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# DEPRIVING THE VEHICLES FOR MILITARY OR POLICE PURPOSES OF THE UTILITY FEATURES IN THE FIELD OF ARMOURED AND AUTOMOTIVE TECHNOLOGY

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**Abstract:** Exploitation of vehicles on the civil market requires the deprivation of utility features of vehicles intended for military or police purposes. The work presents an algorithm of operation to deprive combat vehicles of the utility features. As part of the work, an example of the analysis of the elements of vehicle construction and equipment which should be deprived of functional features is shown, in accordance with the list contained in the above regulations. The authors also provided a description of how to proceed in order to deprive the utility features of the designated construction elements or equipment of the selected combat vehicle.

**Keywords:** functional features, combat vehicle, armored and car technology

## 1. INTRODUCTION

In the era of intensive acquisition of military equipment by the Armed Forces of the Republic of Poland, a need appeared to utilize or sell combat vehicles whose exploitation is unprofitable [3,4]. To allow the vehicle to be placed on the civilian market, to operators not covered by the concession, it must be deprived of these utility features.

### 1.1. THE PURPOSE OF DEPRIVING THE VEHICLES FOR MILITARY OR POLICE PURPOSES OF THE UTILITY FEATURES

The primary purpose of depriving the military or police vehicles of utility features is mainly to enable the use of a vehicle for purposes other than military or police by:

- from the formal point of view - deprivation of functional features, which on the basis of the relevant legal executive act make it necessary to have a license to trade such a vehicle,
- from a practical point of view – depriving the construction elements or vehicle equipment of the utility features that could:
  - make it possible to fight using on-board weapons or other combat measures installed in the vehicle,
  - give a feeling of increased protection of the crew against external hazards typical of the battlefield, including fire,
  - provide special vehicle movement properties useful in combat operations, criminal or terrorist activities.

### 1.2. THE USE OF MILITARY AND POLICE VEHICLES ON THE CIVILIAN MARKET

Military vehicles, which from the point of view of the manager responsible for their life cycle - lost their usability or are used for combat training of soldiers / police specialists and as so called polygonal targets for shooting in their direction with the use of combat ammunition. Other uses of vehicles other than military and police are identified as follows:

- museum exhibits,
- exhibition objects,
- recreational objects,
- movie props,
- equipment for entertainment events,
- equipment of reconstruction groups,
- means of production in business operations, e.g. as working machines or transport means.

## 2. RESEARCH PROBLEM AND RESEARCH METHOD

Exploitation of vehicles on the civil market requires the deprivation of utility features of vehicles intended for military or police purposes. The work presents an algorithm of operation to deprive combat or special vehicles of the utility features. In the Republic of Poland, main reference documents, which regulate the deprivation of utility traits are [1, 2]:

- Ordinance of the Minister of National Defense of 27 August 2015 on the redemption of functional traits of weapons other than firearms and products for military or police

purposes,
- Regulation of the Council of Ministers of December 3, 2001 on the types of weapons and ammunition and the list of products and technologies for military or police purposes, on which production or trading is required concession.

## 2.1. FEATURES OF VEHICLES SUBJECT TO DEPRIVATION - FORMAL REQUIREMENTS

Tab. 1. presents the features of vehicles subject to deprivation - formal requirements (based on Regulation. MON from August 27, 2015).

Table 1

**Features subject to deprivation** [1]

| **Point of the list according to the regulation** | **The names of the product or technology group** |
|---|---|
| **BA** | Types of weapons and ammunition |
| **WT I** | Toxicological measures, "tear gases", equipment, ingredients, materials and technology |
| **WT II** | Fire control equipment, warning and alarming equipment, preventive systems and equipment and its components or equipment |
| **WT III** | Ground vehicles, including tractors (excluding civilian cars or lorries destined for the transport of money and valuables equipped with armored guards) and their components |
| **WT IV** | Martial vessels, special naval equipment and devices and its components |
| **WT V** | Manned and unmanned aerial vehicles, aviation propulsion units, aviation equipment and its components |
| **WT VI** | Electronic equipment not included in items WT II-V of this list and its components |
| **WT VII** | Specialized equipment for training and its components and accessories |
| **WT VIII** | Equipment for mapping or protecting against the movements of an opponent and its specially designed components and accessories |
| **WT IX** | Weapon systems operating with the use of directed energy (DEW), related equipment or counteracting equipment and test models and their components |
| **WT X** | Equipment using the phenomenon of cryogenicity or super- conductivity and its components and accessories |
| **WT XI** | Products and technologies related to the protection of non-public information |
| **WT XII** | Equipment and armored constructions, protective structures and components |
| **WT XIII** | Equipment and "technology" for the "production" of products |
| **WT XIV** | Products not included in WT I-XIII, and intended for military or police purposes |

