

POLISH-CZECH MODIFICATION OF THE DANA HOWITZER

The Polish military plans to carry out an upgrade of the wz. 77 Dana howitzers. This is to be done for the purpose of prolonging their time in the active service, for an indefinite period. A relevant proposal within that scope has been prepared by the Czech industry, whereas it has also been tailored to the requirements of the Polish military. The work, meanwhile, is to be carried out at the Polish facilities belonging to the PGZ Group.

152 mm Dana wheeled SpGH (wz. 77) is one of the older armament systems operated by the Polish military. Nonetheless, it enjoys a good reputation among the soldiers. Despite the fact that the system faces a number of effectiveness-related limitations, when it comes to the contemporary operational context, the system remains accurate, reliable and it is well known in Poland. And because all of the aforesaid factors, certain plans for modifying this platform have been made,

155 and 152 mm tracked or wheeled artillery systems operated around the world right now are much more beyond the cannon itself. These artillery systems also include a whole systemic framework, developed for the purpose of securing their operations or the crew training process. Furthermore, it is also important to have dedicated ammunition available for such systems, including special purpose rounds. A proper set of tactics needs to be defined, for using such rounds.

The systems based on wheeled platforms, in essence, are viewed as cheaper counterparts of the tracked systems. However, the economy was not the only factor taken into account here. There is a need to provide artillery support for the elements involved in operational activities within a specific area, where use of tracked systems would be made more difficult or simply cost ineffective. The wheeled systems will be useful where the military units also use wheeled platforms in their operations (motorized elements), or where the availability of maintenance is limited while time plays a relevant role in operational activities. Hardened roads, urbanized areas or areas where a lot of traffic occurs are the areas where wheeled howitzers exhibit a higher degree of maneuverability, while transportation, with the use of a variety of assets, is limited to a smaller extent.

Polish Dana SpGH

152.4 mm Dana howitzers operated in Poland are a system that has been developed over 40 years ago in former Czechoslovakia. Despite the long lifetime and lack of more significant upgrades (apart from adding the Topaz ZZKO fire control system, RRC9500 radio, Fonet comms system and Tallinn 5000 land navigation suite), Danas are considered to be one of the more successful artillery system designs. The aforesaid platform also still exhibits a certain potential, when it comes to possible upgrades.

The howitzer offers some protection for the crew (ballistic, IED and ABC), and comfort for the crew. Dana also features an autoloader and carries a major quantity of ammunition. Furthermore, the

system may be fired within 225 degrees angle, horizontally.

Dana is well known in the Polish military. A full-fledged support and training system is available alongside. It has seen combat use in Afghanistan and it was working together with Liwiec radars and FlyEye UAVs. The Polish military has made plans to modify the howitzer by extending the length of the barrel.

A few years back Czech Excalibur a.s. company offered a simple and cost-effective modifications of the Dana howitzer to all of the users. On the basis of that, Dana M1PL variant has been developed. This system is collaboratively offered to Poland by the Katowice-based EG POLSKA Sp. z o.o company and by the WZU S.A. facility from Grudziądz. '

The scope of modifications includes enhancement of the system's combat usability through enhancement of its specification and replacement of systems that are worn out or obsolete, or make the operation of the howitzer more difficult, as these are not freely available on the market. This pertains, above all, to the drivetrain, cabin design and the elements that have an impact on the time required to attain combat readiness, and, which follow, the gun's combat capabilities.

The offer makes an assumption, according to which the modifications would be carried out at the WZU facility in Grudziądz, as a part of the main overhaul. Following the modifications, Dana's lifetime may be extended for another 25 years.

Scope of the Proposed Modification

152.4 mm Dana howitzer consists of a specialized drivetrain (modified 4-axle Tatra-815 platform) and artillery portion of the system (rotating turret with the howitzer, autoloader and auxiliary mechanisms). When it comes to the artillery portion of the system, it was decided that the original cannon should stay, with barrel length of 5580 mm. For the purpose of enhancing the howitzer's ability to protect itself, it has been proposed that a modern smoke grenades launcher is installed onboard.

