

Restoration of M5A1 Stuart Light Tank



BAIV BV | British American Infantry Vehicles

Titaniumstraat 11 | NL 6031 TV Nederweert | The Netherlands

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M5A1 Stuart light tank



Technical Specifications

Model:	M5A1 Stuart light tank (2nd model)	Speed:	36 mph (58 km/h) on-road 18 mph (29 km/h) off-road
Manufacturer:	Massey Harris Company, Racine, Wisconsin, USA	Range:	160 km (99 mi) at medium speed
Production period:	From December 1942 until June 1944	Fuel capacity:	Right: 155 litres Left: 160 litres
Production numbers:	Model M5: 1,720; Model M5A1: 6,810; Combined: 8,530	Dimensions	Length: 4.62 m (15'2") Width: 2.39 m (7'10") Height: 2.33 m (7'8")
Hull ID:	A10221	Electrical installation:	12 Volt
UK registration:	T23234 (original USA 3059525)	Armament Main:	37 mm (1.46 in) M6 AT gun
Date of Delivery:	12-1943; US purchase order T-3886	Secondary:	3 x cal.30 (7.62 mm) M1919 machine-guns
Weight:	16.5 tons (33,070 lbs.)	Aarmor:	From 13 to 51 mm (0.51-2 in)
Crew:	4 (commander, driver, gunner, loader)		
Engine:	Twin Cadillac V8, 296 hp (220 kW), air cooled gasoline		
	Displacement: 346 cubic inch (5.7 litres) per engine		
	Power output: 110 HP at 4000 RPM (per engine)		
	Torque: 244 ft-lbs = 331 Nm at 2000 RPM (per engine)		
Transmission:	Twin Hydra-Matic + 1 Transfer case		
Suspension:	Vertical Volute Spring		

The Stuart M5A1 in British Service

Over 1,100 M5A1 Stuarts were delivered to Britain under Lend-Lease and designated as "Stuart VI." Known affectionately as "Honeys" for their smooth handling and reliability, they saw action in North Africa (notably El Alamein and Tunisia), Sicily, and Italy.

Key British adaptations and features included:

- Redesigned turret with bustle:
Based on the M3A3 turret, the bustle allowed room for radios – initially the American SCR-508, often replaced by the British No.19 Set;
- Side-mounted .30 cal pintle mount:
Enabled safer firing from within the turret;
- Modern powertrain:
Twin Cadillac V8s with Hydra-Matic transmissions offered ease of operation and a quieter ride;
- Mobility over armour:
With 13–51 mm armour and a top speed of 58 km/h, the Stuart excelled in reconnaissance and flanking roles;
- Light weaponry:
The 37 mm M6 gun was sufficient against soft targets but not intended to engage heavy armour.

By mid-1944, as the M24 Chaffee entered service, many Stuarts were reassigned to recon duties or converted into turretless APCs ("Kangaroos").



In the production line at the Massey-Harris plant in Rancine, a turret is hauled on a Stuart tank.

Markings & Historical Tribute

For its restoration livery, Bas and Auke Dijkstra chose to honor the legacy of an M5A1 that once served with the renowned Guards Armoured Division during the liberation of the northwest part of The Netherlands.

The distinctive marking—T232341—was replicated from a wartime picture showing a Stuart active in St. Isidorishoeve near Haaksbergen (hometown of the family Dijkstra), as part of the division's advance in early 1945.



Originally, the Guards Division is formed in WWI by merging the Foot Guards and Household Cavalry, and units of the Grenadiers, Coldstream, Irish, Welsh and Scots Guards.

Reactivated in 1939, and due to increasing need of mobility and mechanized forces, the division was transformed in June 1941 to the Guards Armoured Division, donning the black berets of British armoured squadrons.

The division landed in Normandy in June 26, 1944 and played a key role in the break-out from the beachhead, notably during Operation Goodwood around Caen, and in Operation Bluecoat creating the enclosure of German armies in the Falaise Pocket in Normandy. The division also played a role in the liberation of Brussels in Belgium.

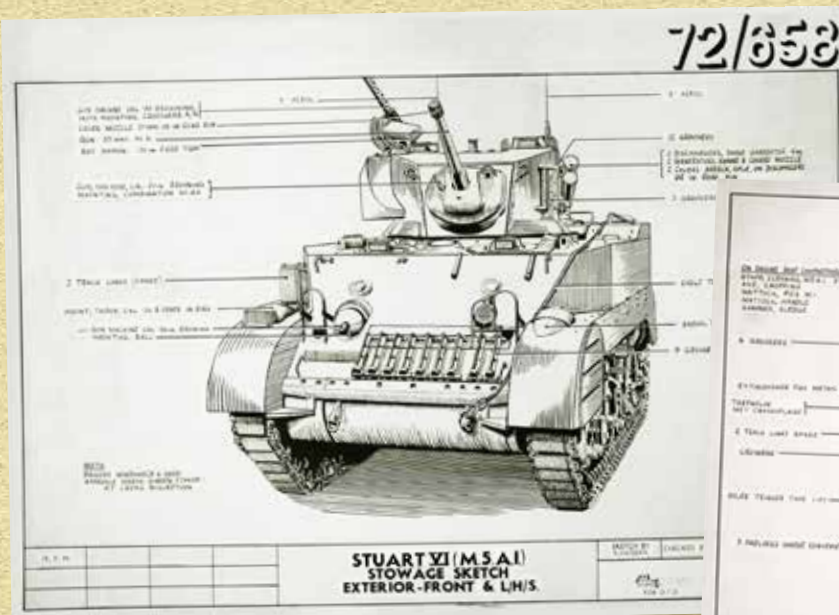
Mid-September 1944, the Guards spearheaded XXX Corps through the Netherlands during Operation Market Garden, liberated Nijmegen bridge, and later, in the spring of 1945, pressed into the Achterhoek, Twente and Drenthe — advancing toward the German border.

By February 1945, units of the Division, including Stuart reconnaissance vehicles, moved through Haaksbergen and the nearby St. Isidorishoeve. Their presence marked a pivotal moment in the local liberation, bringing enduring gratitude to the town's residents.

The T232341 Stuart's historical paint scheme, complete with division insignia and tactical markings, now graces Bas and Auke's restored vehicle.

This is more than a decoration: it's a tribute to the

crew and the soldiers who served in this unit. It is a homage to the division's journey through western Europe into the heart of The Netherlands.



Sketches of the M5A1 Stuart as produced for the British Army, with right the characteristic extra stowage mounted on the back of the tank.



Development of the M5A1 Stuart

The M5A1 Stuart is the second variant of the Light Tank M5 Stuart family, originally developed from the Light Tank M3 Stuart family. In response to the wartime shortage of radial aero-engines used in the M3 light tanks, the new version was designed with twin Cadillac V8 engines and dual Hydra-Matic gearboxes functioning through a transfer case. This tank was quieter, cooler, and more spacious; the automatic transmission also made crew training faster.

Originally designated Light Tank M4 Stuart, but soon referred to as Light Tank M5 Stuart to avoid confusion with the Medium Tank M4 Sherman. This new light tank had a remodeled hull with a raised rear deck over the engine compartment, a sloped glacis plate, and driver's hatches moved to the top. In 1942, the M5 Stuart gradually replaced the M3 Stuart in production. As the M7 light tank project proved undesirable, finally the M5 Stuart was replaced by the Light Tank M24 Chaffee in 1944.

A total of 8,530 M5 and M5A1 tanks were produced. Based on the M5 chassis, also the 75 mm Howitzer Motor Carriage (MHC) M8 was developed, but this self-propelled gun had an open-top turret.

The M5A1 Stuart saw extensive use near the end of World War II, particularly in Normandy and on the western front. They were designed to carry out scouting, reconnaissance, and infantry support rather than engage in tank-to-tank combat with enemies!

In general, the tank was loved by its crew.

Even nowadays, it's a very popular tank for collectors. Its historical significance, characteristic silhouette, relatively compact size, low weight, and especially this model with the twin Cadillac engines in combination with the easy to operate dual Hydra-Matic gearboxes make them very popular in the worldwide MV scene!

Light Tanks Doctrine

Light tanks were issued to Tank Battalions (one of the four companies was a light tank company), Light Tank Battalions and Cavalry Reconnaissance Squadrons. The original role of the light tank in these formations was similar to medium tanks and they were expected to engage enemy armor

with AP rounds and enemy positions with HE rounds. As a result, tank gunnery training for Light and Medium tankers was common.

US Army Field Manuals written before 1944 clearly show that light tanks were to be part of an armored assault on enemy positions, and examples of fire on enemy armor were in these manuals. When pursuing an enemy, Light Tank Battalions were expected to move parallel with enemy columns and, together with accompanying infantry and engineer units, seize "critical terrain that will block hostile retreat". Despite the fact that light tank platoons were not expected to function as a reconnaissance unit, they could be used for reconnaissance purposes. In this role, they were expected to remain behind the main reconnaissance force as the support element and augment the firepower whenever enemy contact was made.

Usage in battles

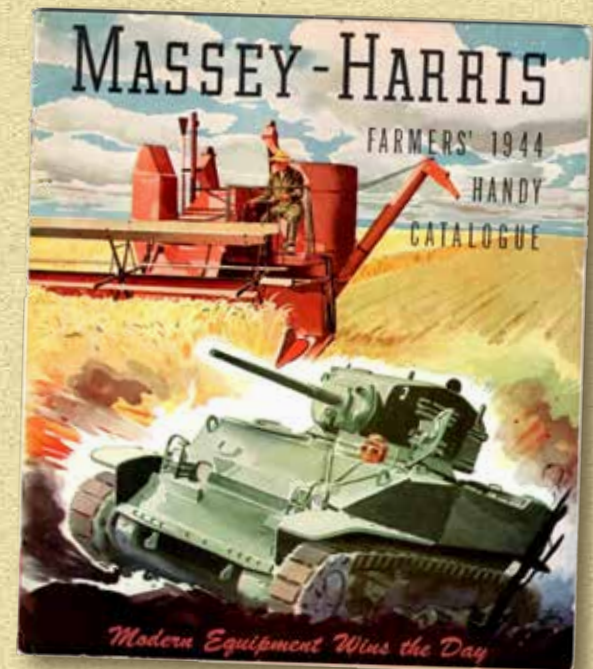
The M5A1 Stuart preserves the Rank I style of fighting. With very good mobility and fast reload, the light tank can speed to an optimal position on the enemy's side and riddle them with the 37 mm cannon. It is recommended to attack from the flanks as the weak armour on the Stuart makes it vulnerable to the newer enemy guns that can penetrate the armour with ease.

With the fast reloading 37 mm cannon, the M5A1 Stuart can deliver some good-hitting rounds if shooting at the flank at the enemies. A frontal engagement is possible but detrimental as Stuart's thin armour makes any incoming shot lethal.

If coming up to German Panther or Tiger tanks, load the M74B1 AP round for maximum penetration. In case the M5A1 comes across a heavy German tank, the recommended course of action to take it out is to get in a point-blank range and fire at the turret ring or engine rear. It is the only way for the Stuart's 37 mm grenade to penetrate the armour of heavy German tanks.

With its weak overall armour, most enemy grenades are able to penetrate the M5A1 Stuart. Enemies with heavy ammo like the Panzer IV with its short 75 mm and its HEAT rounds could destroy the Stuart with ease.

However, with its speed and relatively small size, as well as the ability to scout, the Stuart proved to be a very reputable reconnaissance vehicle. Even if you cannot penetrate heavily armoured opponents it was -combined with its decent firepower- a well-regarded and amazing reconnaissance vehicle.



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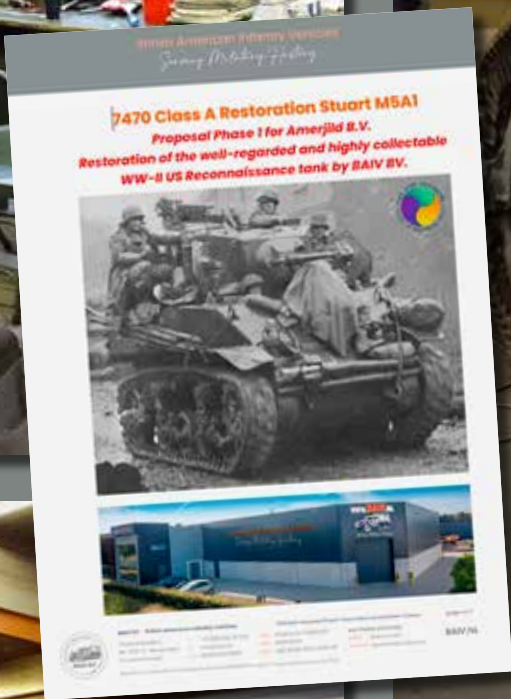
BAIV (British American Infantry Vehicles) BV is a family business driven by expertise and history. Founded and run by Ivo Rigter Senior and his son, Ivo Rigter Junior, the company is propelled by a shared commitment to supply, restore and service historic armoured vehicles & tanks.