## 2.2. THE PROCEDURE OF DEPRIVING THE VEHICLES FOR MILITARY OR POLICE PURPOSES OF THE UTILITY FEATURES

In the following diagram (fig. 1) a procedure of deprivation of the vehicle's functional characteristics was presented. Preparation and publication of the Technical Specification for the deprivation of utility characteristics of the vehicle can be performed only by an entity empowered to approve and confirm the technical activities related to physical removal of the traits. The same applies to the issuing of the proof of deprivation of functional features.

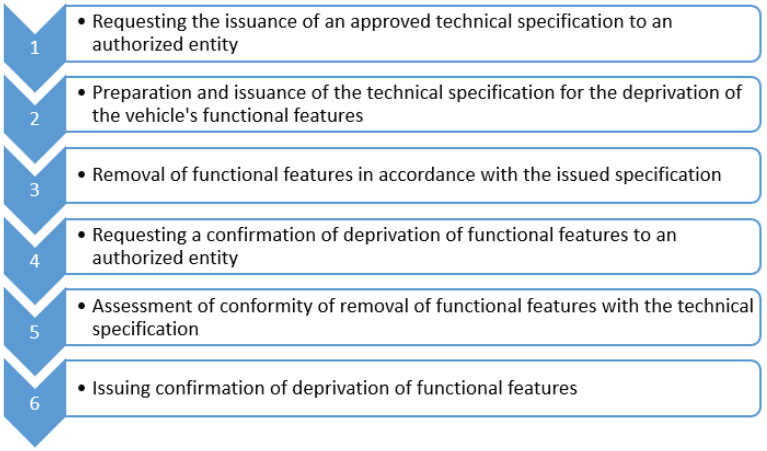


Fig. 1. Procedure for depriving vehicles of utility features [1, 2]

Examples of functional characteristics of a wheeled combat vehicle subjected to deprivation are shown below:

- pneumatic tires specially designed to provide bullet resistance or retainability in spite of the lack of air (run-flat inserts, self-supporting tires),
- tire air control systems controlled from the inside of the vehicle in motion (Central Wheel Pumping System),
- armored shields of key elements, such as fuel tanks or vehicle cabins (plates or armour elements shielding fuel tanks, plates or armour panels shielding the engine compartment),
- special reinforcements for weapon holders (attachment elements for weapon holders).

The general principle of deprivation is as follows: 'The object is subject to changes consisting of the removal or neutralization of parts and assemblies in a permanent and irreversible way essential for the functioning of a given type of weapons and product or the elimination of characteristics determining the military or police purpose.

The technologies used for the permanent deprivation of functional characteristics include, among others:

- disassembly,
- cutting,
- welding,
- hardfacing,
- reaming, drilling,
- machine processing: cutting, grinding, peeling,
- filling, e.g. with concrete, metal alloys, resins,
- crushing,
- permanent combustion, e.g. memory elements of electronics.

## 2.3. RULES FOR HANDLING EQUIPMENT IN AND OUT OF THE SCOPE OF ARMORED AND CAR TECHNOLOGY

Rules for dealing with equipment in the field of and beyond the scope of armored and car technology are shown in fig. 2.

