



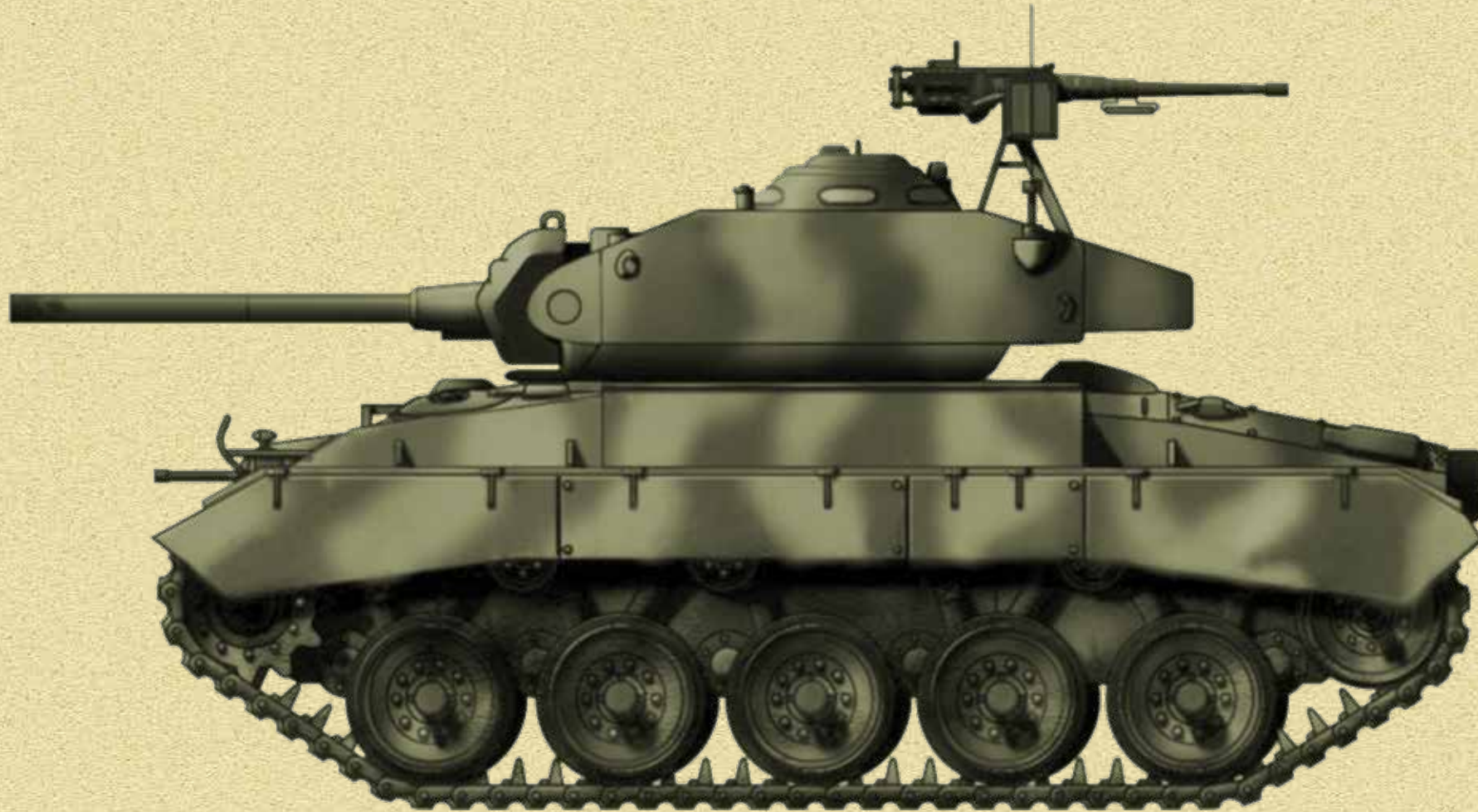
Restoration of M24 Light Tank Chaffee 'Dorothy'



www.BAIV.nl

**Nederweert
The Netherlands**

M24 Light Tank Chaffee



Technical Specifications

Manufacturer: Cadillac
Production period: March 1944 till August 1945
USA registration: USA 30113301
belonging to the 16th Armored division
Date of Delivery: October 1944 (T714)
Weight: 40,500 lb. (18,207 kg)
Crew: 5: commander, gunner, loader, driver, co-driver
Engine: 2 Cadillac V8-cylinder 44T24 petrol-engines, developing 110 hp each
Displacement: 2x 346 cu inch / 5,71
Power output: 2x 110 hp at 3400 rpm
Torque: 2x 240 lb.ft at 1200 rpm
Transmission: 2 Automatic (hydramatic) transmissions (8 Forward, 4 reverse)
Suspension: Torsion bar with five rubber-tyred medium size road wheels per side
Electrical installation: 24 Volt
Parts identification: G200

Speed: 56 km/h (off-road 40 km/h)
Range: Off-road: 100 miles (160 km)
Highway: 175 miles (280 km)
Fuel capacity: Right: 55 gallon (210 liter)
Left: 55 gallon (210 liter)
Dimensions: Length: 18.0 ft (5.49 m)
Width: 9.7 ft (2.95 m)
Height: 9.0 ft (2.77 m)
Armament Main: 1 × 75 mm Gun M6 with 48 rounds
Barrel ID: 7230679
Secondary: 1 × .50 cal. Browning M2HB mg w/440 rounds
2 × .30-06 Browning M1919A4 mg w/3,750 rounds
Armour: Front glacis: 1 inch 45°
Manlet: 1 ½ inch (38 mm)