It started with a group of enthusiasts in the mid-'90s. Due to expansion BAIV was founded as a company in 2012. Over the decades, the BAIV team gathered a wealth of knowledge in the field of maintenance, restoration, and reconstruction of military armoured personnel carriers, half-tracks, tanks, and howitzers.

As a result, we are able to help with identification, parts supply (N.O.S. but also a wide range of high-quality reproductions), customizations and comprehensive support services.

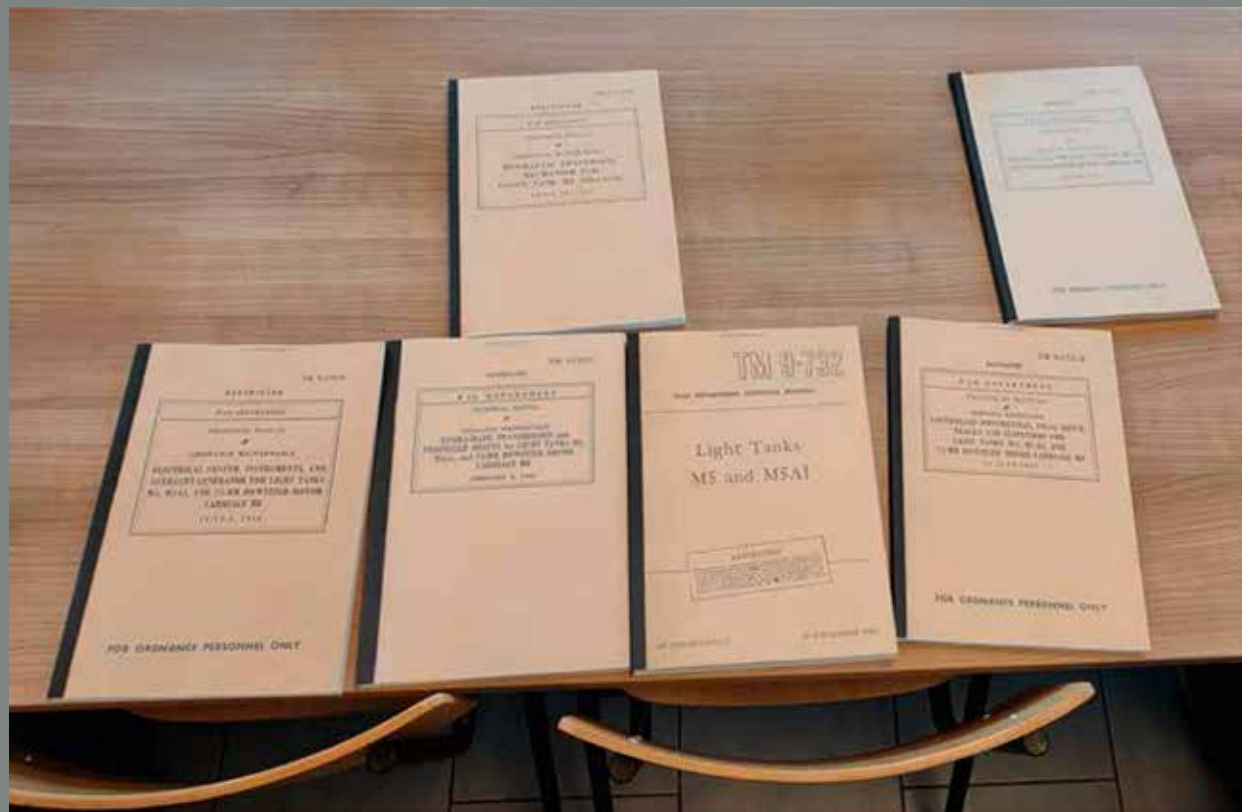
Ivo recognized the need to simplify the complexities around historic military and armored vehicle transactions, leading to the creation of Tracks & Trade.

Over the past years, our business has evolved significantly. This led us to reassess our position in the market and refine our strategy. We are proud to announce that later this year, we will launch our new strategy! This reflects exactly who we are today and where we are heading in the future.

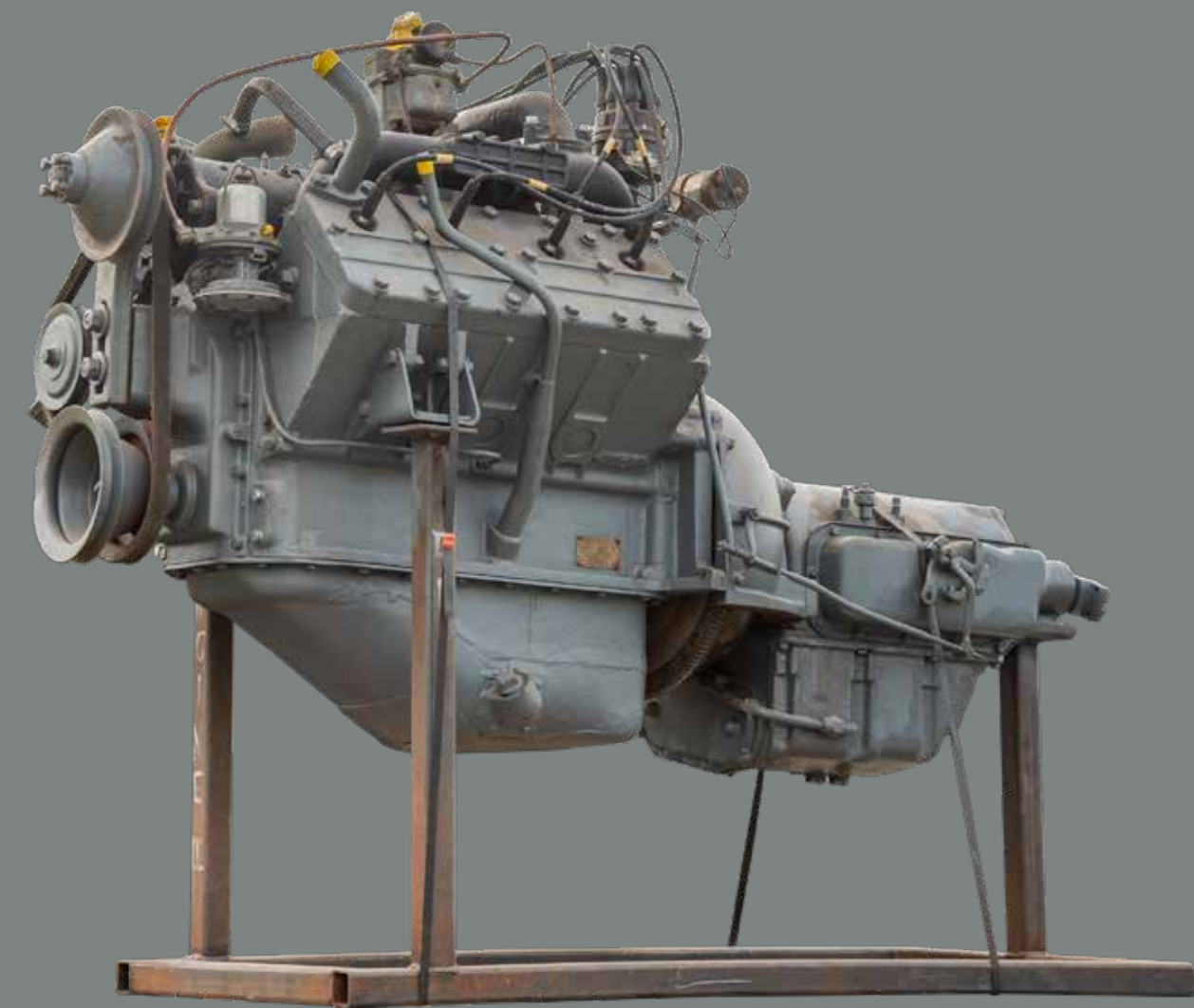




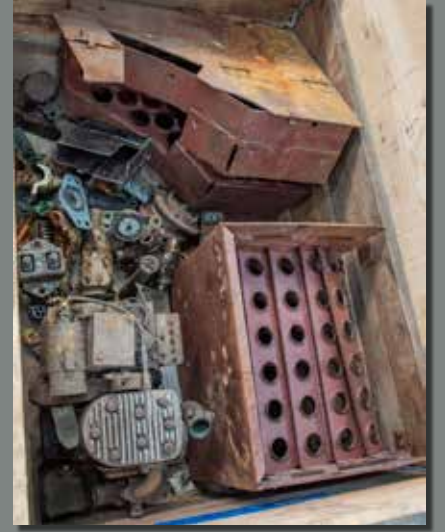




Ready to start the restoration



First inventory of all supplied loose parts







Trial fitting supplied loose parts













Start of dismantling the M5A1













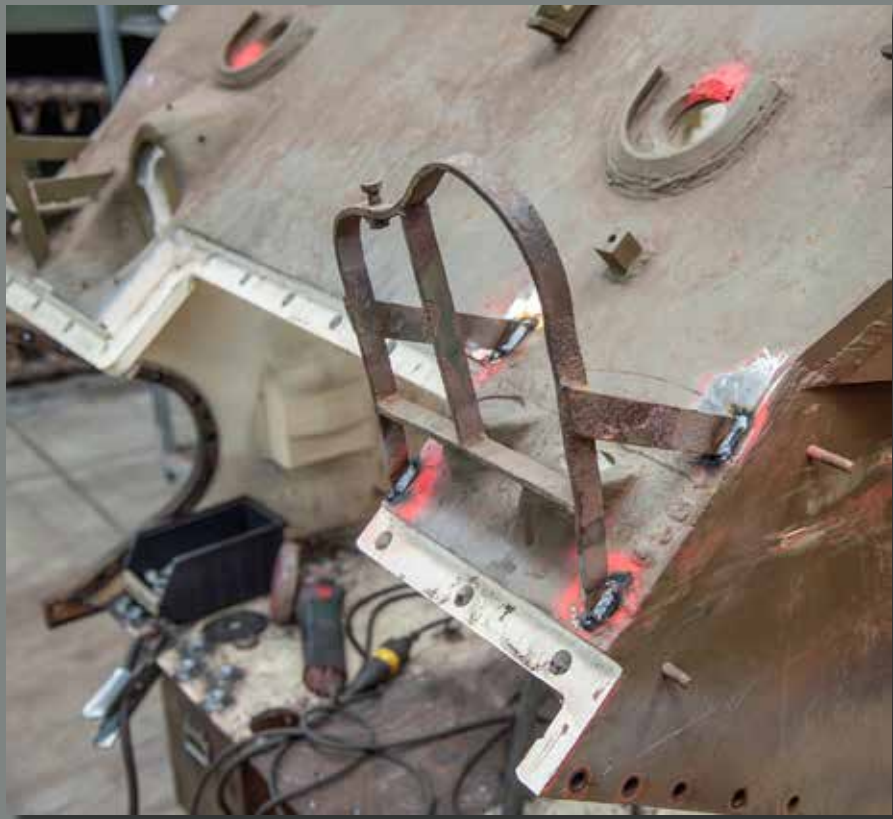






Start of the actual restoration











When fitting the turret, the upperdeck of the hull proved to be warped





The upperdeck at the front needed to be realigned and rewelded, plus all blocks to guide the turret had to be grinded down to fit correctly

