

LOGISTIC SUPPORT OF „HOMAR” ROCKET SYSTEM

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Abstract

In paper was showed structure of “Homar” rocket system, its technical equipment and need of logistic support. In that support it is taken into account need of maintenance of systems on specified level of reliability. Together with logistic support it was stressed need of economic support within life cycle of rocket system.

Particular attention is taken to repair processes applicable in peace time and within operation. In the peace time it was taken into account service and repair abilities arising from structure like service and repair planned arising from parameters characteristic for given kind of equipment. Similar procedures of service and repair were showed for operation. During the peace time there are standard procedures and equipment but during operation there is necessity of using special repair workshops. It was proposed workshop of special repair on the wheeled chassis and vehicle of technical support designated for temporary repairs and evacuation of damaged equipment to point of gathering that equipment.

There were proposed specialists to conducting service and repair works in mentioned workshops. For transportation of weapon system (rockets) was proposed vehicle with ability of loading and unloading on itself and/or launch. In service and repair and loading/unloading processes were proposed proper systems of security of works. Great attention in work was dedicated to problems of logistic support of fire system (launch). It concern of commanding systems, executive systems and commanding superior and subordinate subsystems. Those commanding modules/vehicles which should be technically efficient are the subject of service and repair processes similarly to basic modules.

Separate problem of logistic support are subsystems enable gathering of additional information from reconnaissance UAVs and meteorology support. Logistic support of system was proposed taking into account life cycle of fire system module. In that process it was dedicated great attention to acquisition stage with using of tender as the main way to get lowest costs. In the maintenance stage in particular was stressed service and repair processes. At the end of maintaining stage of fire system there are proposed conditions concerned with disposal and/or recycling. That work emphasizes practical attitude from logistic support point of view in application aspect. It is also proposed that the problem of logistic support should be enclosed to general system of management of maintenance processes which encompass of land forces equipment.

Keywords: rocket system, infrastructure, logistic, technical support economical process

1. Introduction

Efficiency of „Homar” rocket system is determined by efficient functioning of logistic infrastructure. Infrastructure $Z(t)$ is defined as required processes $P(t)$ which are subject to service and repair treatment and needed metering equipment $A(t)$. Formal record of that support is showed by dependence:

$$Z(t) = \langle P(t), A(t) \rangle. \quad (1)$$

2. Technical support of system

Among the elements of structure, the most important are:

- Launch with launching container is showed on Fig. 1.

For the rocket system „Homar” type of chassis system should be chosen by tender on basis of WTT (Tactical and Technical Requirements) analysis for all vehicles produced e.g. in Jelcz taking into account operational requirements.

As a basis of rocket system „Homar” is considered selection of chassis of large load capacity and high mobility vehicle showed on Fig. 2.