M24 Tank Chaffee 'Dorothy' - USA 30113301

UNIT 23 of COMPANY D, 16th Tank Battalion of the 16th Armored Regiment



The M24 Chaffee, arguably the best light tank of World War II, was a fast light armored vehicle with the ability to deliver relatively large caliber direct fire with the excellent 75 mm M6 gun. More than 4,000 were produced by Cadillac and Massey-Harris during 1944-45. The first Chaffee's reached Europe in late 1944, where they proved very effective and highly reliable.

History & development

By 1942 it became evident that the 37mm gun was inadequate for the needs of America's light tanks, and indeed as main armament of any tank. Several attempts to install a 75mm gun into the existing M5 Light Tank (which suffered from a lack of crew space and poor cooling) failed.

In April 1943 work commenced on a completely new light tank design of Cadillac. A prototype was completed by October 1943 and production commenced in April 1944 with deliveries being commenced to the US Army in Europe later in that year.



The new Tank was given the name Chaffee in honor of General Adna R. Chaffee "Father of the US Armored Force" who had died in August 1941.

The M24 Chaffee was armed with a lightweight high velocity (2,050 feet per second) 75mm M6 gun adapted from aircraft use in the turret. The M6 Gun had an elevation of +15 degrees and a depression of -10 degrees. 48 rounds of 75mm ammunition was carried in the tank.

The turret was shared with a Coaxial 0.31-in Browning machine-gun. A 12.7mm M2 "Ma Deuce" Anti-Aircraft machine-gun with 440 rounds of ammunition was frequently mounted on the turret cupola.

The twin 346 cu inch (5,710cc) V-8 Cadillac petrol engine was the same power plant as used successfully in the M5A1 light tank (but the transmission was manual rather than automatic) and the torsion bar suspension system (with five rubber-tired medium size road wheels per side) was the same one as used on the M18 Gun Motor Carriage.

A crew of five was carried, of which the driver sat at the front left-hand side, with the co-driver-cum-radio operator on his right, where he controlled a ball mounted 0.31-in Browning machine-gun in the glacis plate. Separate emergency driving controls were provided for the co-driver. The commander, gunner and loader occupied the turret.

Between April 1944 and June 1945 some 4,070 M24's were built by the Cadillac Division of General Motors (3,300 vehicles) and Massey-Harris (770 built).

Introduction at the battlefield in WW-II

The Chaffee was first used in Europe in the latter part of 1944. Of the initial 34 tanks which reached the battlefield, seventeen were issued to the 2nd Calvary Recon Battalion of F Company and seventeen were issued to the 42nd Calvary Recon Battalion.

The tanks were sent immediately to fight in the infamous Battle of the Bulge in December, 1944. The 1st U.S. Army received two of these tanks, which were assigned to the 740th Tank Battalion. However, getting these tanks to the combat units on the front was slow, so many of the units were still using the obsolete M5 Stuart until the end of the war.

Nevertheless, the M24 Chaffee proved to be a fast (34.16 mph or 55 km/h), efficient reconnaissance vehicle despite being only lightly armored (maximum 38mm).

Korean War

It was in the Korean War that the M24 realized its full combat value, with its agility for reconnaissance, coupled to being well-armed for battle. Stories are known of Chaffee's which knocked out a couple of T34's. A tank which was considerable heavier and better armed!

Post war service

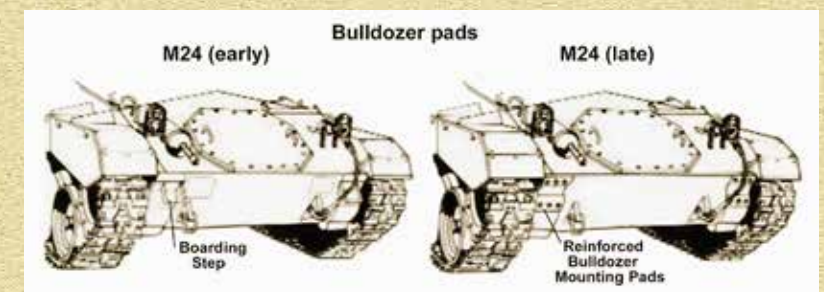
Many were later supplied as military-aid to several countries and many of these were still in service for many decades after the War. This one was one of them (Norway).

In addition, the M24 chassis would form the basis for a number of related vehicles including the M37 and M41 Howitzer Motor Carriages and the M19 Gun Motor Carriage Self-propelled Anti-Aircraft Tank, although the US Army replaced the M24 Light Tank in the early 1950's.

After 1945 the M24 Chaffee was used by many American allies. The French army used them in Indochina (later Vietnam), including at the Battle of Dien Bien Phu. Though obsolete by the mid-1960's, it remained in service in some countries until the late-seventies.

This example

This M24 Chaffee was built by Cadillac in October 1944 and according to the hull number (T714) it was belonging to the 16th Armored division with US. Army registration USA 30113301. It is an early built Chaffee since it does not have the front reinforced bulldozer mounting pads (see below).



