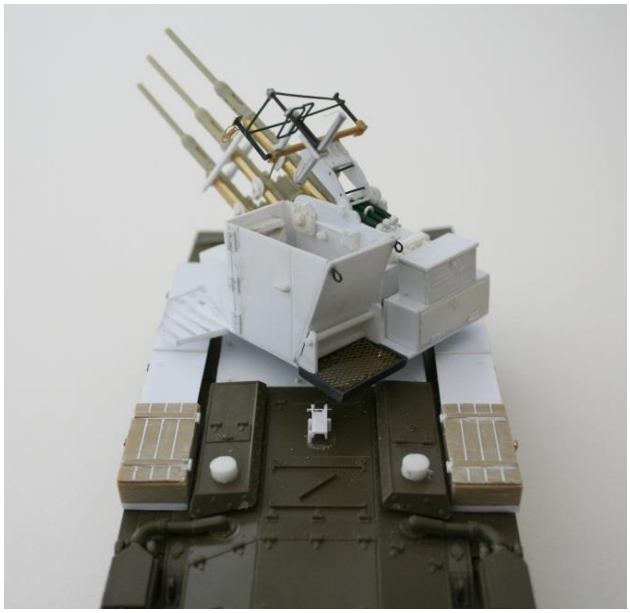


The Italeri hull was put together as per instructions with the exception of the stowage boxes. These differed from those normally found on the Crusader and were either build from plastic card or were modified parts from the spares box. The circular gun mount was the base of turret basket of Italeri's Crusader twin 20mm inverted and sections filled with Milliput.

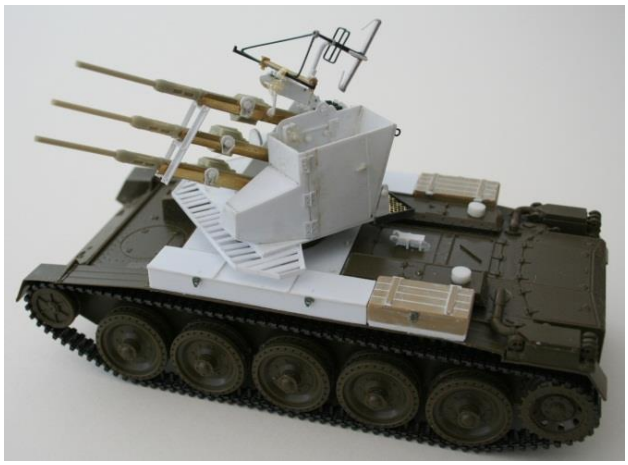
To ensure a good fit when mated, the gun platform was fitted with a strong section of plastic rod with shims of plastic sheet added at the top to secure the fit.



Viewed from the rear is some of the additional detail added. The central bracket may be a travelling lock for the guns but the purpose of the two short cylinders is unknown. The two rings at the back of the cab were to hold a strap that would steady the aimer in position.