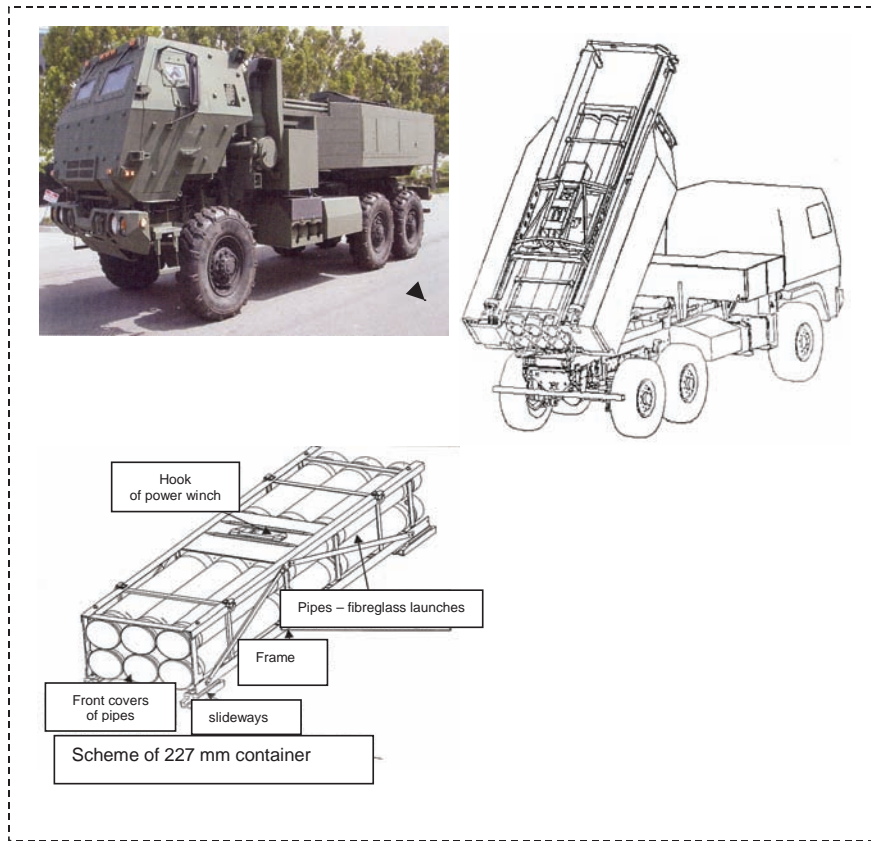


Fig. 1. Launch and launching container

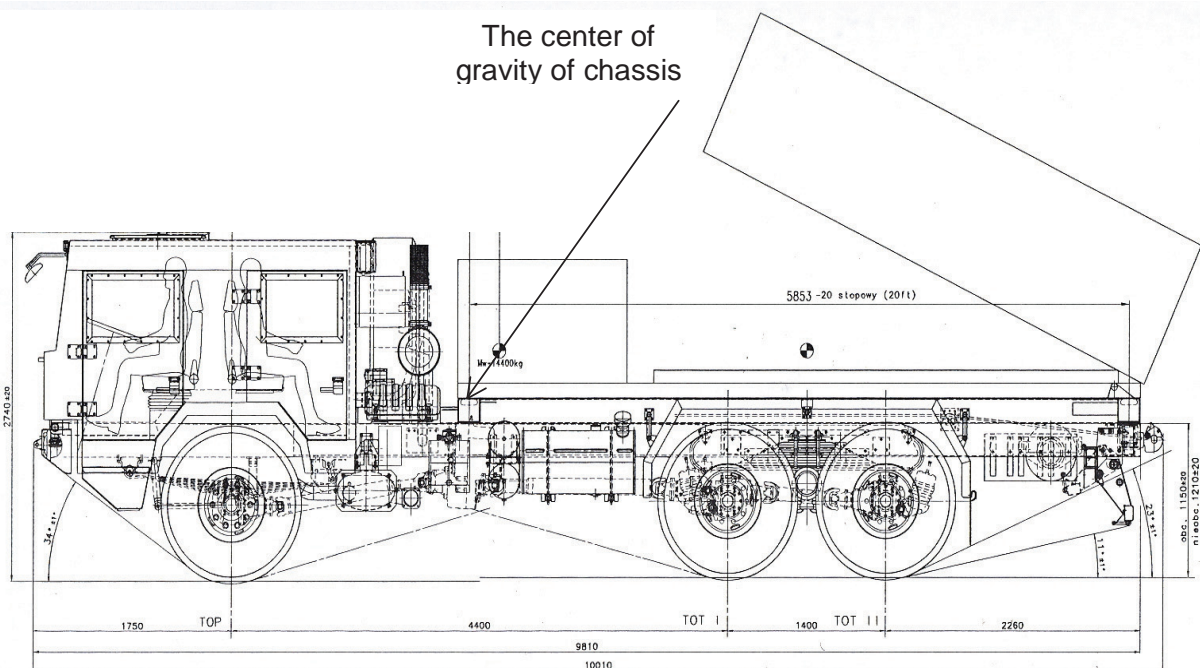


Fig. 2. Jelcz 662.D.35, chassis prepared as basis for launch “Homar”

3. Stages of functioning and logistic support of system

Rocket system „Homar” is subject to technical and economical processes within cycle showed on Fig. 3.