This Chaffee, which once liberated the City of Pilsen in the Czech Republic, was most probably being released after WW-II and supplied as military-aid to the Norwegian Army. It stayed in operation until the late fifties after which its turret was removed, and the vehicle was cannibalized for other units.

Many owners

In the seventies the hull was purchased from the Norwegian Army by the Belgium surplus dealer Mr Chris Muys who sold it later to Mr. Jaap Rietveld. Jaap did his best to collect all

Restored for the Egholm Museum, 4070 Kirke Hyllinge, Denmark

missing parts. He bought through a relation a turret from the correct model and type in Greece and realized a restorable 'parts kit' to start the restoration.

Next owner was Mr. Julius Koopman who owned it for several years but never started the actual restoration.

Prior to the purchase by BAIV it was owned by Mr. Adrian Scott, a sympathetic UK collector who did an exchange of parts of the Chaffee project against his M4 High Speed tractor. Early 2018 however, Adrian realized that the project was also for him one size to big.

Purchase by BAIV

In August 2018, the project was finally purchased by BAIV. From the beginning BAIV always targeted on a full restoration. However, for such a project a client needs to be there as such a restoration is a complicated and financially very cost intensive operation.

In October 2018 BAIV came in contact with Ole and Jannie Falck of the Egholm Museum in Kirke Hyllinge, Denmark.

The couple visited BAIV the same month during which their expectations for a Chaffee project was discussed. The project fitted into their plans to extend the museum and add some living history objects being a T34 and this Chaffee.



End of 2018 Ivo Jr. and Sr. visited the museum. Both Ivo's were very impressed by the huge collection the Falck couple brought already together in the museum.

As a result of this visit a contract was signed aiming on a full restoration of the tank in a twenty months period starting after the BAIV Normandy tour of 2019.

Next to a Class A restoration, the scope included the following demands:

- Disassembly to the last screw, restoration and rebuilt in accordance with factory specifications,
- WW-II correct by using as much as possible original parts.
- Preservation with a 2K US coating system (Carboline) in the color of USA Army WWII OD Green.
- Original markings and identification,
- Full set of documentation (operation and maintenance manuals), restoration photographical log, delivery protocol, certificate of conformance, valuation report and CEx,
- Deactivation of the 75 mm Gun,
- Training to learn critical information in the preservation and maintenance,
- Quality control and progress reporting,
- Factory and Field Acceptance Test
- Transport and delivery to Denmark.



The restoration process

On July 17th 2019, just after the return of the BAIV team from their 75th Anniversary Tour of the D-DAY operations in France, a kickoff meeting was organized by Ivo Jr. to start the restoration process. Aim was to have the project completed in March 2021. Reason: the M24 Chaffee will have a prominent position in the new building of the Egholm Museum which was also planned to be ready in Q2 2021.

The process of restoration of a tank is basically relatively simple: disassembly (which was already done), repair and renewal, painting, and assembly. However, restoration is always a real journey of discoveries, with learning moments, great excitements, unique discoveries, and of course also various setbacks.

One of the unknown things was how complete the M24 was. BAIV had in these days no experience with this model. It was nearly impossible to identify whether the parts delivered were complete and usable. Though the package contained a lot of parts, still many had to be searched or newly built. The engines in the package were even in such a poor condition that rebuilding was economically not feasible.

Besides that all fenders and storage bins were missing and had to be fully rebuilt in accordance with the original design. Luckily, BAIV was able to measure the dimensions and construction details of all missing parts on the Chaffee of Mr Jan Caron, a collector in Oosterhout, The Netherlands. Remarkably the fuel tanks could be reused, but the oil coolers and many other small parts needed to be renewed.



Most of the missing parts were produced by the BAIV team under the inspiring leadership of MSgt. Vincent Kooijman. Vincent tells: *"As we started the work on the Chaffee it was nice to see that we had a pretty good base to start with. There were some modifications that we had to restore back to the original specifications and we had some major repairs, but basically the basis was great."*

Restoring back to original was the 'icing on the cake' for me and my team. We all love the steps, starting with nearly scrap, modifying and rebuilding to almost better as new.

The drivetrain and engines were fun to rebuild, and it was a challenge to bring them back together in working order. Fine-tuning of the engines and the automatic gearboxes (which were overhauled by Mark van Aalderen) was tricky. It was hard to get them working simultaneously and responding at the same time. However, finally we managed this as a team.

Luckily, some things went easy. For the gear shifter there was a simple way to get it in the basic settings. In the past a mechanic had made holes in the levers that connected to the rods and finally to the automatic gearbox. We found out that if you line them all up you have the basic settings!

From there we only had to concentrate at the synchronization! This may sound difficult, but it turned out to be easy. Finally, everything was installed and we were able to start up the engines in the tank for the first time.

This was a nerve wrecking time. This was the moment to find out if we had everything installed right ... and we did!!! I can assure you that the sound of her engines running smoothly was a great feeling.

Of course, we took the Chaffee also out for a test drive in the industrial area where our workshop is located, in order to find out whether everything was working as it should be.

Already at the first test drive it turned out that she shifted perfectly, so that made us feel so proud."