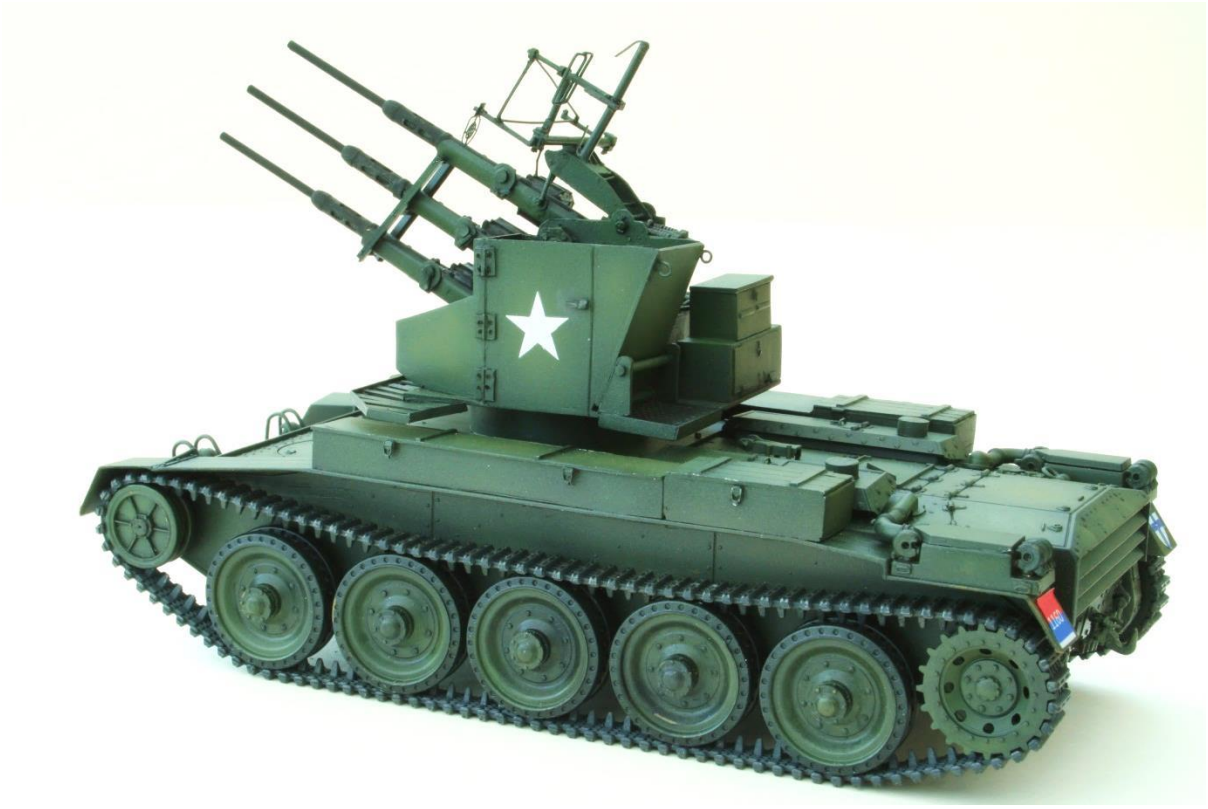


Hinge detail has been added to the door on the cab



All ancillary equipment has been added with wiring, conduit and guard rail for the loader's seat are in place.

The full extent of additions can be seen in the photo. Photos of the finished model operating under the command of the 2nd Army follow below.



Titled ***"Bonjour Mademoiselle"*** **t**he sergeant full of optimism tries to charm the young lady passing by.


A mix of the characters used in the diorama with the young lady coming from Master Box, the bare headed soldier from SKP and the helmeted solder being a hornet figure with a replacement head


Loaded with the baggage of war the vehicle undergoes its daily checks

Detail of the homemade tree and wall from Lion Roar

Chapter 14
Crusader Artillery Tractor Conversion

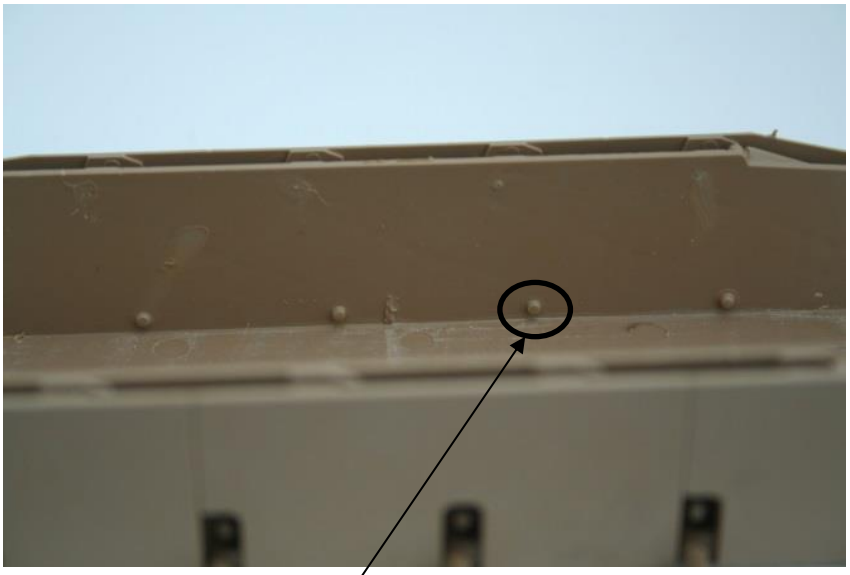
The Crusader found another use as an artillery tractor to pull the heavy 17 pounder quick firing anti-tank gun. Any of the kits can be used as the base kit with the Accurate Armour (AA) conversion kit. The key to a successful build was to carefully read the AA instructions. The instructions advise that the kit is built as sub-assemblies which are detailed but lack a clear order in which to follow.

The build was planned with the order of assembly planned being:

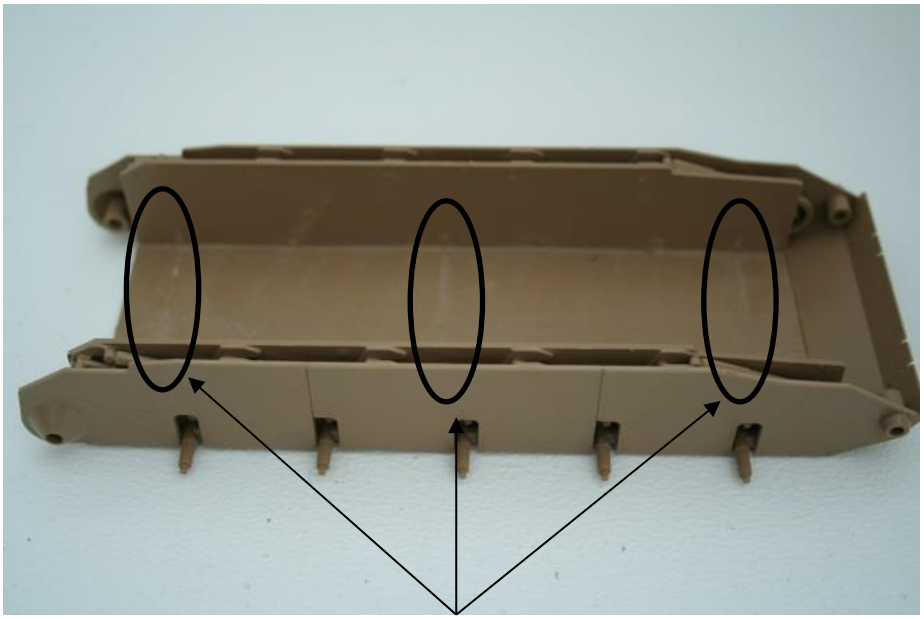
- Hull and deck
- Driver's compartment
- Load pack
- Crew superstructure
- Deck stowage
- Running gear and tracks assembled as single removable assemblies for ease of painting
- Fitting the painted driver's position and load pack
- Fitting the crew superstructure and painting all external parts