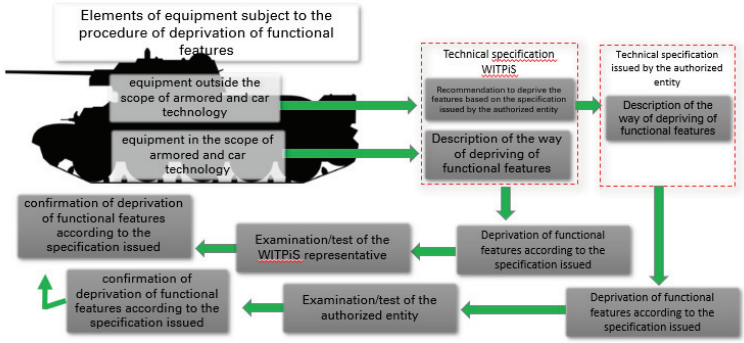


Fig. 2. Rules for handling equipment in and out of the scope of armored and automotive technology [1, 2]

# 3. RESULTS

As part of the work, an example of the analysis of the elements of vehicle construction and equipment which should be deprived of functional features is shown, in accordance with the list contained in the above regulations. The authors also provided a description of how to proceed in order to deprive the utility features of the designated construction elements or equipment of the selected combat vehicle.

The result of work related to the deprivation of traits is a vehicle which does not contain:

- effective armour protection,
- efficient from the point of view of combat effectiveness of weapons elements, fire

control systems, aiming devices,
- specialist equipment for overcoming the wilderness, paddling, swimming, detecting contamination and preventing contamination, orientation in the area.

However, each case (a specific identifiable vehicle) is considered individually and conditionally for selected features, strictly defined deviations in the field of deprivation of utility features are allowed.

## 3.1. EXAMPLES OF ANALYSIS OF CONSTRUCTION ELEMENTS AND EQUIPMENT OF A VEHICLE, WHICH SHOULD BE DEPRIVED OF UTILITY TRAITS

An important problem from the point of view of aesthetics and maintaining of the style of the vehicle, is the deprivation of functional features in museum objects or intended for monuments. An example of how to deal with a monument-object will be described based on the example of depriving of only a few selected functional features described above in subsection 2.2.

At present, disassembly or change of tires, removal or cutting of cartridges for driving with shot-out tires, as well as disassembly or removal of the central pumping system of the wheels and removal of gun holders is not a major problem.

The challenge for the expert is to deprive the armour of the protective features without changing the appearance of the vehicle.

The most effective way to deprive the hull of protective features is to pierce the openings in the places of crew members as well as in the immediate vicinity of the engine, propulsion system and fuel tanks (Fig. 3–4).

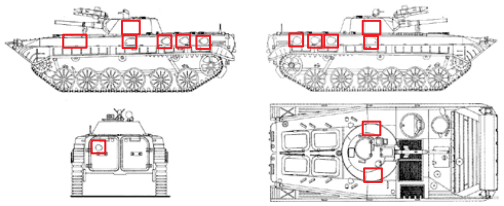

Fig. 3. Scheme of making cuts in the armour of the BWP -1 infantry fighting vehicle

Fig. 4. View of the BWP- 1 infantry fighting vehicle with holes in the hull of the vehicle and turret and dismantled covers of the shooting holes

In the place of cut fragments or disassembled armour plates, you can insert cut-to-measure elements made of material that does not provide ballistic protection, for example: wood, plywood, unreinforced plastic, aluminium, low carbon steel. The thickness of the metal sheet should not exceed 2 mm. It is not possible to use a sheet with a greater thickness if there is a risk that the cut-outs in the armour may weaken the structure of the self-supporting body of the vehicle and lead to its damage during the movement of the vehicle. Such elements should be covered with a trowel or other filler and after the mechanical processing paint it with a corresponding paint colour.

The above solution is not beneficial for a museum object or monument, because during the cutting of holes, damage and weakening of the hull structure occurs, which may cause its distortion, e.g. when placing the object on the monument's plinth. In addition, by blinding the cut holes with a material with a different structure and properties than the armour material, cracking of the putty may occur places of attaching caps to the native armour, e.g. during the movement of the vehicle or under the influence of unfavourable weather conditions.

With museum objects you also need to account for by-products arising from gas or electric cutting (e.g. melted metal) that can also damage the interior of the vehicle.

An example of the prepared object - a BMP-1 type vehicle for a monument is shown in Figures 5–9. The weapons and weapon holders were removed from the vehicle - fig. 5.

Fig. 5. View of the combat and landing compartment after removing the elements of the arming and disassembling the ball joints

In order to deprive the ballistic shield of key elements (such as fuel tanks, engine, etc.), the engine and gearbox were removed from the vehicle and the engine mounting base was cut; assembly base – fig 6.