The tracks on the current unit are from the original model and type of the M24 Chaffee using the standard sprockets. The client decided to use the original early type WW-II tracks. However, BAIV is also able to deliver a post war model set which is very similar. For this post war sets the sprockets need to be renewed as the pitch of these tracks is slightly different, BAIV can also deliver these new sprockets if needed. By the way, the same model of tracks can also be used for the M18 Hellcat.

Though rather complete, still many parts needed to be traced to complete the M24 Chaffee. They were found at specialized companies all over Europe and even in the US.

Vincent continues: *"After the successful test drive we focused on the details of the M24, finishing up the last things that needed to be done."*

In this respect the electric system was a challenging task. Lots of effort was invested to make this as original as possible with usage of all different model's milspec connectors, shielding and special fabricated wiring with timely correct cotton cloak.

Vincent: *"Finally, we did a full test drive on a military training area so that we could test her in similar conditions as where these tanks have been designed for. It was fantastic to drive her, to see and feel her running as she was intended to do."*

Due to a lot of effort and commitment the entire project was completed, despite the fact that BAIV was relocated to a new workshop in Q2-2020 and the Corona epidemic, by Vincent and his team within the time frame as requested by Ole and Jannie Falck.

Panther Puppy

Vincent adds: *"By the way, did you know that the nickname of the Chaffee was "Panther Puppy"?"*

When the Chaffee saw action for the first time in the battle of the Bulge, she was introduced to the troops. It appeared that the suspension of the M24 looked a bit like a German Panther tank. The introduction to the troops was to prevent Chaffees being shot by friendly fire!

As the Chaffee is a lot smaller than a German Panther she soon received the nickname "Panther Puppy".



The Dorothy

While the restoration was in progress Ivo Jr. traced down the history of the tank. During this process he found out its specific history and even found in the city library photographs showing the tank deployed during the liberation of Pilsen.

The liberation of the city of Pilsen in 1945 is a significant moment in the memory of the Czech Republic. Patton's 3rd Army entered western Czechoslovakia in May 1945 and proceeded to liberate the city of Pilsen. This small sliver of territory in the Bohemia region became the sole Czech territory liberated by American forces.



Early in the morning of May 6th, American tanks from the 16th Armored division set out for Pilsen, reaching the city around 08.00 hours. The first unit into town was Combat Command B led by Colonel Charles Noble.

The American forces encountered sporadic resistance from



German soldiers and were shot at from the tower of the local cathedral. However, it soon became apparent that further fighting was futile and the German commander, General von Majewski decided to surrender.

Around 14.15 hours General von Majewski signed the capitulation ordering his troops to put up no further resistance. The 16th Armored Division was followed by the 2nd Infantry Division and the 17th Belgian Fusilier Battalion which included 700 volunteers who had joined the U.S. Army after the liberation of Liège. There are several monuments in the city of Pilsen commemorating the Allied forces that took part in the liberation of the city.



BAIV in short

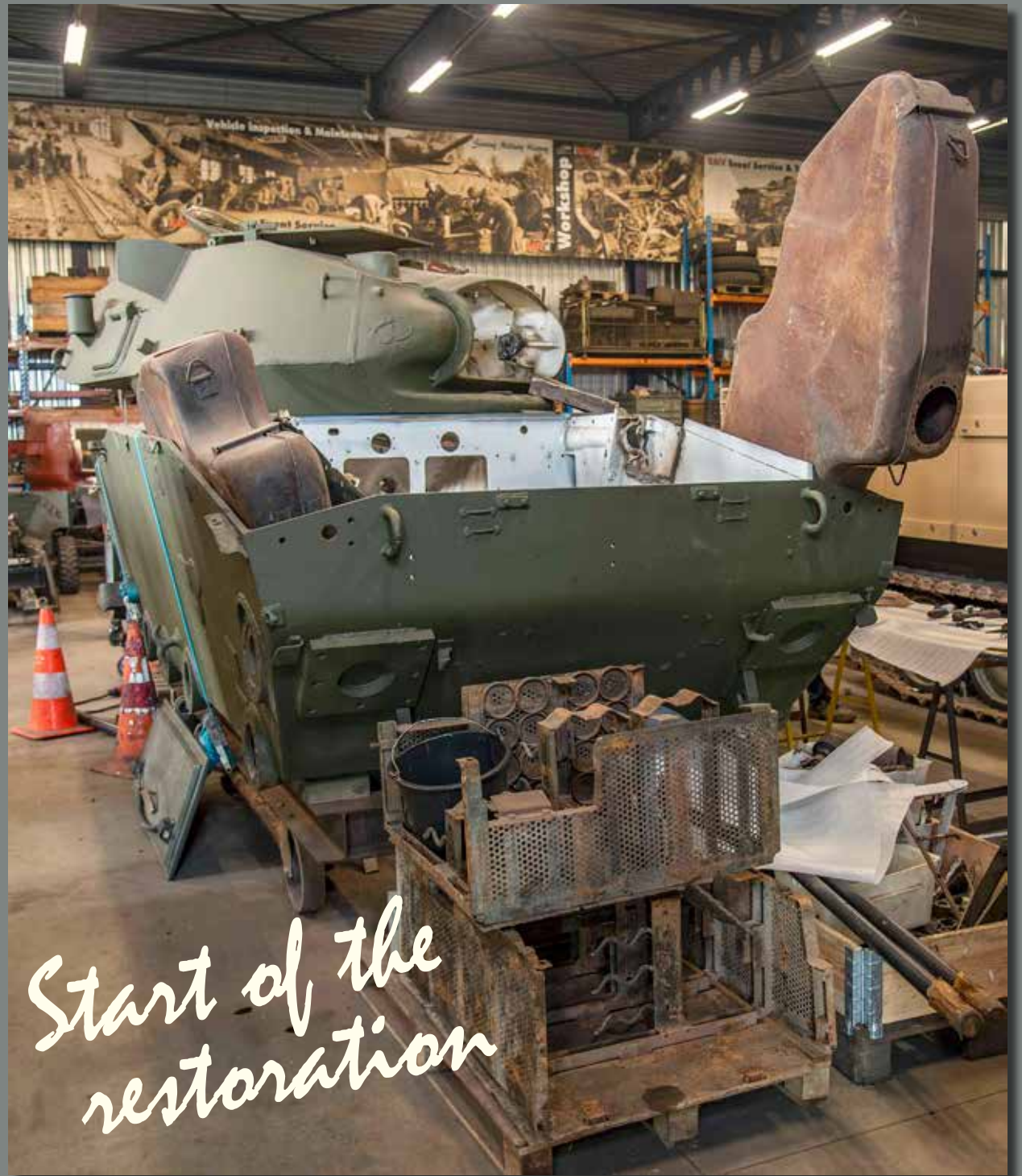
Why: We have a distinct passion for the high-quality restoration and preservation of historic military armored equipment. The love for-, and the traditional knowledge and craftsmanship of technical restoration is in our DNA. We operate in the high-end sector of this specific market and make a sustainable and valuable contribution to the preservation of Military Cultural Heritage. We also promote the real experience of this equipment for current and future generations.