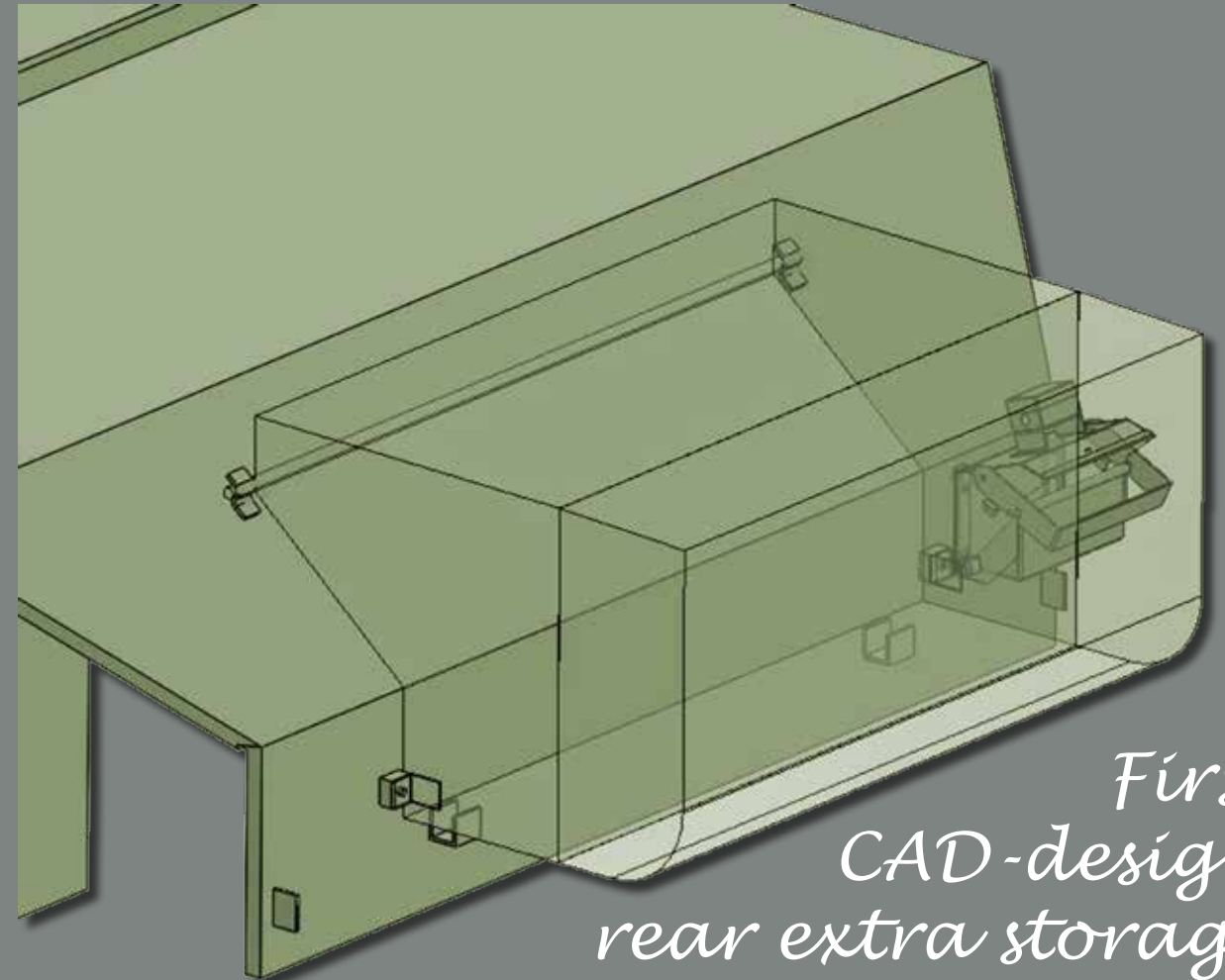




Now it runs smoothly







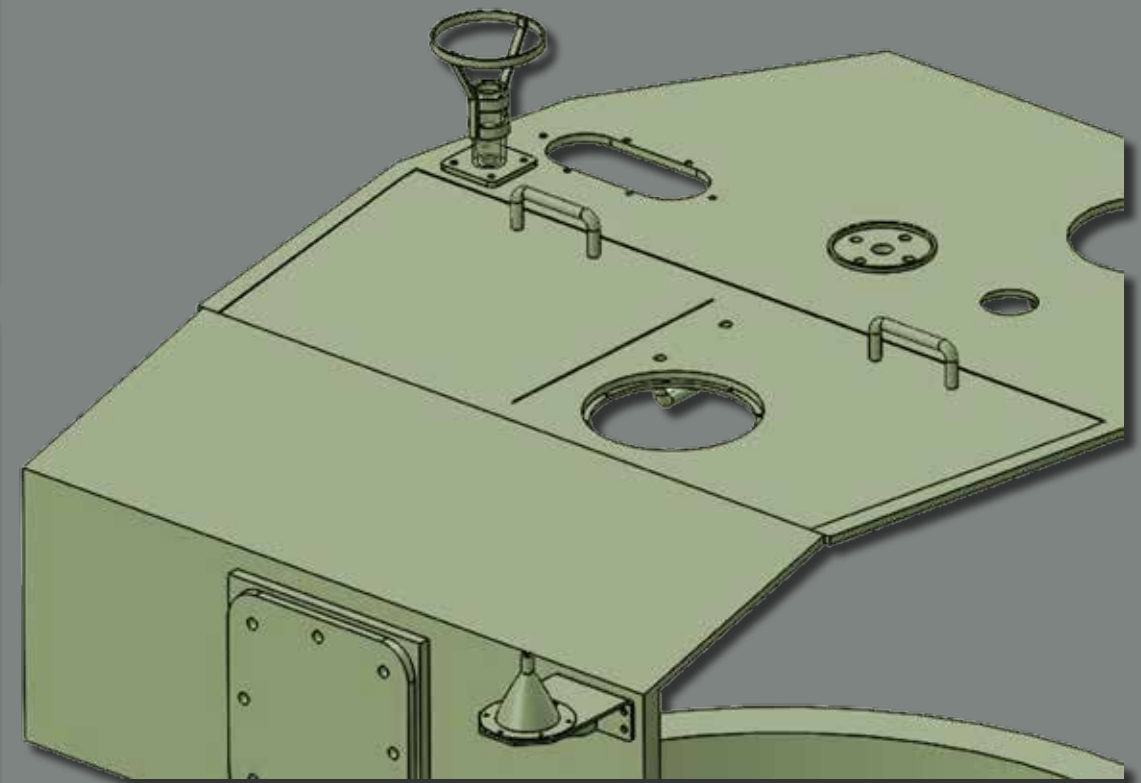
*First
CAD-design
rear extra storage*







*CAD-design for production
of new hatches in turret*



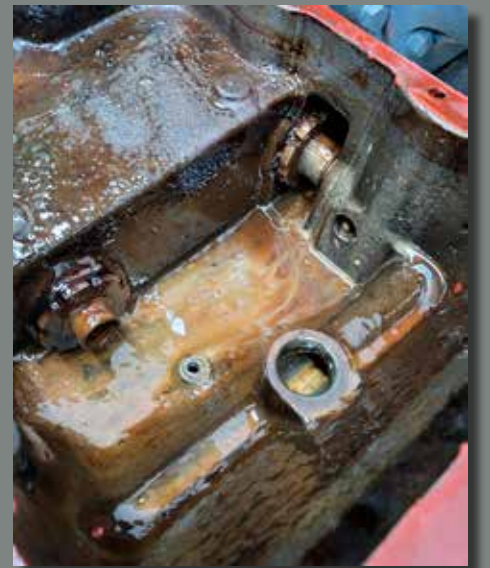




Hull and large parts go off to be blasted and set in primer

Meanwhile...





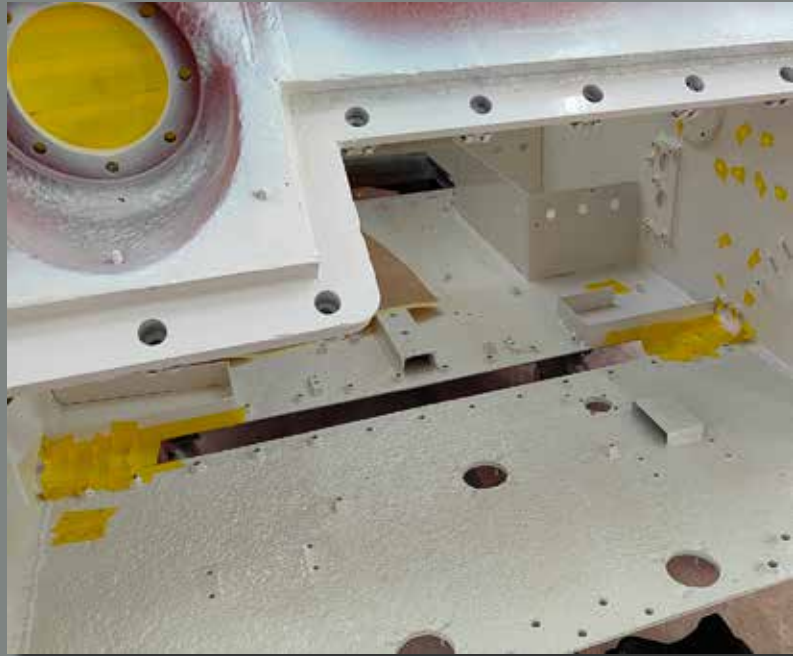




Hull and parts blasted and in the primer









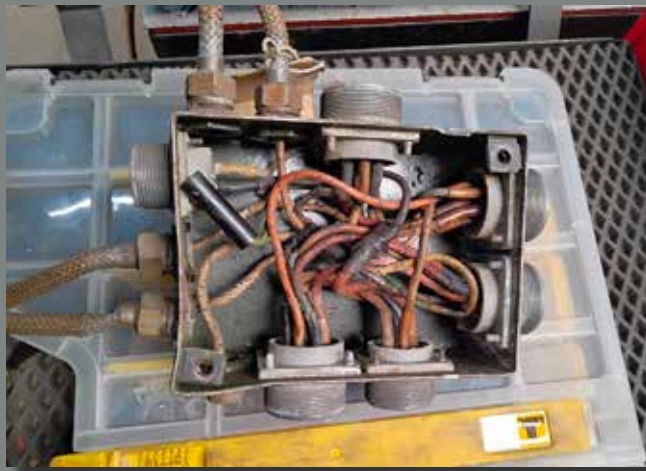


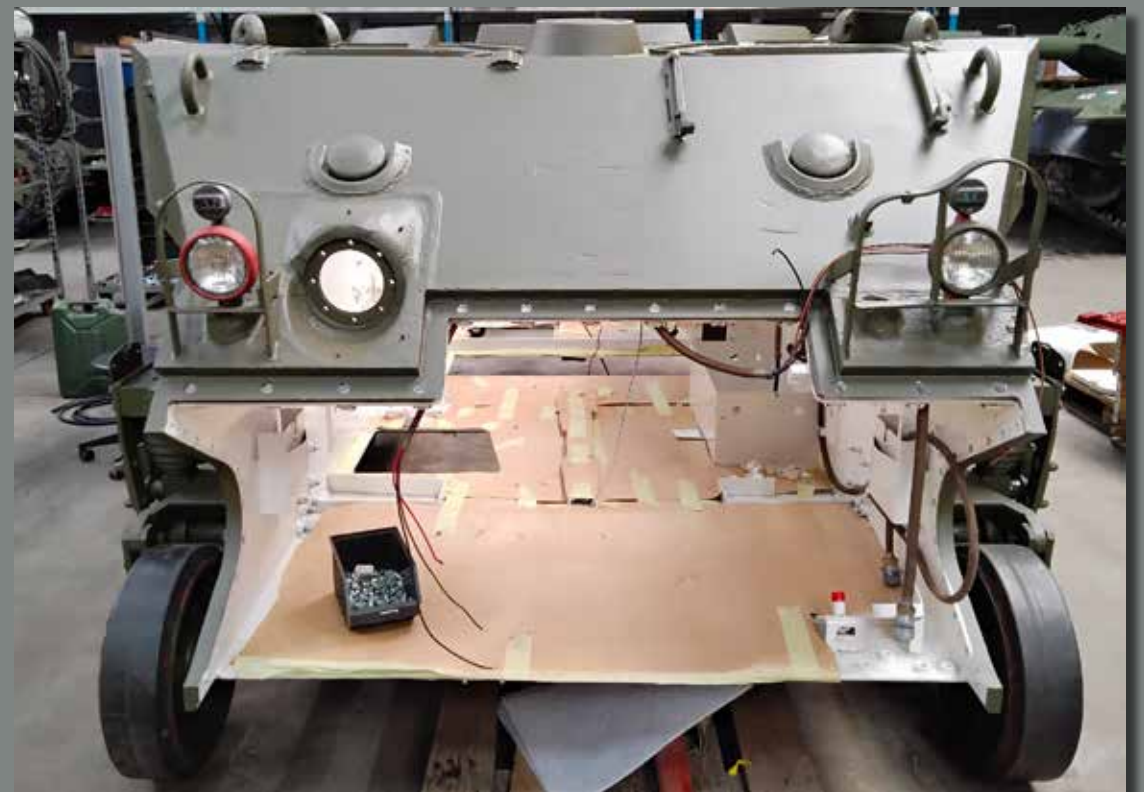
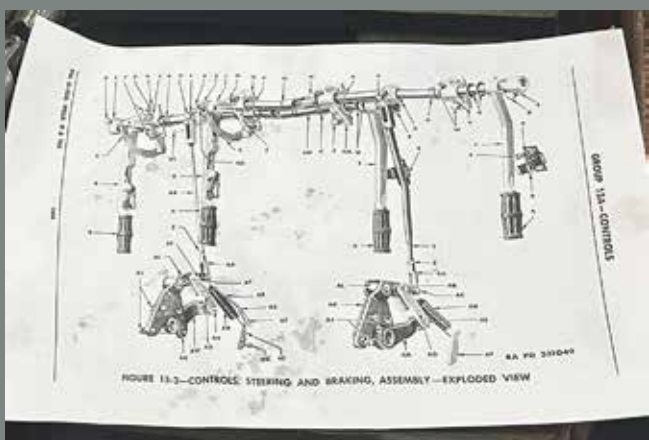
Time to build up the M5A1