The critical point of the build was that the crew superstructure could only be fitted with all interior assemblies in place as finished items. In practice this was not strictly adhered to. Work was progressed on all of the sub-assemblies throughout as they were required for dry fitting together.

The build started with the lower hull but required additional work that is detailed in the instructions. The ribs in the bottom of the hull were removed along with the excess ends of the locating pins that come through into the hull. The driver's position and load pack then sit flush on the floor.



The locating pins can be seen prior to removal

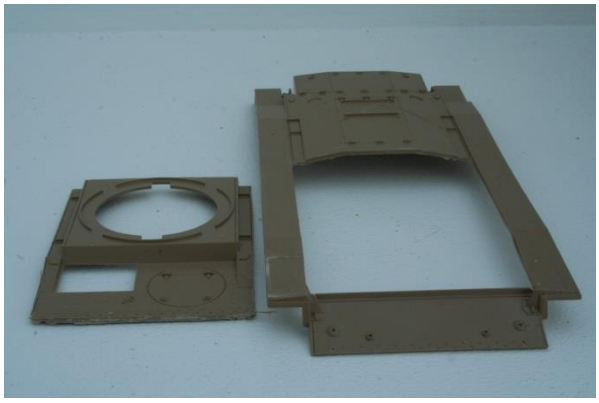
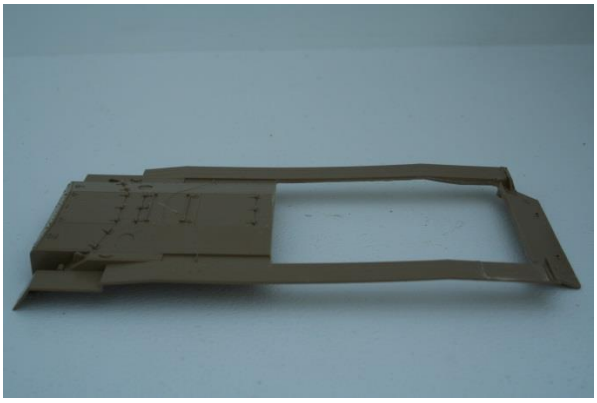


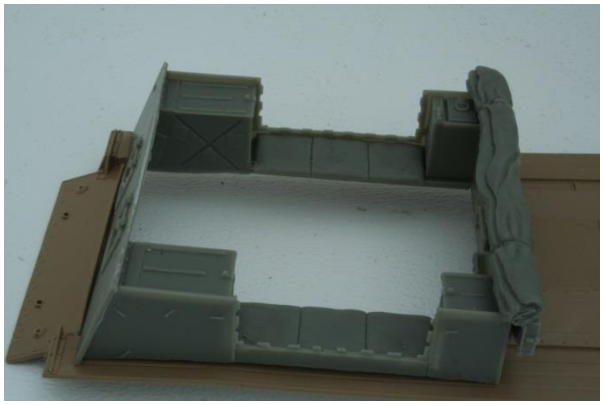
The locating pins and three ribs have been removed

A critical part of the build was to position the firewall between the crew compartment and engine in the correct location. For this the firewall had to be matched to the tank superstructure. The tank superstructure had to be carefully cut to remove the turret section. The back of the section was cut most of the way through with a razor saw followed by a Stanley knife along the other edges and to finish off. Having lined up the parts, the firewall was trimmed to give a good fit without warping the lower hull. Throughout the process the parts were repeatedly dry fitted.