- Founded on February 2nd 2012 in Eindhoven The Netherlands by Ivo Jr. and Sr.,
- Since July 1st 2020 BAIV moved to a new dedicated tank workshop in Nederweert, The Netherlands,
- Building footprint; 1.217 m2 ,
- Commercial Organization for Restoration of Military Heritage; especially Armored Vehicles and Tanks,
- In Top 3 Worldwide of Restorers of Military Heritage,
- Socially dedicated and educational organization creating opportunities for employees and volunteers,
- 17 permanent employees; average age 36 years,
- Licensed Arms & Weapons Dealer Category 2 NL20191618779.







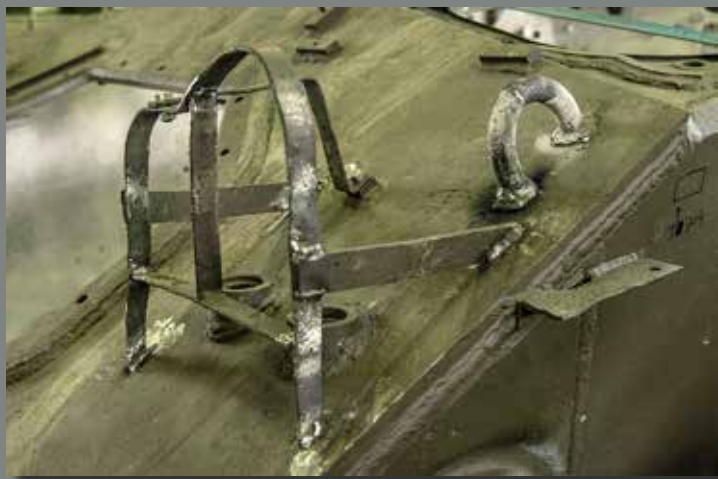


Start of the restoration





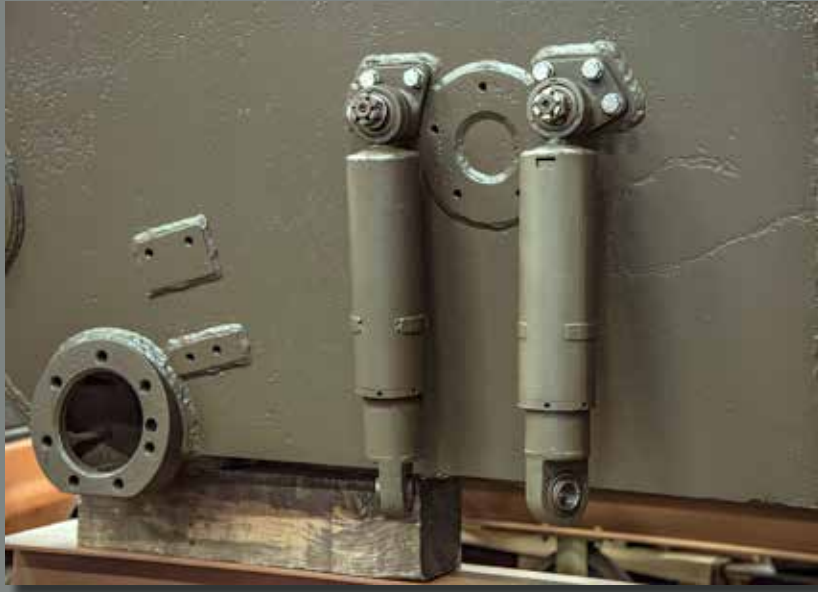
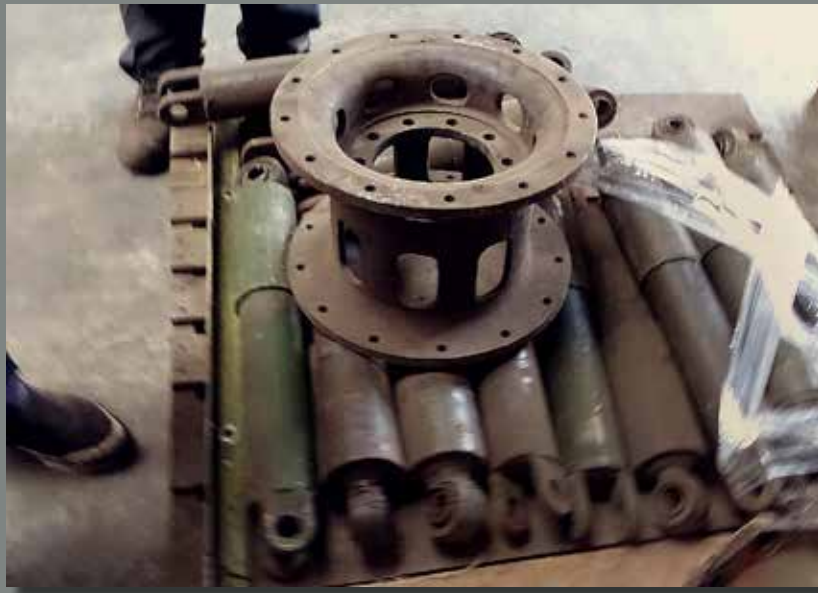