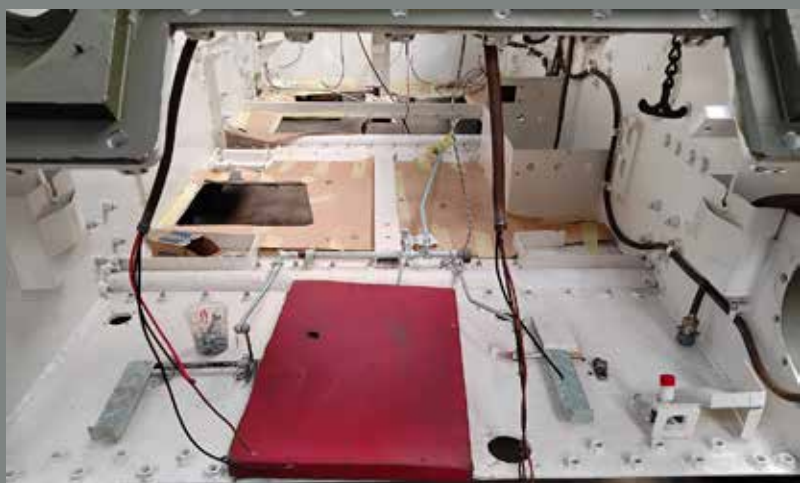
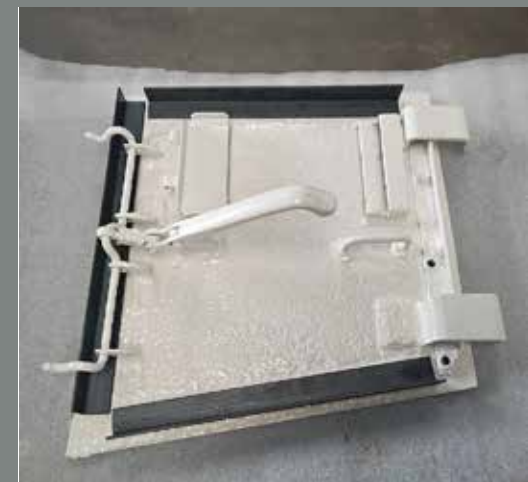
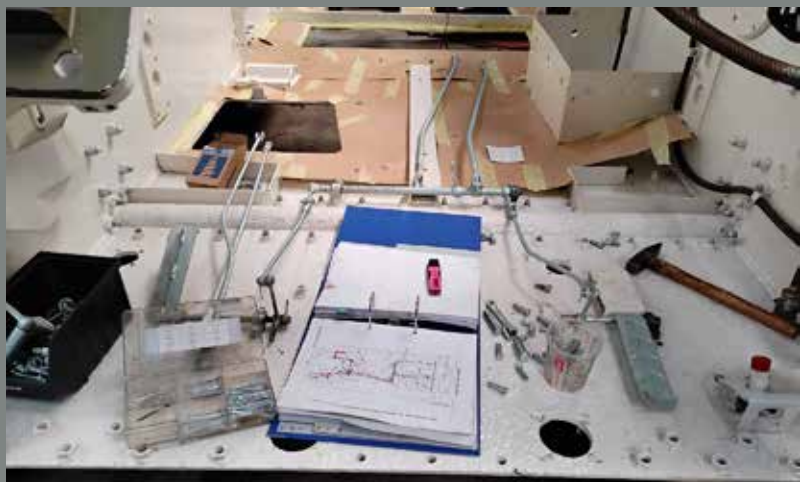