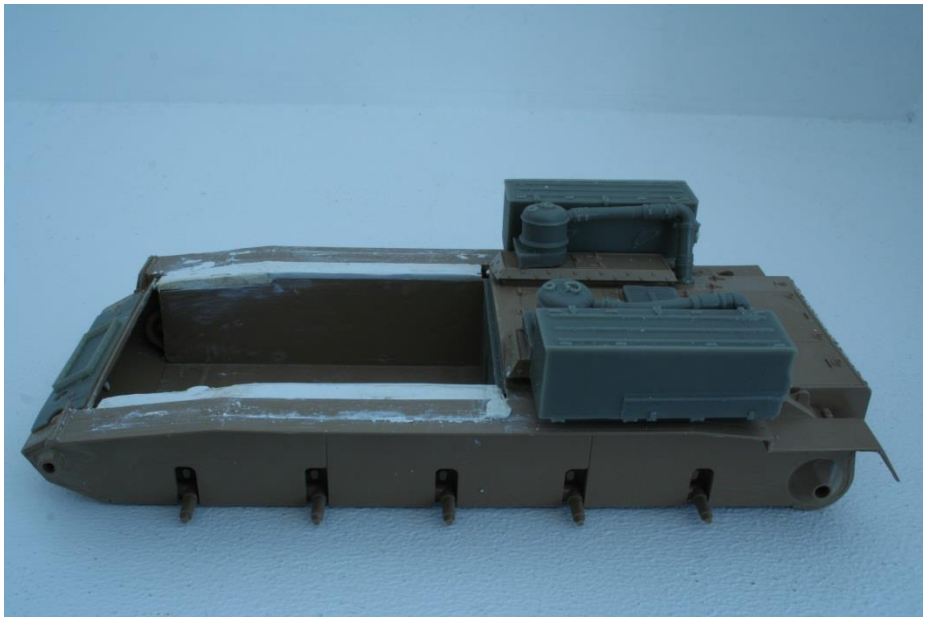
The driver's compartment and load pack being test fitted

The new superstructure/crew compartment was assembled and test fitted to confirm that the original superstructure had been correctly removed. Key to the success of this was to chamfer the edge of the glacis plate to match the angle of the front plate of the new superstructure.

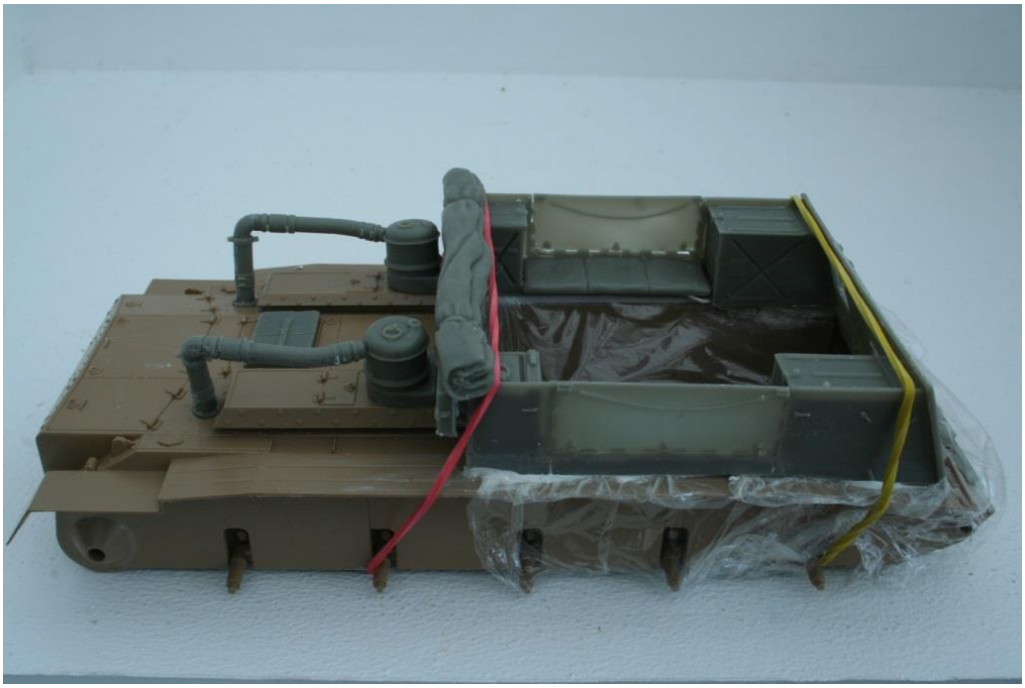


The area immediately below the crew seats needed to be built level with the fenders. The gap was filled with card and sealed with a coat of Milliput. The stowage boxes and air filters were test fitted to ensure that when located they did not foul the fitting of the crew superstructure.