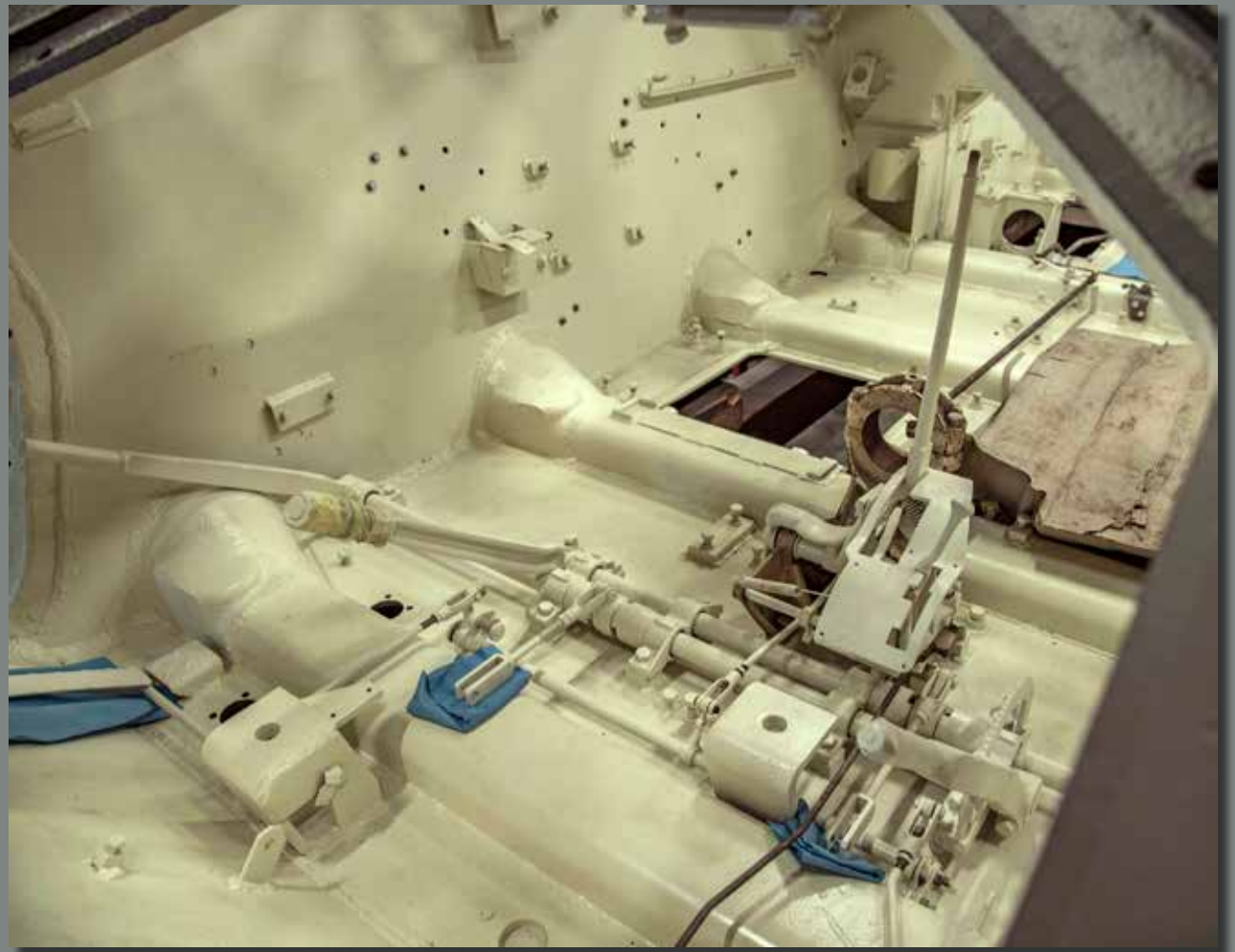