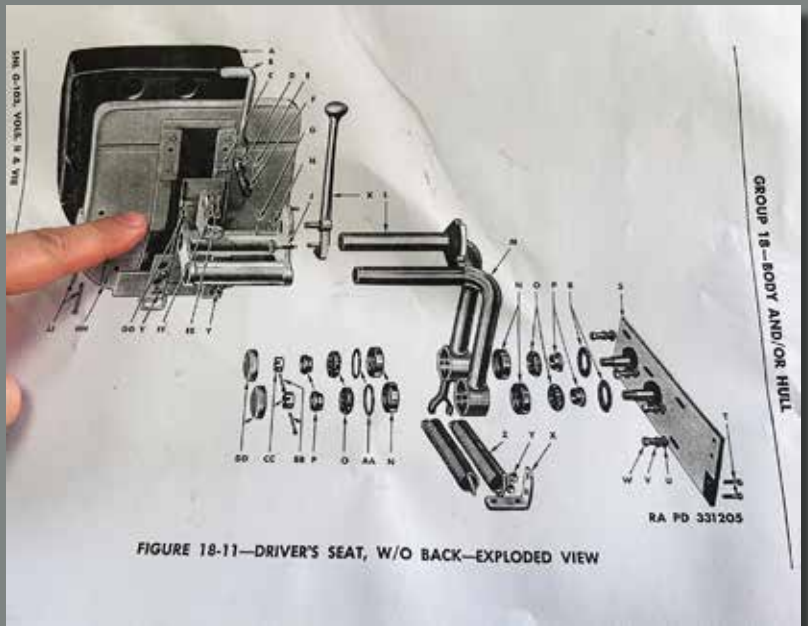


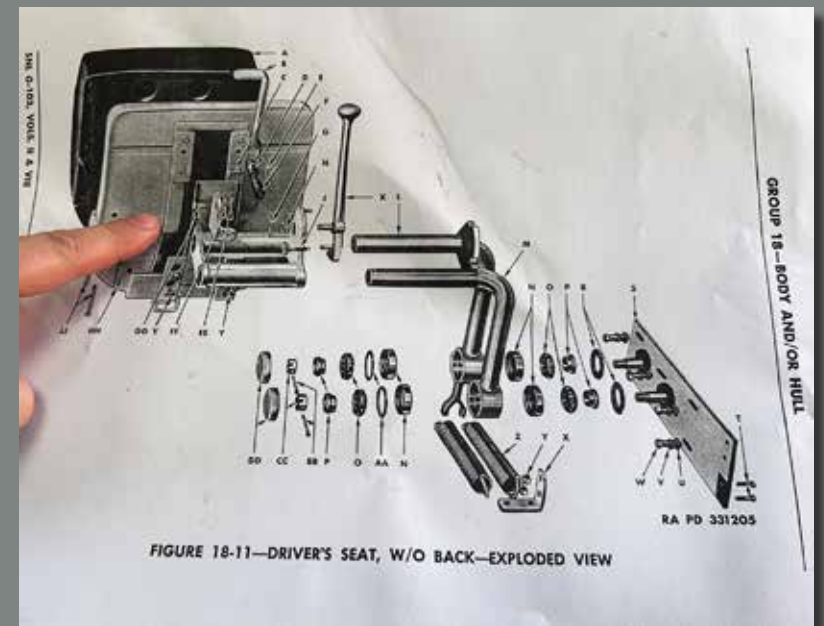


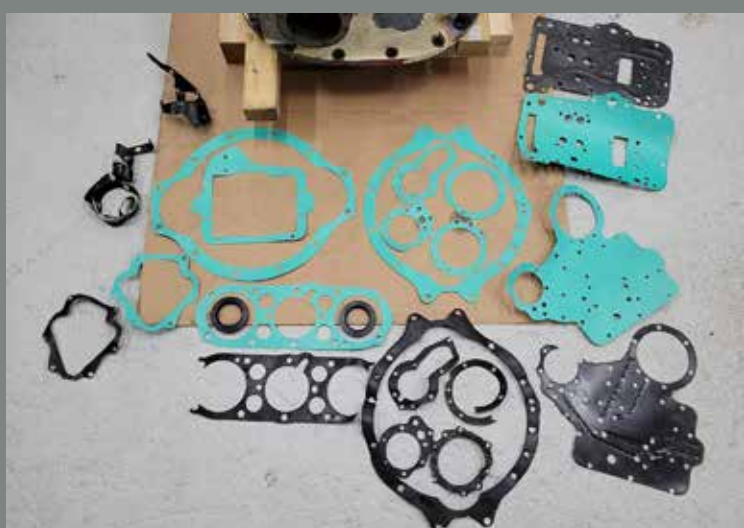






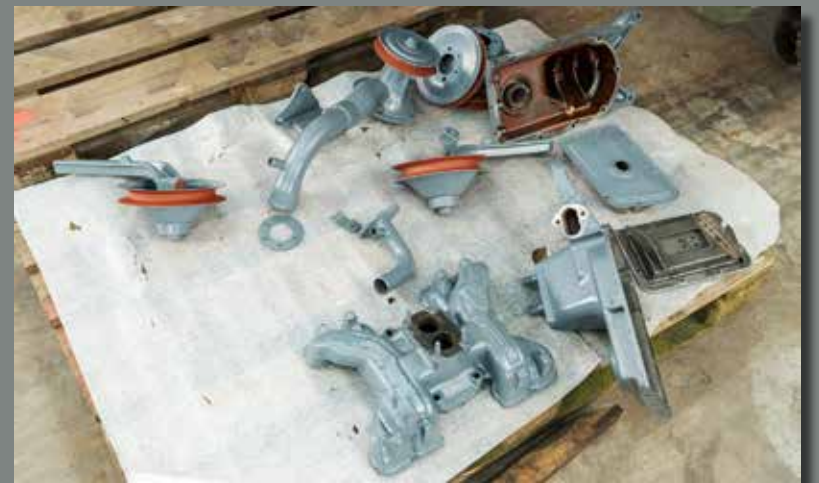






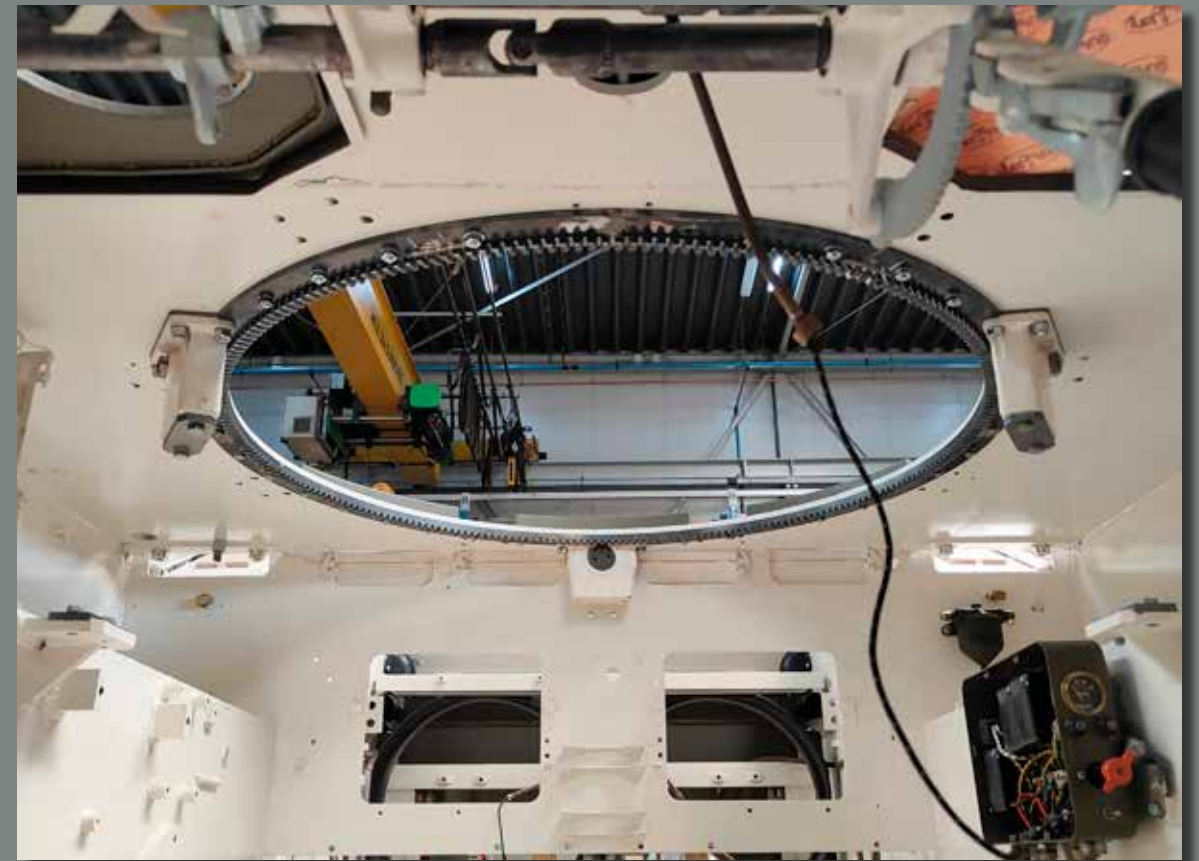




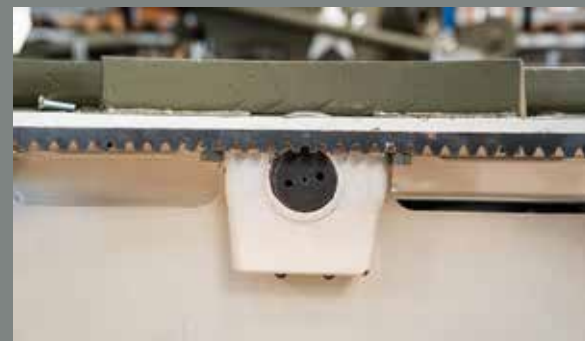


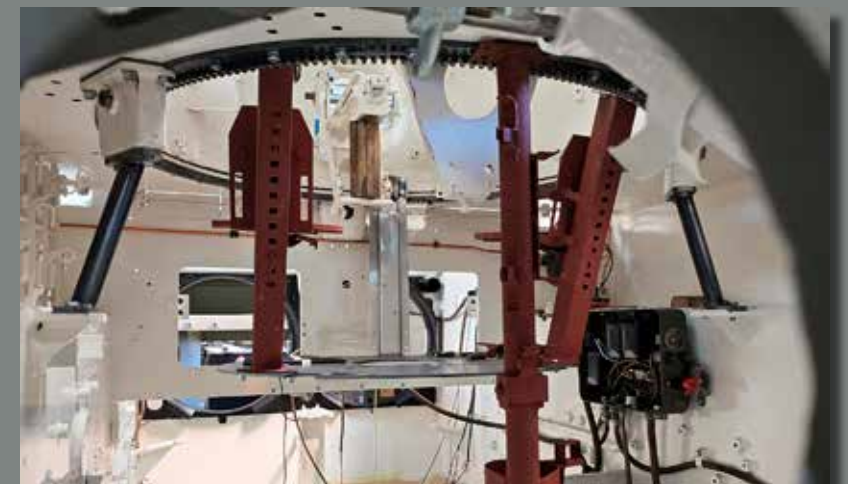
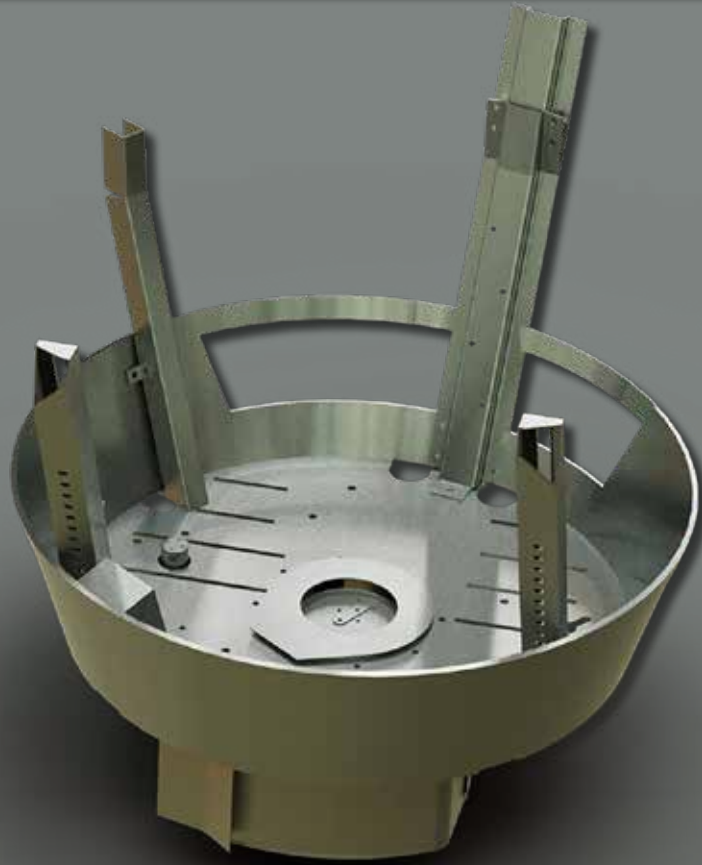






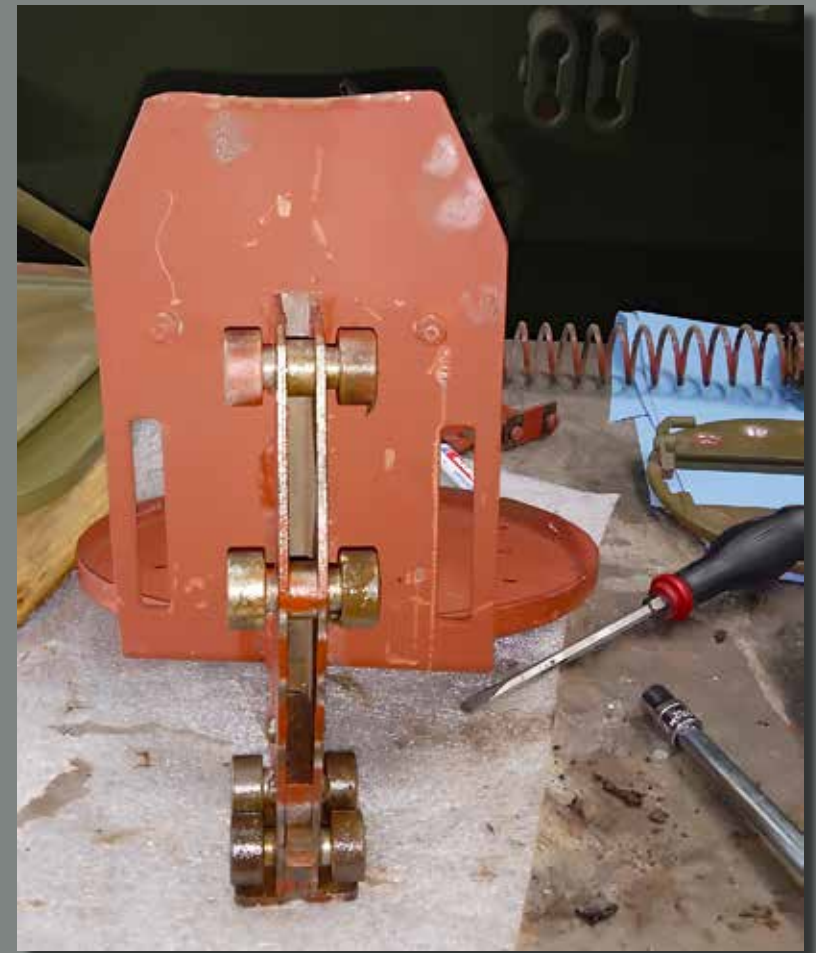
*CAD-design of a
new turret ring*





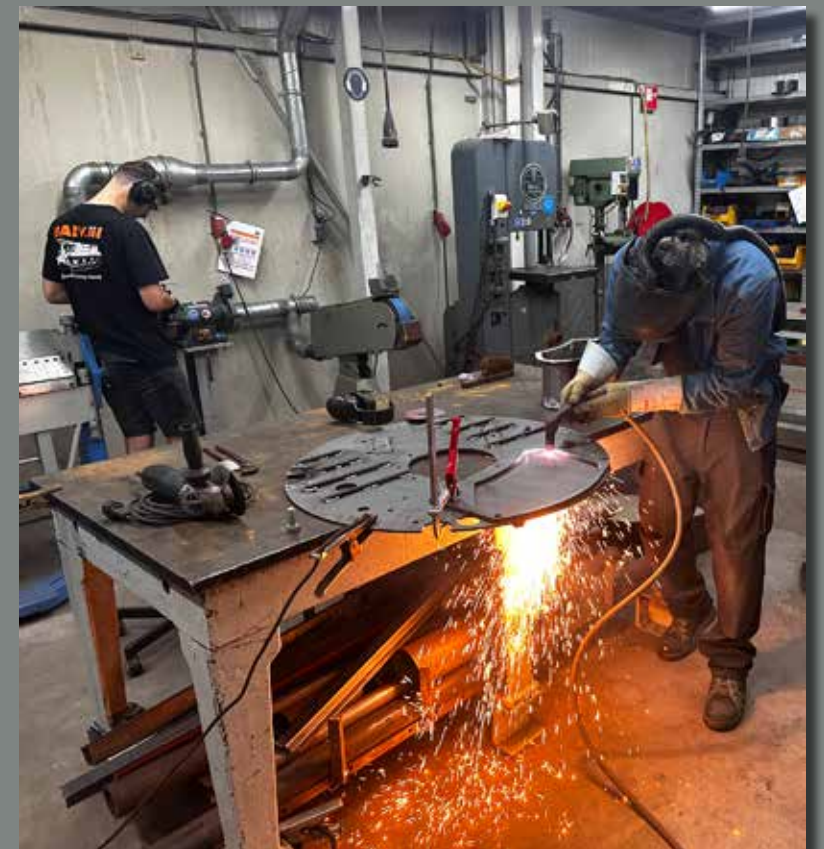
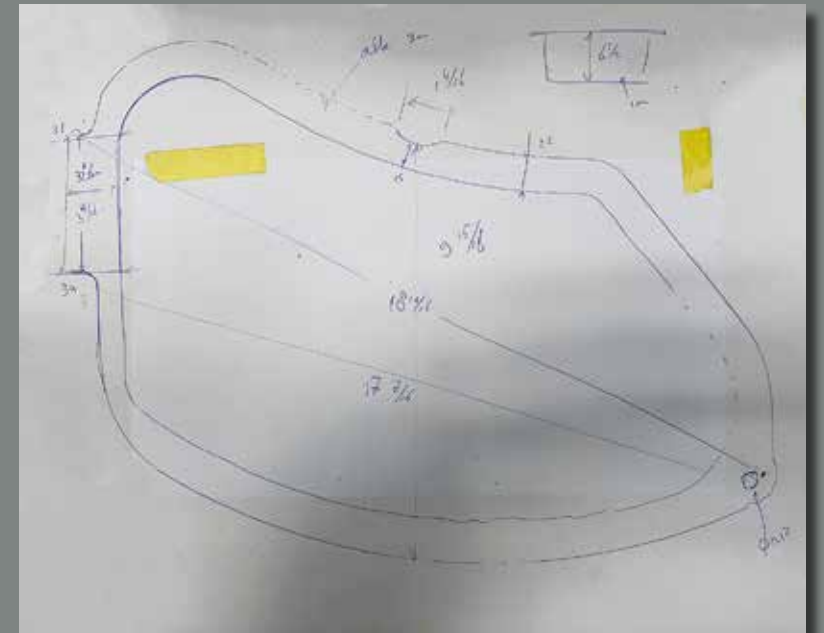
*CAD-design of
the gunner's basket
under the turret*