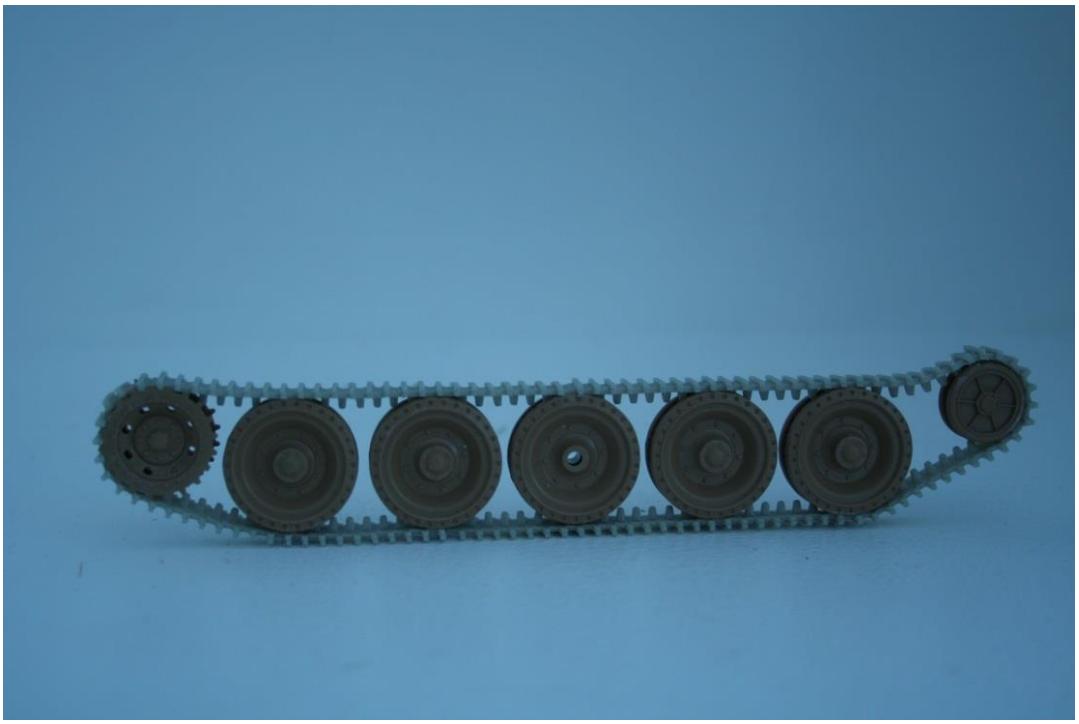
On assembling the hull and deck, the alignment with the crew superstructure was poor. Either too much of the casting blocks had been removed or there was a warp in the superstructure or deck. The gap was filled with Milliput using a piece of cling film to stop the two parts adhering to each other. At this point I noticed that the drop down access panels

(acting as seat backs) had been put in back to front. This arose from me not reading the instructions properly! As a result they had to be re-built from plastic card and stock.

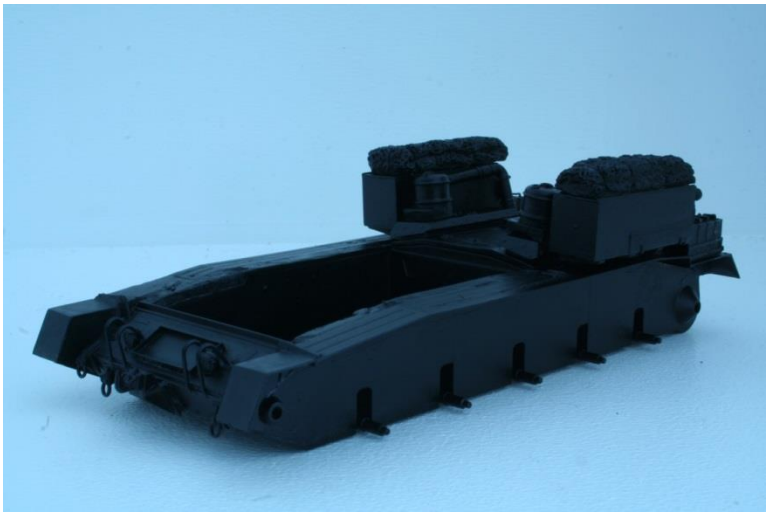


The addition of the resin conversion parts on the hull and deck have been completed. The spare wheel for the 17 pounder gun was not fixed into position in order to allow it to be painted separately.

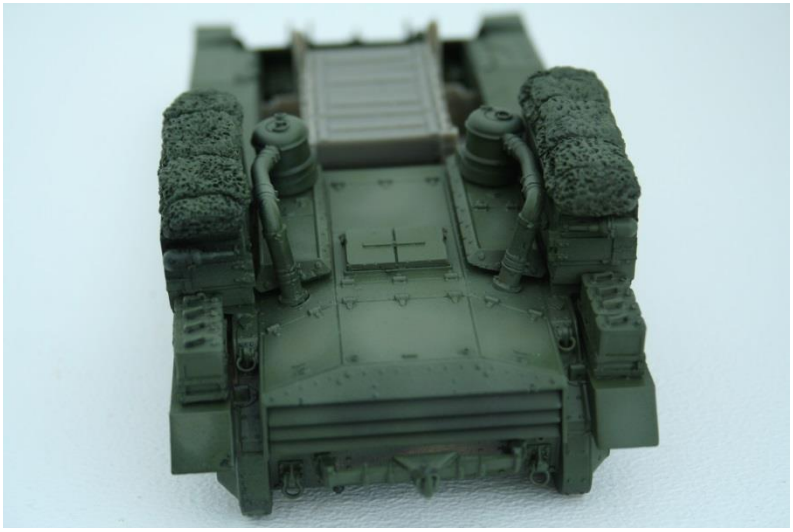
A three-quarter view of the vehicle. Note that the crew superstructure is in a dry fitted position as are the wheels and drive sprocket. Gaps in the casting of the POW can holder have been filled with plastic strip.