Meanwhile, there is a possibility of implementing a modification, in a form of an automated control system for the cannon, that would compute firing solutions on the basis of the targeting data delivered from the fire control system (with a digital ballistic computer, the data input may also be remote or manual). The modified system has been integrated with the Topaz solution and with the Polish means of communication.

Furthermore, two independent positioning blocks/inertial topographical navigation units have been coupled with the barrel axis. Ammunition selection and firing may be automatic. All of the above brings the modern datalinks together with modern command stations and other coupled C2 systems, whereas the individual solutions pertaining all of the above or selected elements may be selected by the user.

In the present iteration, the turret system is powered by the main engine. 7.5 kW APHU is also proposed, within the framework of modifications, for the purpose of facilitating silent operation. Not only does this reduce the thermal signature, as it also diminishes the cost of operation and enhances the durability of the drivetrain.

Another relevant modifications may be introduced in case of the drivetrain itself. T3-930-52M2 engine with a power output of 260 kW at 1800 RPM (replacing the T3-930.52 unit) is offered. It attains maximum torque of 1650 Nm at 1200-1400 RPM. Furthermore, two turbochargers the engine uses are to be replaced with a single Holset HX50 system with an intercooler. The scope of works also includes modification of the injection and intake systems and enhancement of the cooling and oil systems of

the engine. Gearbox would be replaced with a semi-automatic 10TS130 unit with the integrated NORGREN system. This would also entail replacement of the clutch - here we are referring to the MFZ-430 SACHS 430 mm clutch with a hydraulic control support system.

All of the above would make it possible to reach higher top speeds on hardened surfaces (up to 90 km/h) and to extend the range to more than 650 kilometres, assuming that the vehicle would spend 50% of the time offroad. The new drivetrain is going to be more economic in operation. The vehicle is also to be fitted with a new type of hydraulic pump: QHD2-150R. The drivetrain is also expected to feature new 14.00 R20 tyres with a CTIS solution included.

Using an entirely new cabin is also an important element of modifications. It is to enhance the crew ergonomics. Visually, application of large windowpanes is noticeable. That really enhances the situational awareness and safety. The glazed surface is expanded from 3 thousand square centimeters to more than 15 thousand square centimeters. Cabin protection level corresponds with level I of the STANAG 4569 norm.

The cabin may also feature a modern cockpit, ergonomic seats, hatches of a greater diameter, new 360 Degrees Observation System with cameras, new lighting (LED), internal thermal and acoustic insulation. The driver may have large rear view mirrors at his disposal.

Furthermore, as the cabin and its equipment are changed, BITE (Built-In Test Equipment) system is going to be embedded within it, making it possible to test the control units of the TEU cooling system, ETC gearbox, and the actuator of the injector pump. Furthermore, KFM 200 or COMPOSITE 170 air filtering/ventilation system is offered.

Change of the cabin itself will entail replacement of the steering system, with a new steering wheel (320 mm diameter instead of 470), new steering gearbox and an adjustable steering column.

Modified hydraulic system, with electronic control unit, will make it possible to shorten the external support extension period from 60 seconds to 20 seconds. The complete deployment would take 27 instead of 70 seconds. This means, in practical terms, that the time required to obtain combat readiness and the time required to leave the firing position is less than 30 seconds. This is important, when it comes to survivability of the howitzers. Thus, they would be less prone to fall victims to counterfire.

The modifications are also to concern the electric system of the vehicle, along with the pneumatic system. All of the above would also translate into lowered ride height (410 mm to 396 mm) and increased weight, up to 30 000 kg, with 60 rounds (previously the system weighed 29250 kg, with an identical number of rounds).

The whole proposed scope of modifications is a modular solution tailored to the specific user needs and some systems offered within the scope of the said modernization may also be replaced by other solutions, that are similar in design. The basic assumption is to make it possible to significantly extend the lifetime of the Polish military's artillery solution, greatly increasing its combat capacity.