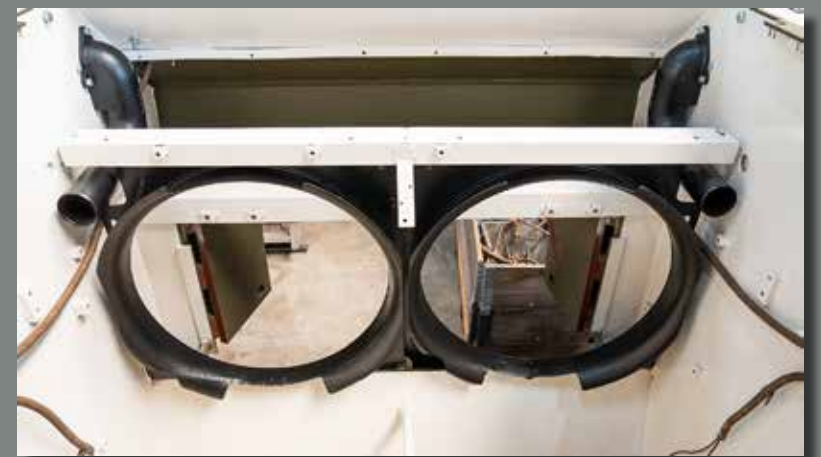






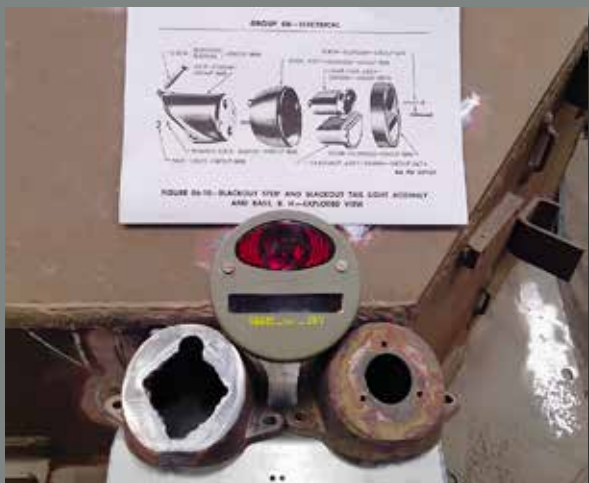
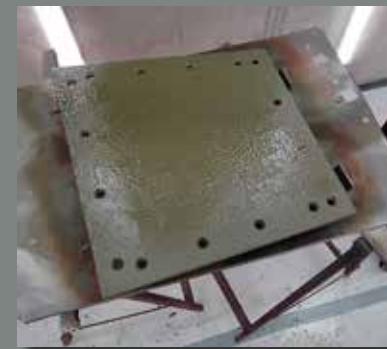
*Removable steel
basket under
gunner's basket*



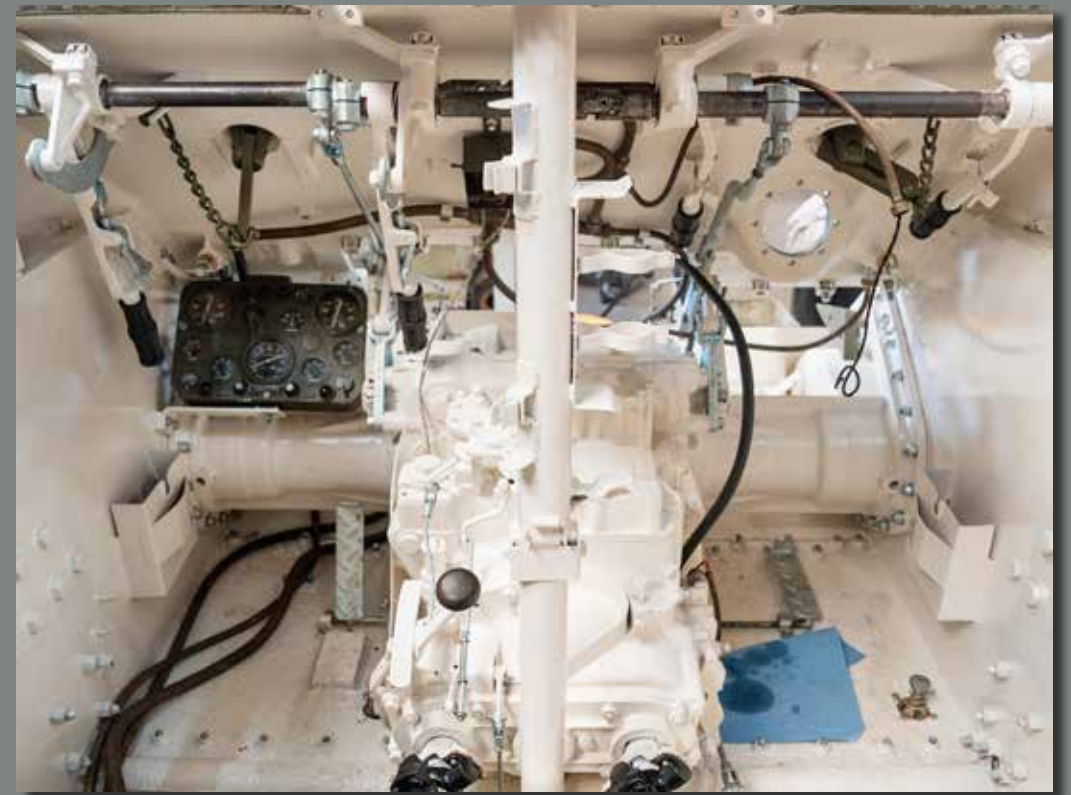


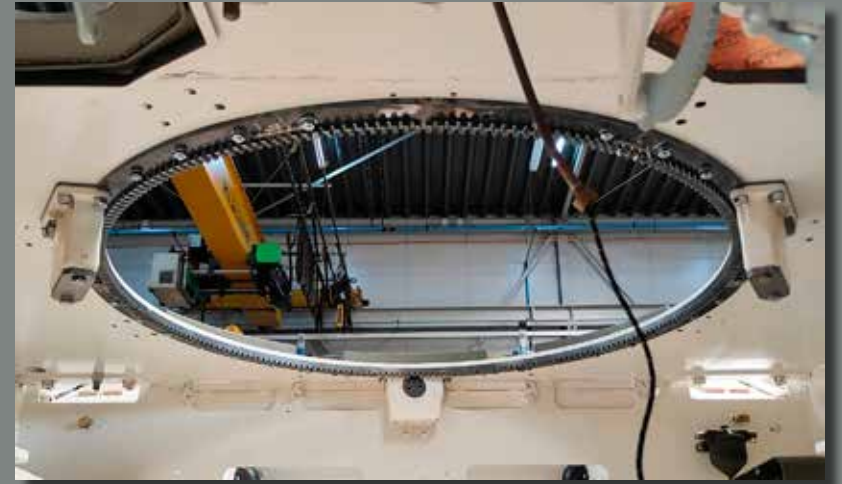


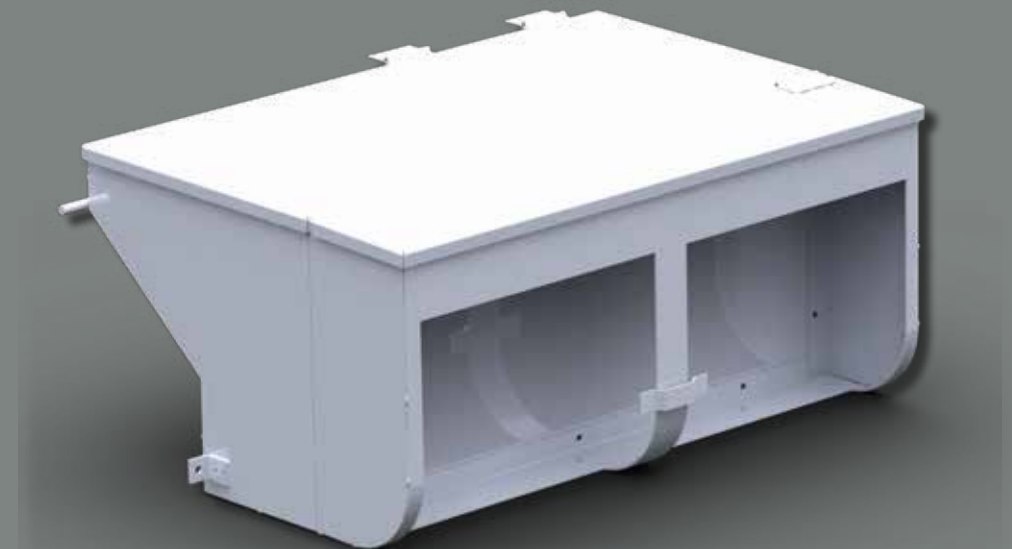
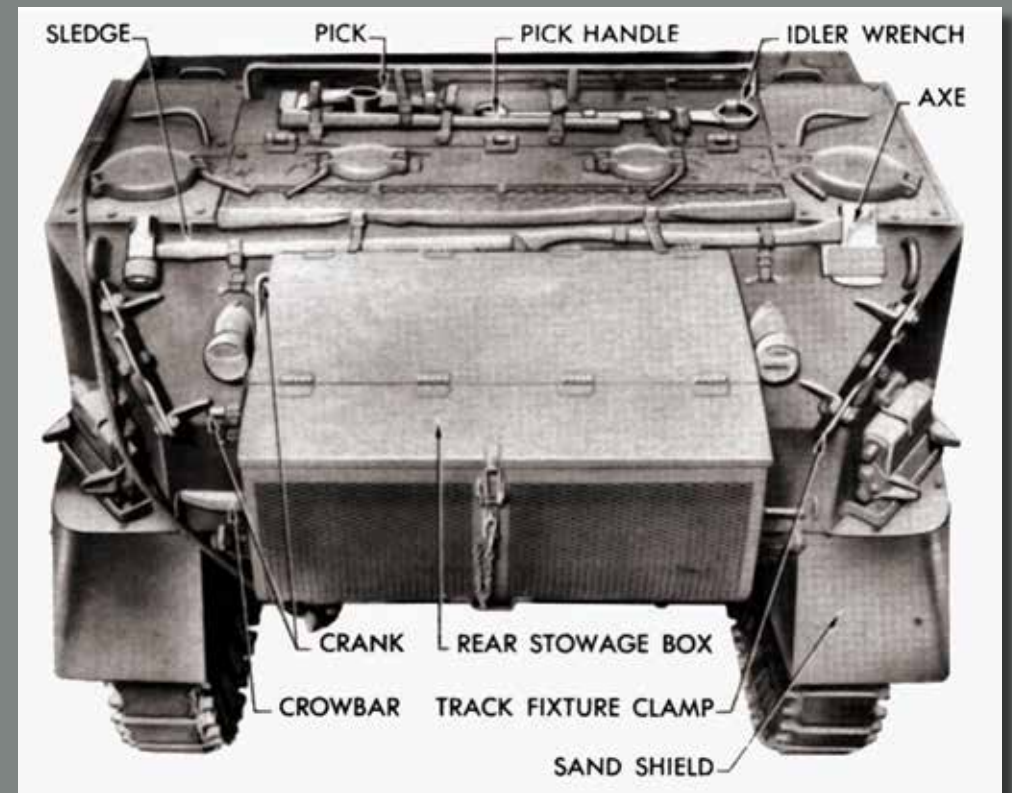