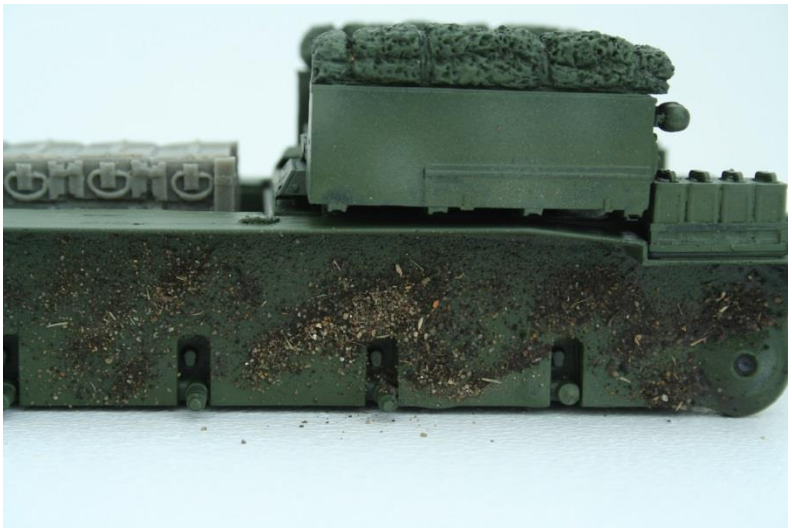
The addition of the resin track from Accurate Armour allowed the track and running gear to be handled as a single piece that could be removed for ease of painting.



The hull primed in black paint to provide a pre-shade.



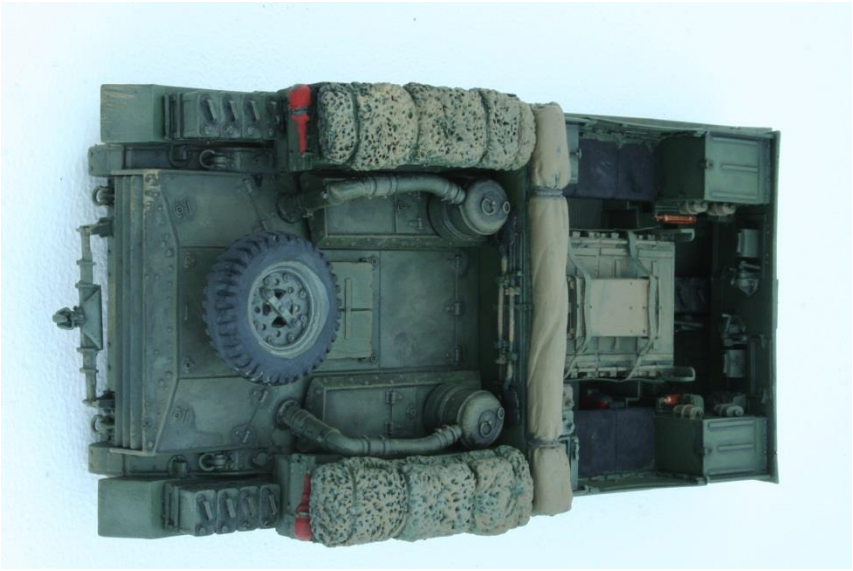
The vehicle has had a coat of Revell olive green followed by an overspray of faded olive green as the basic paint layers prior to weathering



Loose grit and grass was added to the lower hull over a coat of matt varnish

The grit and grass has been weathered with a variety of earth colours to remove the stark appearance prior to attaching the wheels and tack

The wheels have been given a wash of diluted black paint to bring out the detail around the wheel nuts