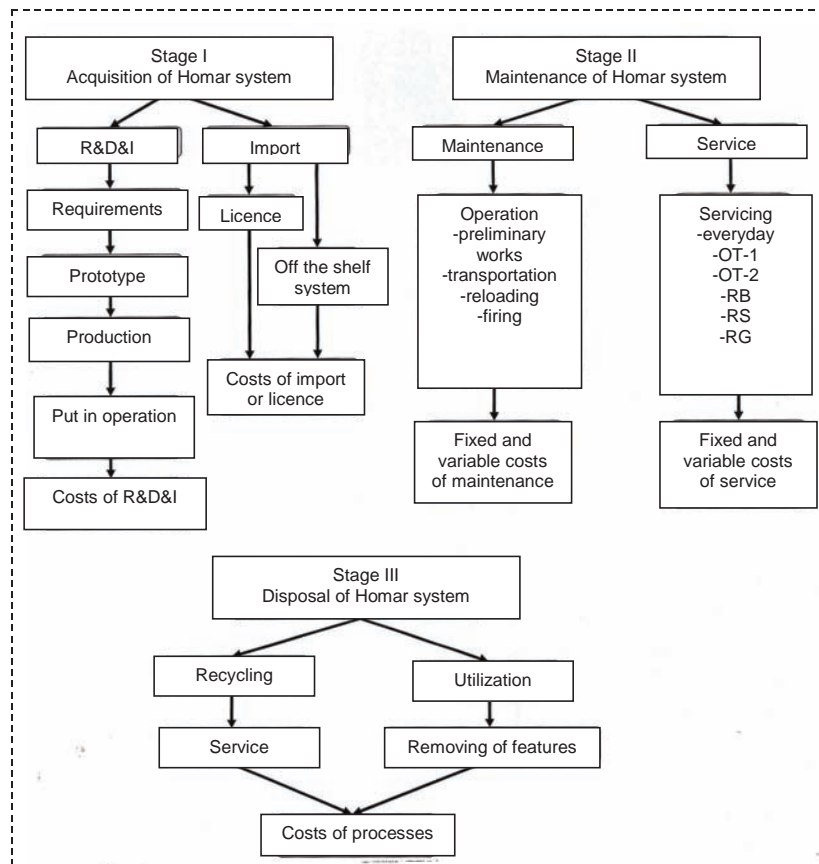


Fig. 3. Life cycle of „Homar” system

Acquisition process of „Homar” rocket system should be considered from logistic support point of view with taking into account life cycle costs in following stages: acquisition, maintenance and disposal.

3.1. Acquisition stage

On the acquisition stage there is required tendering form. Depending on economic conditions (financial) tendering form can concern limited and non limited tender. In both form of tender there is required elaborated by tender team algorithm of evaluation for needed parameters of system.

Assumption that in considered system user is interested in two parameters like price $C_s(t)$ and date of paying $T_p(t)$, thus evaluation those parameters is conducted follow algorithm:

Costs of system $K_s(t)$

$$K_s(t) = \frac{C_s(t)}{C_o(t)} * P_w(t) * P_i(t), \quad (2)$$

where:

$C_s(t)$ – price specified by organizer of tender, $C_o(t)$ – price offered by sellers, $P_w(t)$ – parameter of costs weight (points 1 - 100), $P_i(t)$ – parameter of relevance of costs (refilling $P_w(t)$).

Date of paying - $T_p(t)$

$$T_p(t) = \frac{T_o(t)}{T_u(t)} * T_w(t) * T_i(t), \quad (3)$$

where:

$To(t)$ – date offered by sellers, $Tu(t)$ – date specified by user, $Tw(t)$ – parameter of weight of date of delivery (points 1 - 100), $Ti(t)$ – parameter of relevance of date of paying (refilling $Tw(t)$).

It is worth to mention that dependences (2) and (3) are expressed in points. Taken into consideration offer, which gathers the greatest number of points may be taken into account in contract preparation. Example of offer calculations basis on dependences (2) and (3) is showed in Table 1.

Tab. 1. Example of offer calculations basis on dependences (2) and (3)

No.	Vendor	Evaluation of offers				Sum of points
		Price [zł]	Number of points	Date of paying [days]	Number of points	
1.	A	2.50	7680	14	933	8613
2.	B	2.48	7742	30	2000	9742
3.	C	2.44	7869	30	2000	9869
4.	D	2.40	8000	21	1400	9400
5.	E	2.56	7500	30	2000	9500

3.2. Maintenance stage

On the maintenance stage „Homar” rocket system should have abilities of keeping required technical condition in peace time and within operation.

Those processes should be subordinate:

- a) Launch with containers, including elements of Fire Control System (SKO) and rockets,
- b) Rockets caliber 227 mm and 607 mm,
- c) Commanding vehicles with special equipment,
- d) Logistic support equipment and additional vehicles.