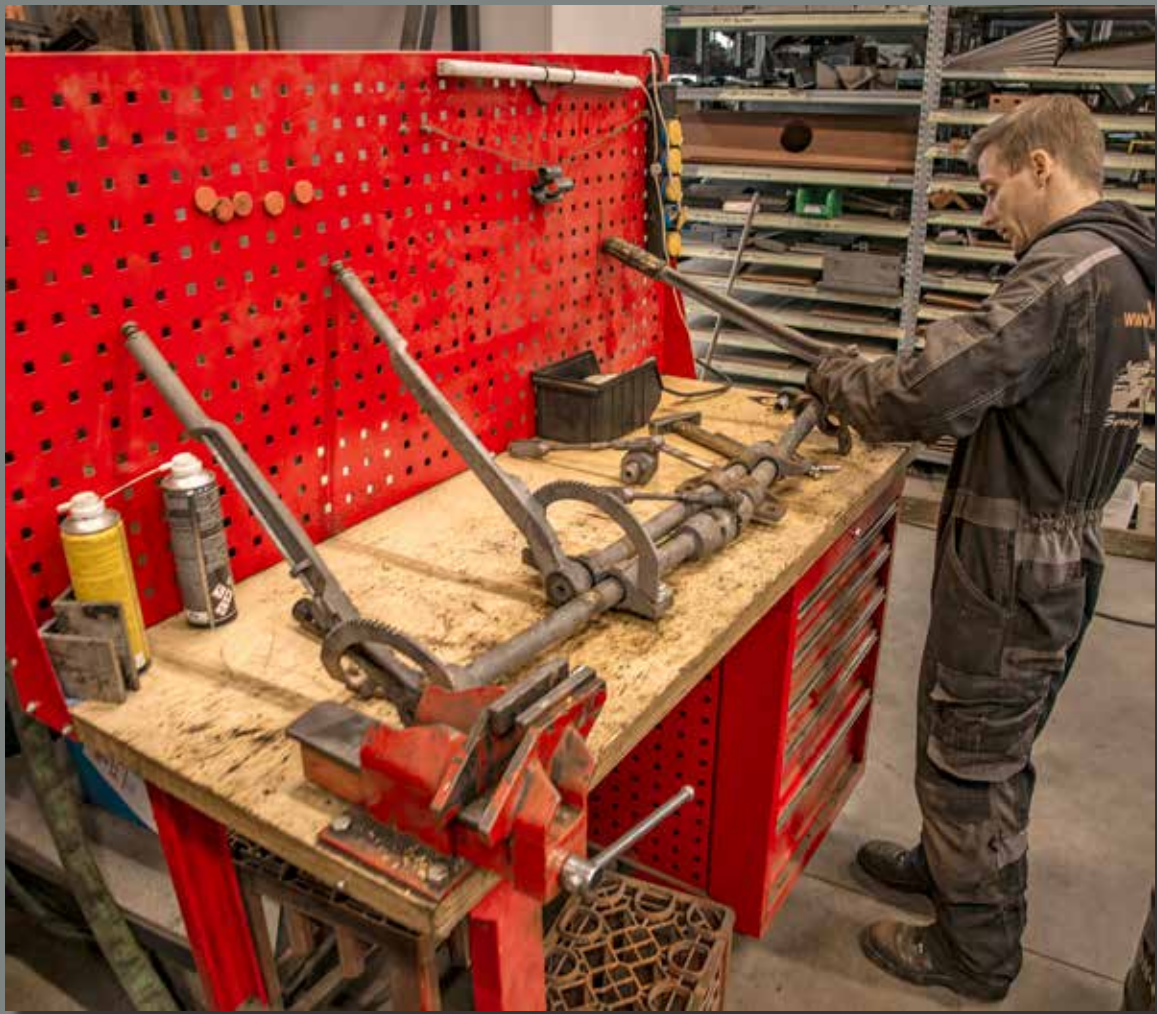