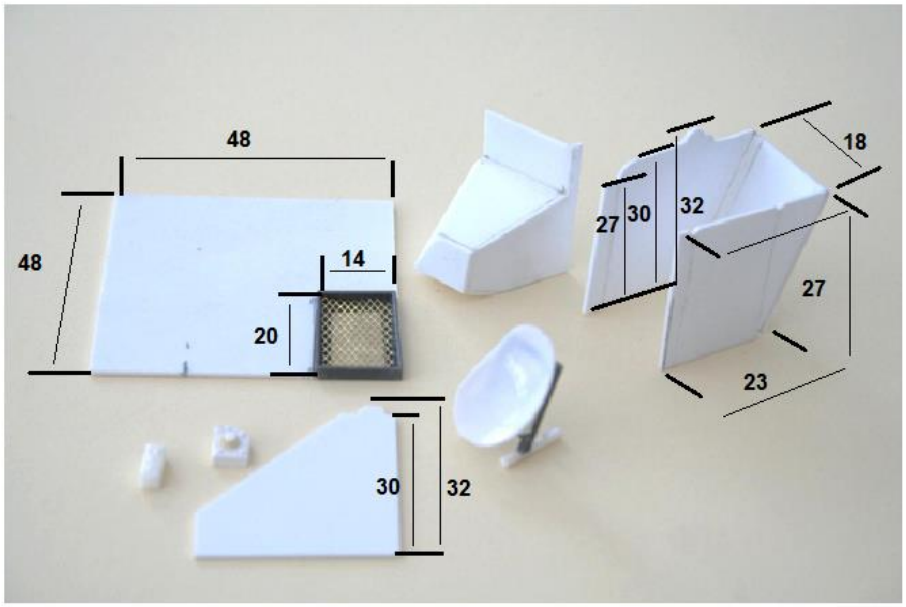


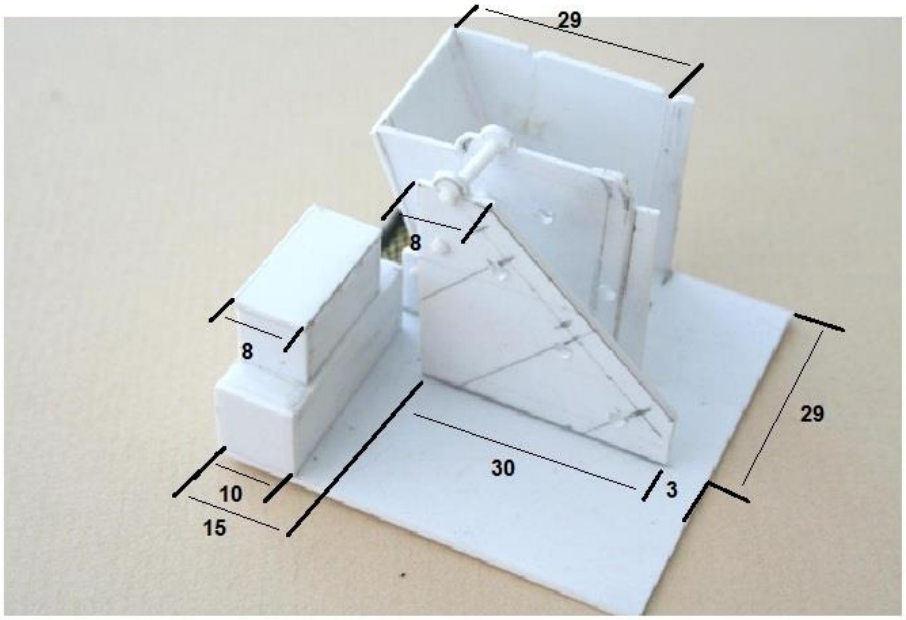
Weathering consisted of a number of earth coloured washes and dry brushing along with black pin washes to bring out the detail round the panel lines and rivets

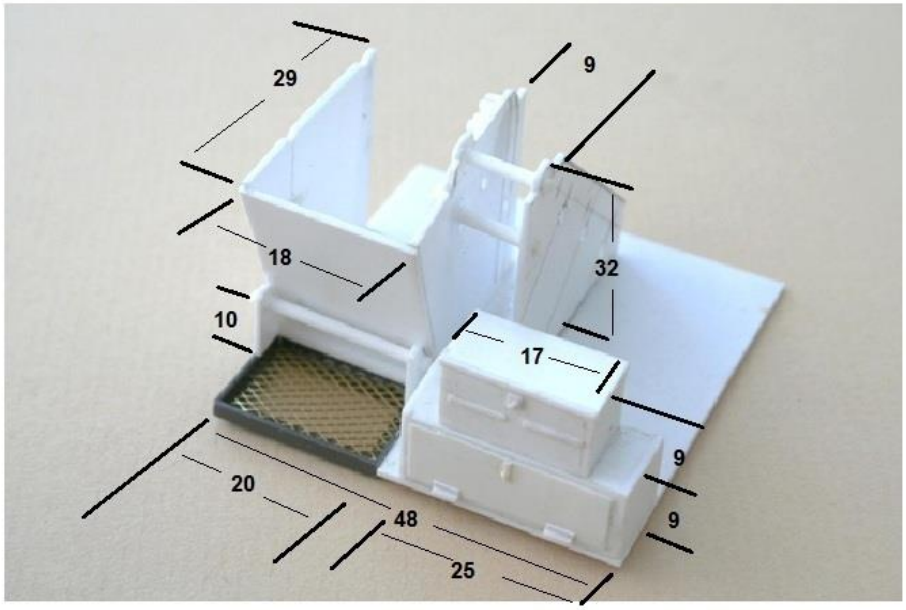
The vehicle awaiting application of the decals