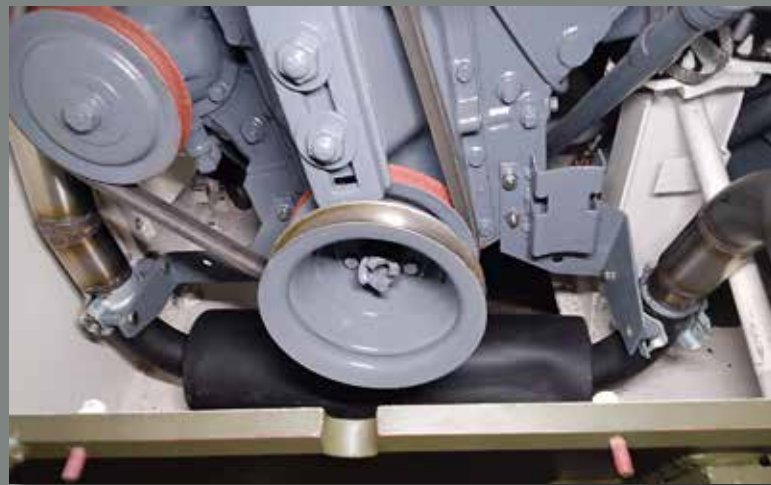


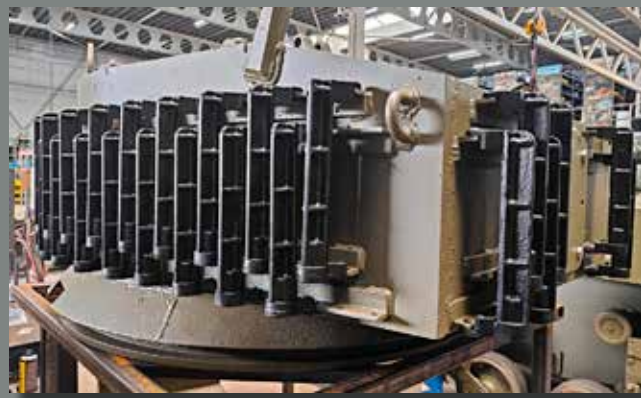


CAD-design rear storage box



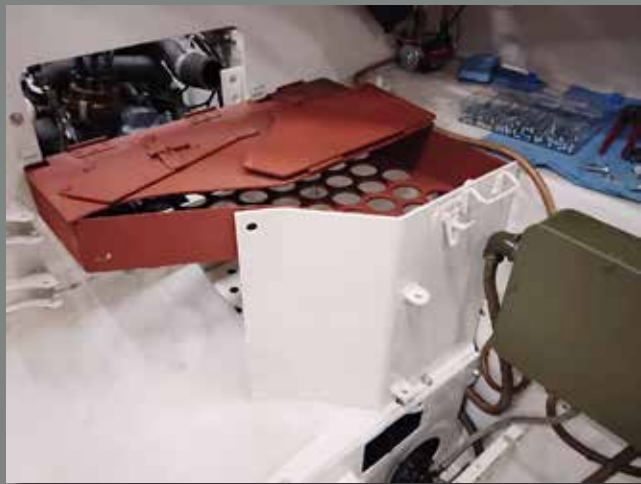


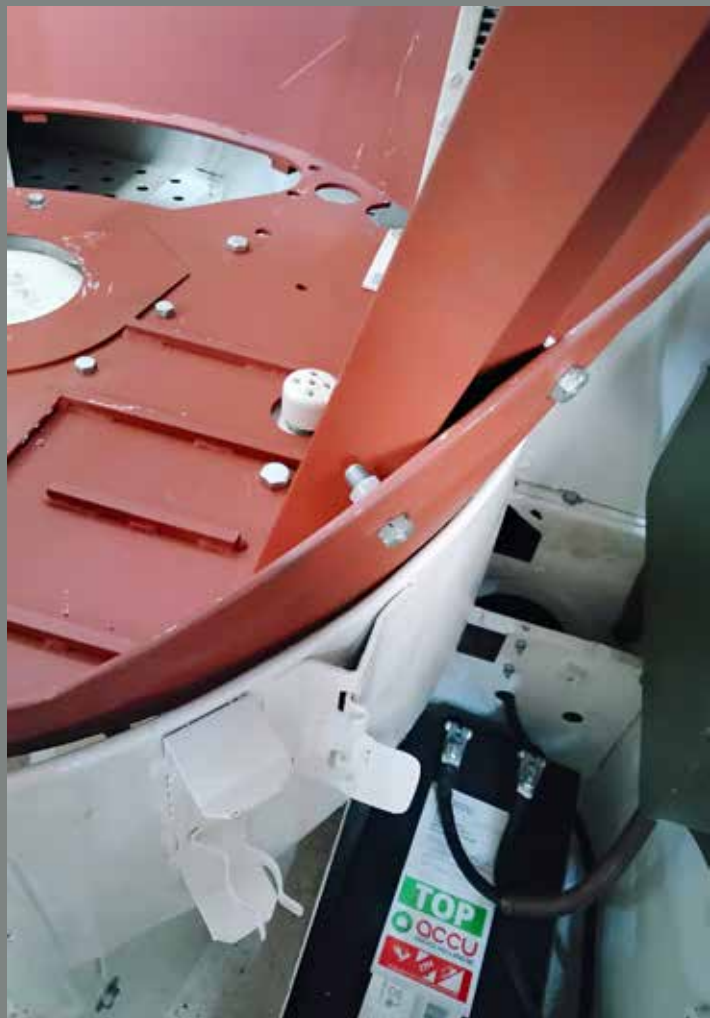
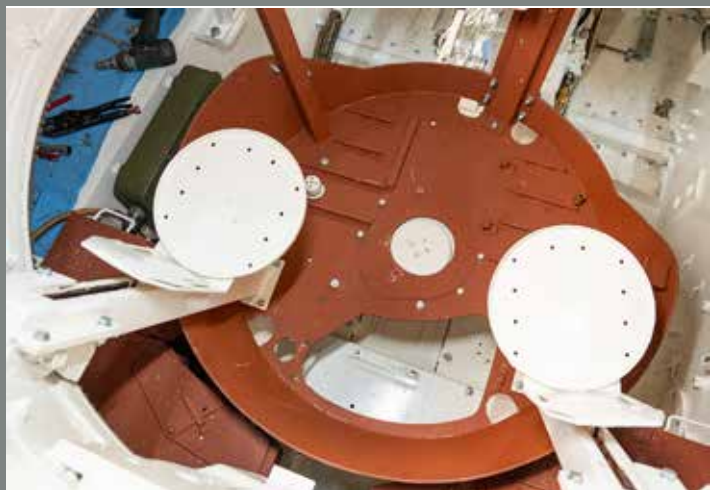




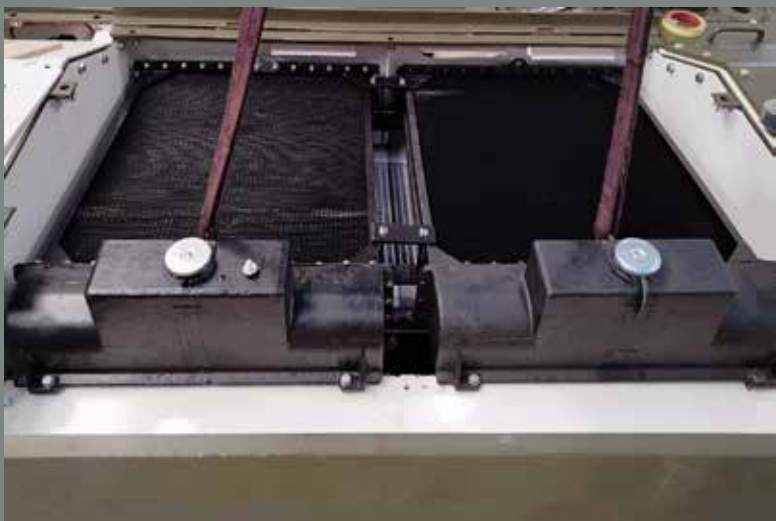






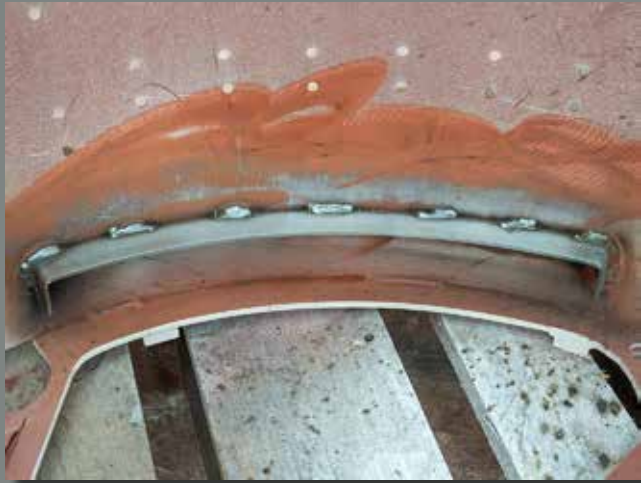
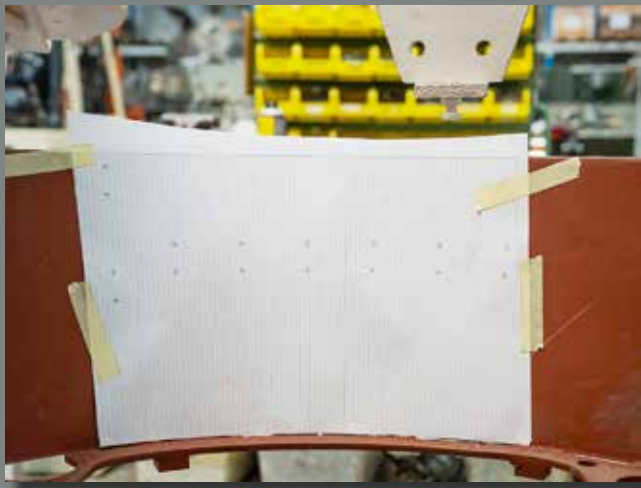










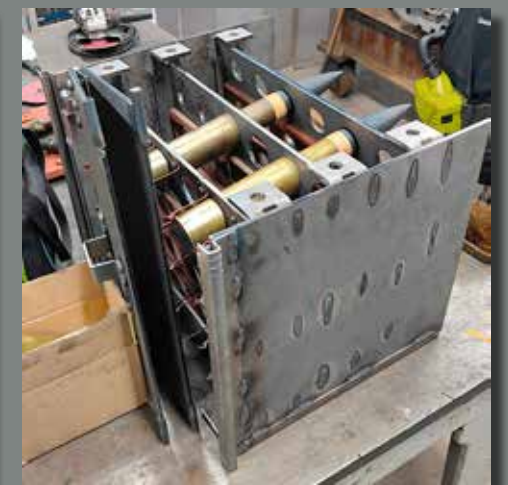
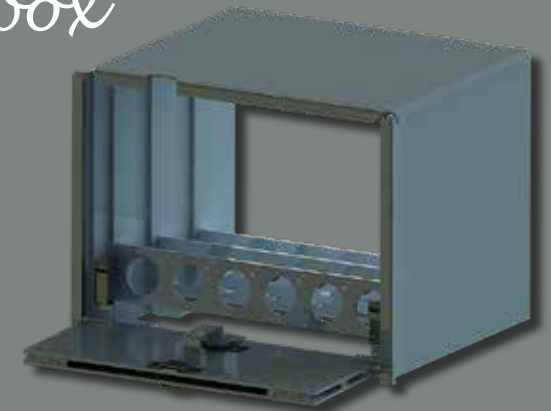
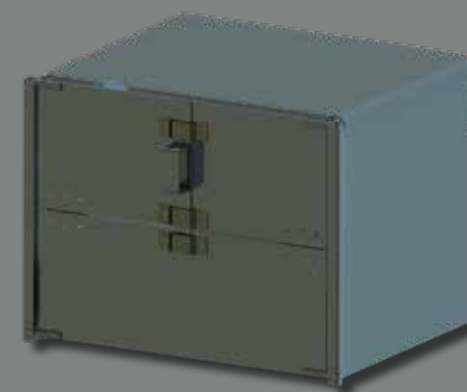


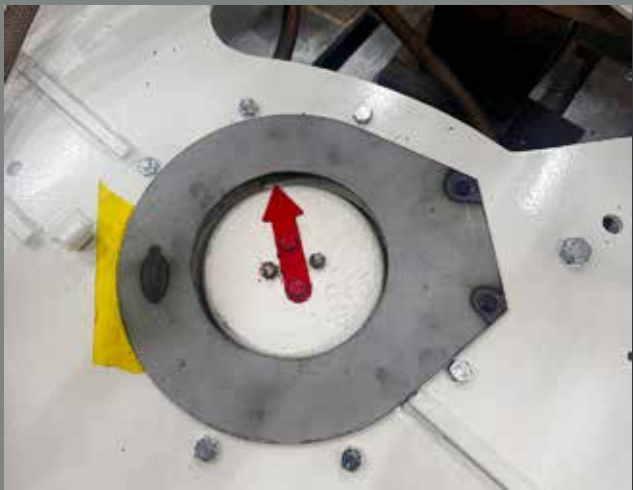


CAD-design for reproduction of grenade holders in turret basket



CAD-design for reproduction of ammunition box









*CAD-design
knob of Gyro
system of gun*





*CAD-design for reproduction
of 30. gun mechanism*

VEHICLE	LIGHT TANK M5A1
OVERALL LENGTH	181 1/4
OVERALL WIDTH	88 1/4
OVERALL HEIGHT	100 7/8
LOWEST OPERABLE HEIGHT	94 1/8
SHIPPING CUBIC	934
SHIPPING TONNAGE	23.3
FIGHTING WEIGHT (LESS CREW)	33375

TANK, LIGHT M5A1	
ORDNANCE DEPARTMENT, U.S. ARMY	
CREW 4-GROSS WEIGHT	31000 LBS.
MAX. ENGINE SPEED	3500 R.P.M.
MAX. VEHICLE SPEEDS:-	
HIGH RANGE	30 M.P.H.
TRANSFER UNIT LOW RANGE	15 M.P.H.
HYDRAMATIC LOW RANGE	6 M.P.H.
DATE	12 43
SERIAL NO.	NO 221 INSP. D M H
PUBLICATIONS	PARTS LIST SNL-G105V013
OPERATORS MANUAL	TM9 7273
MAINTENANCE MANUALS	TM9 17273 17274 17275
MANUFACTURED BY	
THE MASSEY-HARRIS CO.	