Fig. 6. View of the driving compartment after disassembly of the engine, gearbox and removal of the clamping legs

Fig. 7. View of the landing compartment after dismantling the fuel tank and depriving the tanks of the landing craft

The main tank fuel tanks removed and the landing door stripped traits by removing the stoppers and welding the holes for the fixing screws - fig. 7.

In order to prevent getting inside the vehicle, all hatches and landing doors were welded - fig. 8.

Fig. 8. View of point welded hatches: mechanic - driver, commander, gunner and amphibious

In order to maintain the car's silhouette, a breakwater and a telescopic tube were left, but the mechanism of lifting the breakwater and the telescopic tube was welded, making it impossible to eject it. Vehicle was marked with a plate permanently fixed to the hull of the vehicle - fig. 9.


Fig. 9. A view of a BMP-1 vehicle without utility features, prepared for setting as a monument

# 4. CONCLUSIONS AND SUMMARY

The implementation of the requirements of the Regulation [1] provides future users with the possibility of having a vehicle that is completely safe and incapable of being used in accordance with the original design purpose.

The authors are aware of the destruction of military technical objects that are unacceptable to collectors, museums or parks of military technology. Because military actions are born in the minds of people, it is necessary to build awareness in the minds of not using for combat purposes the withdrawn equipment with military or police destination. Then such objects can be the basis for conducting live history lessons and showing various construction solutions, teaching exploitation and respect for historic equipment and engineering thought.

The authors propose an amendment to the Regulation to protect the goods of the military or police technique against physical destruction (scrapping / melting in the steelworks).

## 4.1. SUMMARY

1. The current legal status allows the passage of military or police vehicles to the area not covered by the concession system.
2. The acquisition of a vehicle for military or police purposes by a business entity without a concession or a natural person requires the deprivation of its many features or special equipment.
3. The utility features deprivation process is three-stage (1. Issue of the Technical Specification, 2. Deprivation of features, 3. Confirmation of deprivation of functional features).
4. It is possible to preserve the mobility of the vehicle and its original appearance, but without the possibility of swimming and long wading.
5. In the case of combat vehicles, it is often necessary to deprive them of features or to remove elements belonging to the scope of rights of various Units - it is necessary to carry out parallel processes.

### References

1. Rozporządzeniem Ministra Obrony Narodowej z 27 sierpnia 2015 r. w sprawie pozbawienia cech użytkowych broni innej niż broń palna i wyrobów o przeznaczeniu wojskowym lub policyjnym.
2. Rozporządzeniem Rady Ministrów z dnia 3 grudnia 2001 r. w sprawie rodzajów broni i amunicji oraz wykazu wyrobów i technologii o przeznaczeniu wojskowym lub policyjnym, na których wytwarzanie lub obrót jest wymagana koncesja.
3. Simiński P., Wojskowe Pojazdy Kołowe, Sulejówek - Warszawa, Belstudio, 2015.
4. Kończak J., Tendencje rozwojowe samochodów w wysokiej mobilności małej i średniej ładowności eksploatowanych w Wojsku Polskim, Prace naukowe Politechniki Warszawskiej. Transport, z. 112, 2016.

## POZBAWIANIE CECH UŻYTKOWYCH POJAZDÓW O PRZEZNACZENIU WOJSKOWYM LUB POLICYJNYM W ZAKRESIE TECHNIKI PANCERNEJ I SAMOCHODOWEJ

**Streszczenie:** Eksploatacja pojazdów na rynku cywilnym wymaga pozbawienie cech użytkowych pojazdów o przeznaczeniu wojskowym lub policyjnym. W ramach pracy przedstawiono algorytm działania w celu pozbawienia cech użytkowych pojazdów bojowych. W ramach pracy pokazano przykład analizy elementów budowy i wyposażenia pojazdu, które należy pozbawić cech użytkowych, zgodnie z wykazem zawartym w powyższych rozporządzeniach. Autorzy również przedstawili opis sposobu postępowania w celu pozbawienia cech użytkowych wskazanych elementów budowy lub wyposażenia wybranego pojazdu bojowego.

**Słowa kluczowe:** budowa i eksploatacja środków transportu