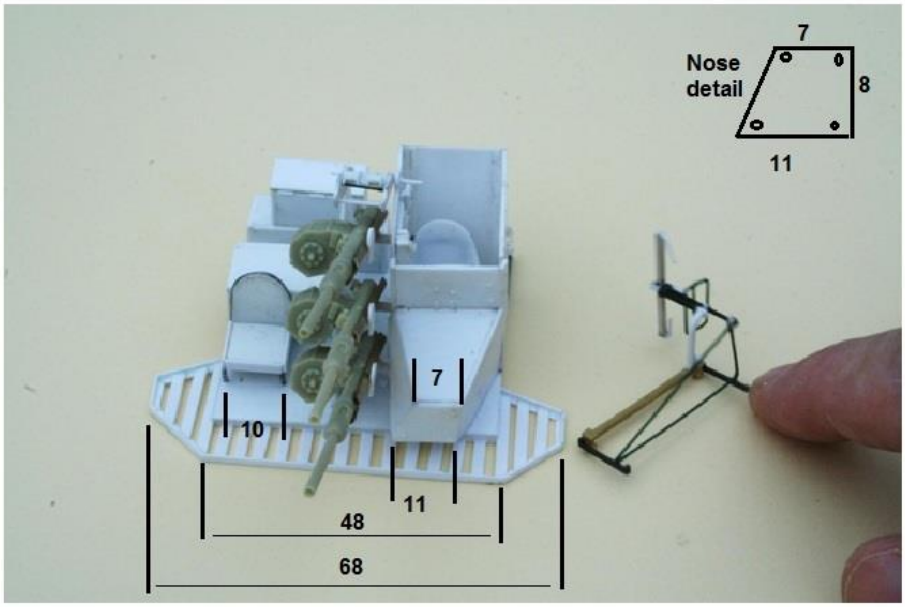
Various views of the finished model

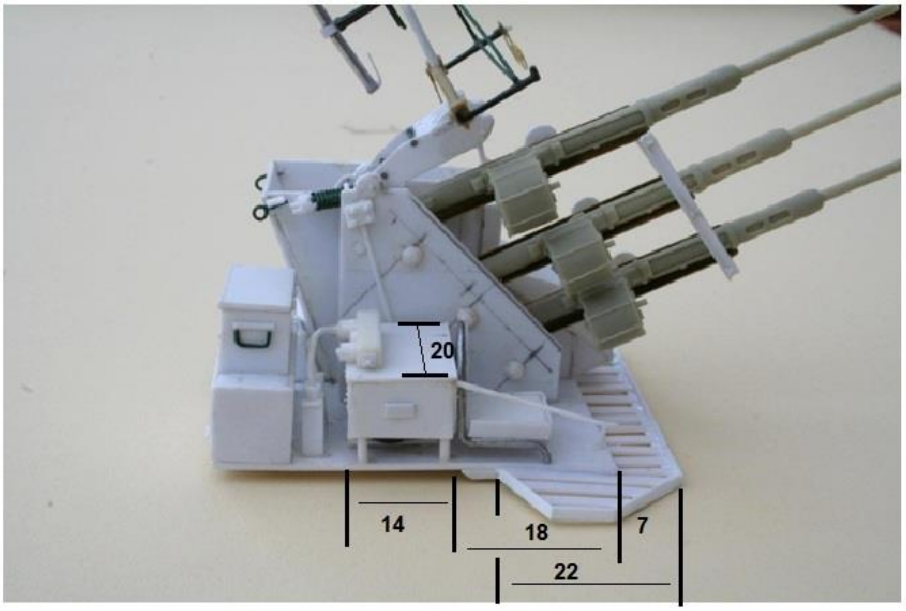
Triple AA Crusader Measurements

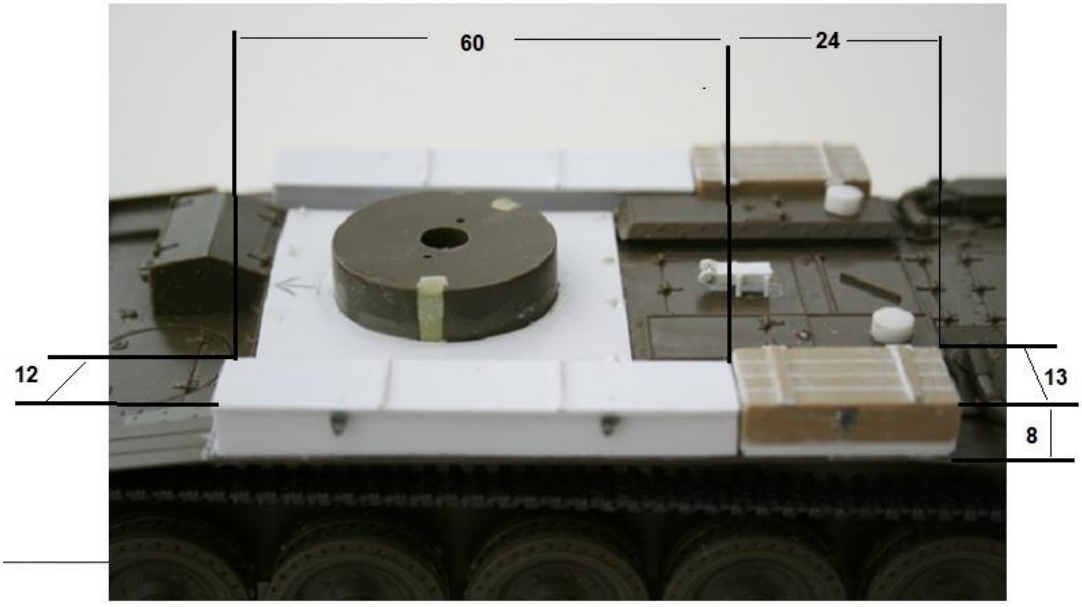












APPENDIX 2 – Walk Around a Crusader Mark II
Photographs by Carl Dennis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