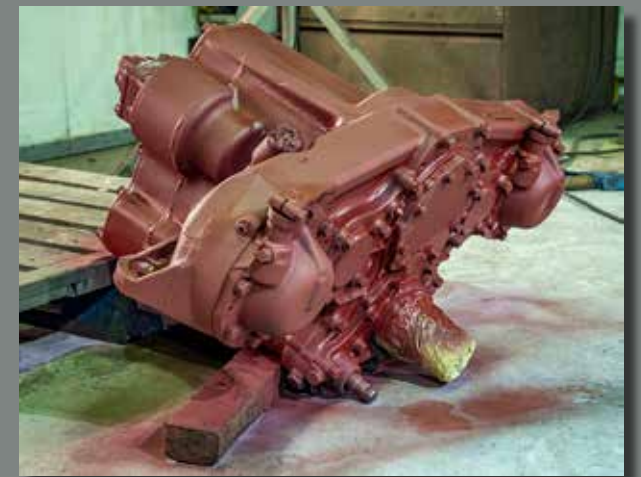


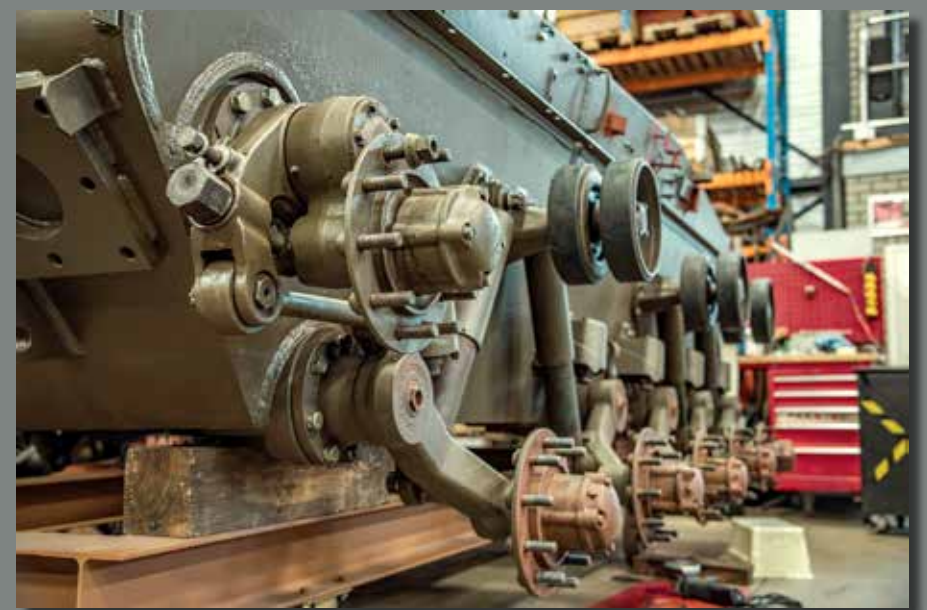




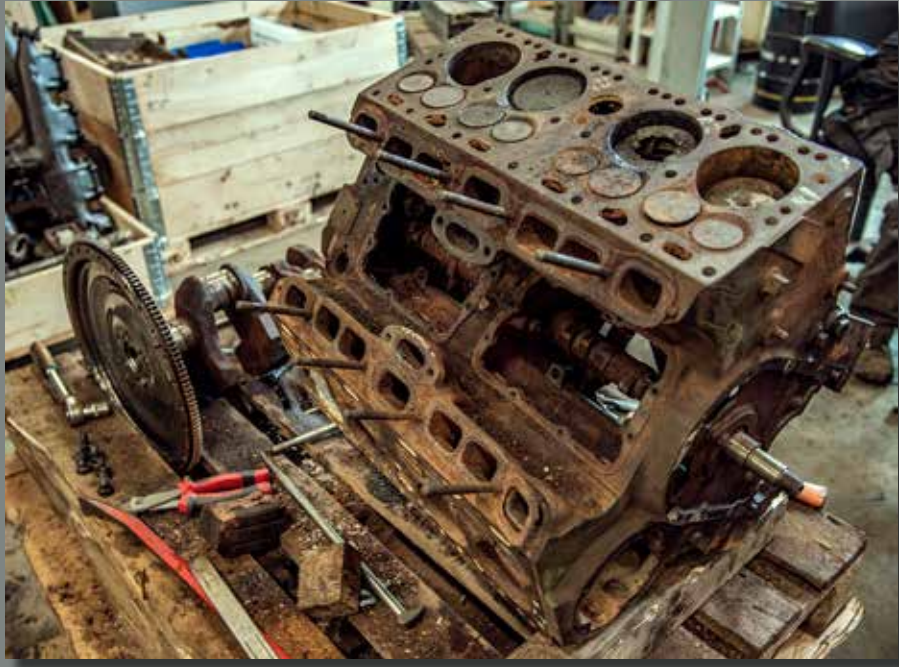


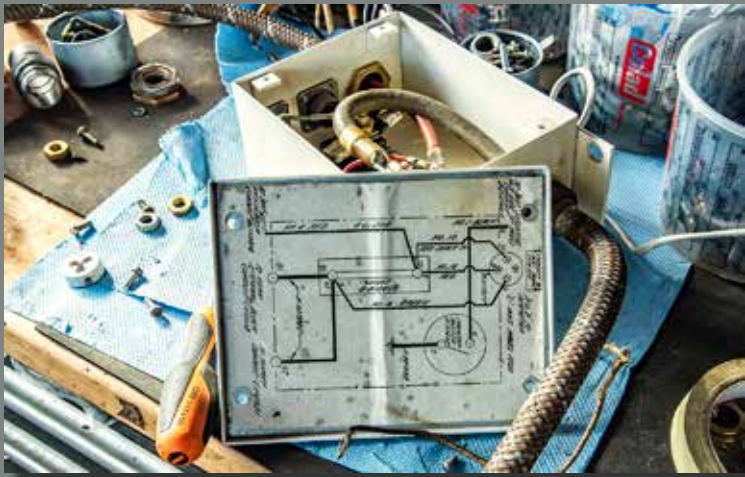










































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