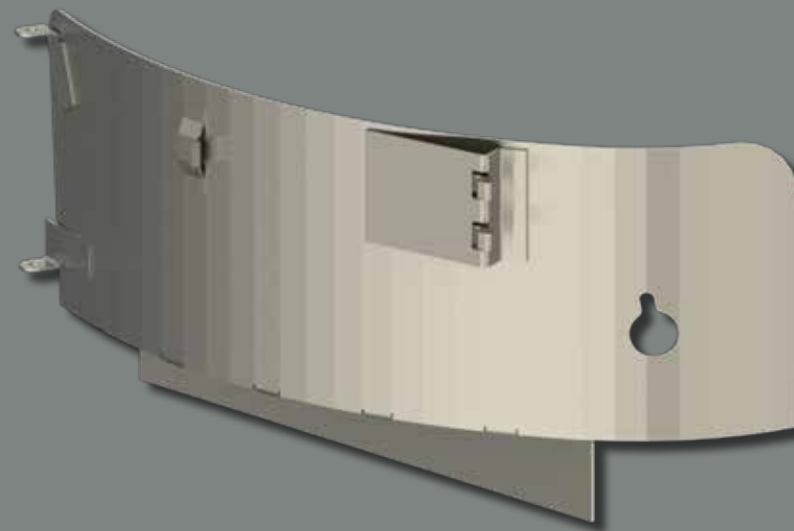
*Special
data plates*



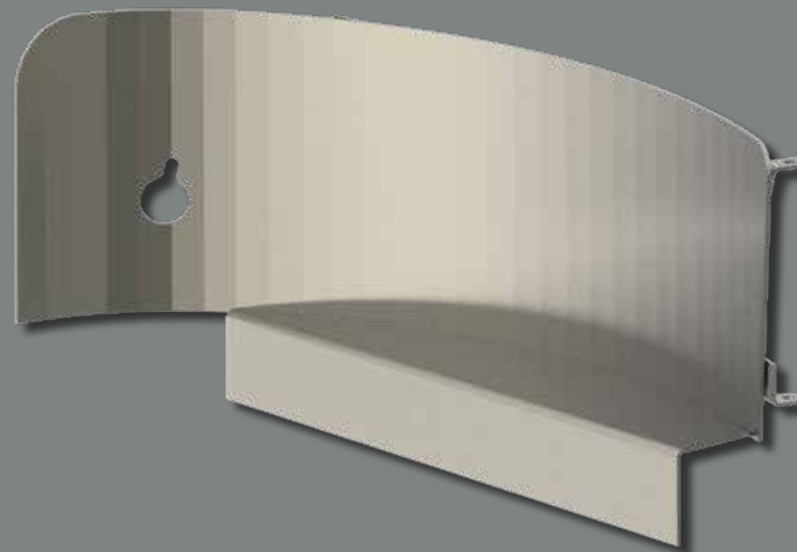


*CAD-design
of lock
hatches of
driver and
co-driver*

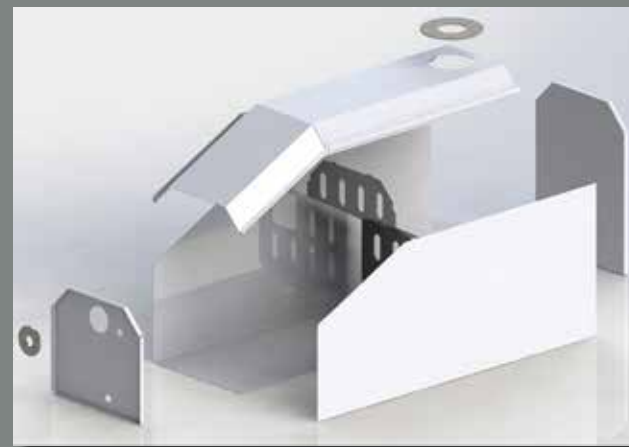




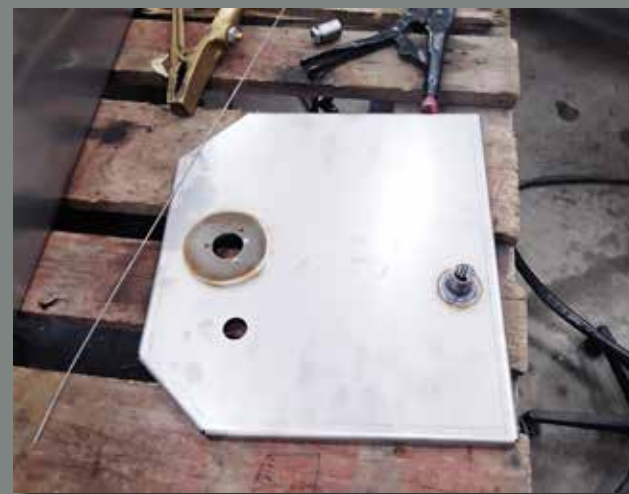
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the other
turret basket shield*

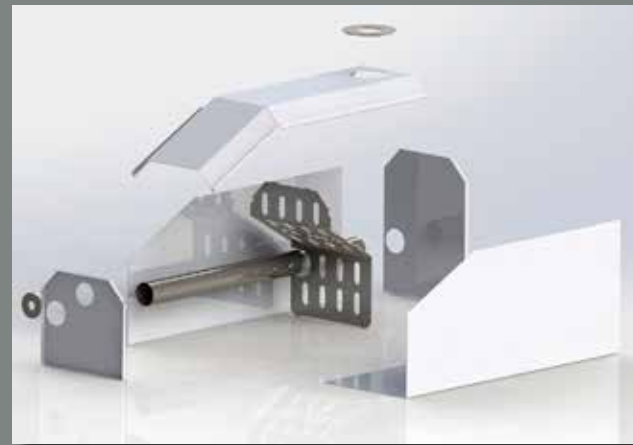






CAD-design of the right fuel tank





CAD-design of the left fuel tank

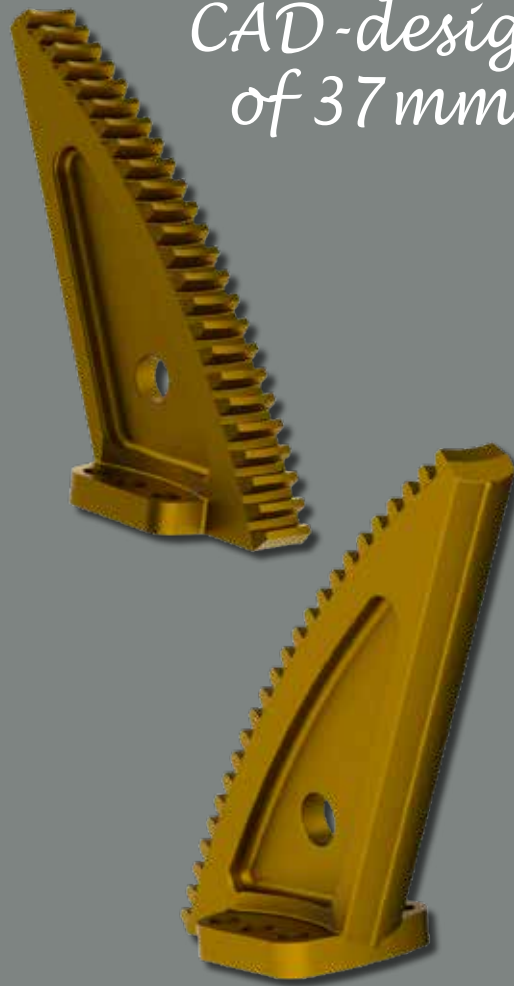


*CAD-design
mesh
plate
of the
fuel cap*





*CAD-design of elevation gear
of 37mm M6 A1 gun*



*CAD-design of
traverse control
box*

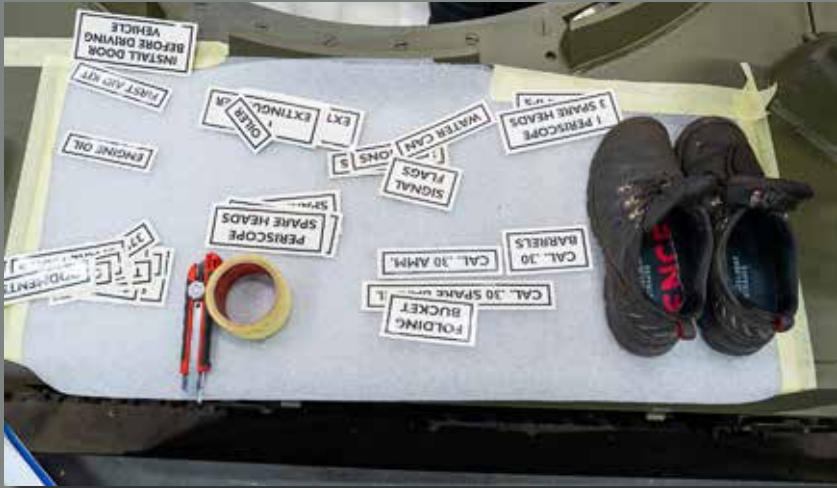


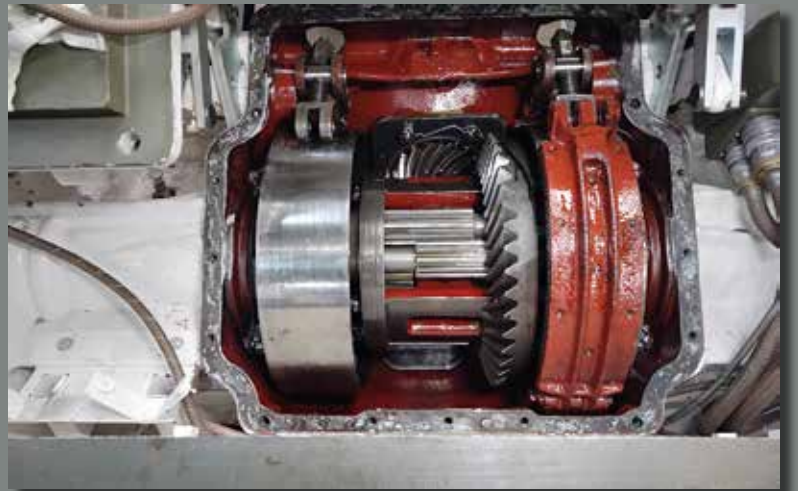


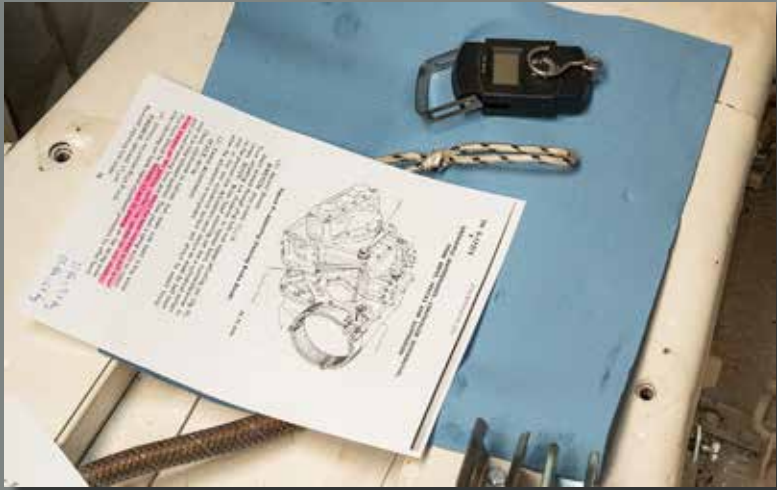
*CAD-design of cover
of siren*



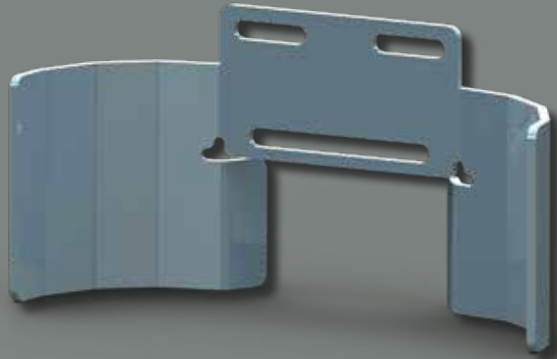








CAD-design protection pad gunners periscope









Restoration of M5A1 Stuart Light Tank



BAIV BV | British American Infantry Vehicles

Titaniumstraat 11 | NL 6031 TV Nederweert | The Netherlands

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