Realization of process of service and repair should encompass:

- On the level of economic department (OG) with using permanent service and permanent special unit of technical service OT-1, OT-2.
- Current repair and average by means of repair units of division level.
- Main repair by special military repair industry.

In execution of mentioned processes there is predicted using of special vehicle of technical service showed on Fig. 4.

Special vehicle of technical service should enable:

- a) Identification of type and scope of damage.
- b) Conducting of measurement basic parameters in order to generate decision about place of repair.
- c) To extent possible (depend on kind of damage) repair of damage and checking of maintenance.
- d) At least should enable transport (towing) of damaged equipment to Point of Gathering Damaged Equipment (PZUS).

Taking into account points (a - d) special vehicle of technical service should manage:

- a) Basic documentation of service and repair of system equipment.
- b) Vehicle crew (driver, two specialists - mechanic, electronics engineer).
- c) Basic diagnosis and repair sets which enable evaluation of technical condition of respective subsystems of "Homar" system.
- d) Towing equipment (with rope enabled pulling out damaged equipment and towing equipment to Point of Gathering Damaged Equipment (PZUS). Endurance of towing rope - 20 tons).
- e) Protection of vehicle and towed equipment (7,62 mm kbkAK) and WKM 12.7 mm).
- f) Maintaining of outside communication.

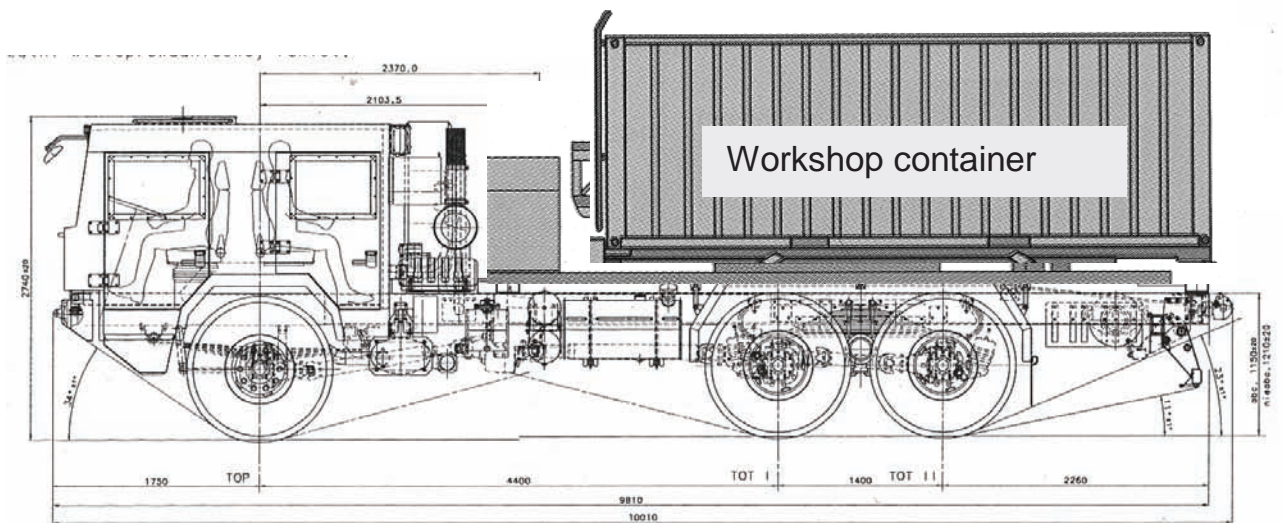


Fig. 4. Special vehicle of technical service and evacuation

Together with vehicle of technical service should cooperate vehicle of service and basic repair (WONB) of „Homar” system. General view of that vehicle is showed on Fig. 5.

Mentioned vehicle (Fig. 5.) should fulfil following tasks:

- a) Cooperate with vehicle of technical support (WPT) in area: estimation of kind of damage and execution of service and basic repairs of equipment. Its place of waiting should be at Point of Gathering Damaged Equipment (PZUS), but the same time should be able to serve in place of equipment damage. Similarly to vehicle of technical support WPT that vehicle should have proper crew (driver, three specialists - mechanic, two electronic engineers).
- b) Execution of service maintenance character and repair of operational damages treated as basic repairs.
- c) Using of self protection by 7.62 kbkAK and 12.7 mm WKM.
- d) Maintaining of outside communication (in fame of PZUS and more).

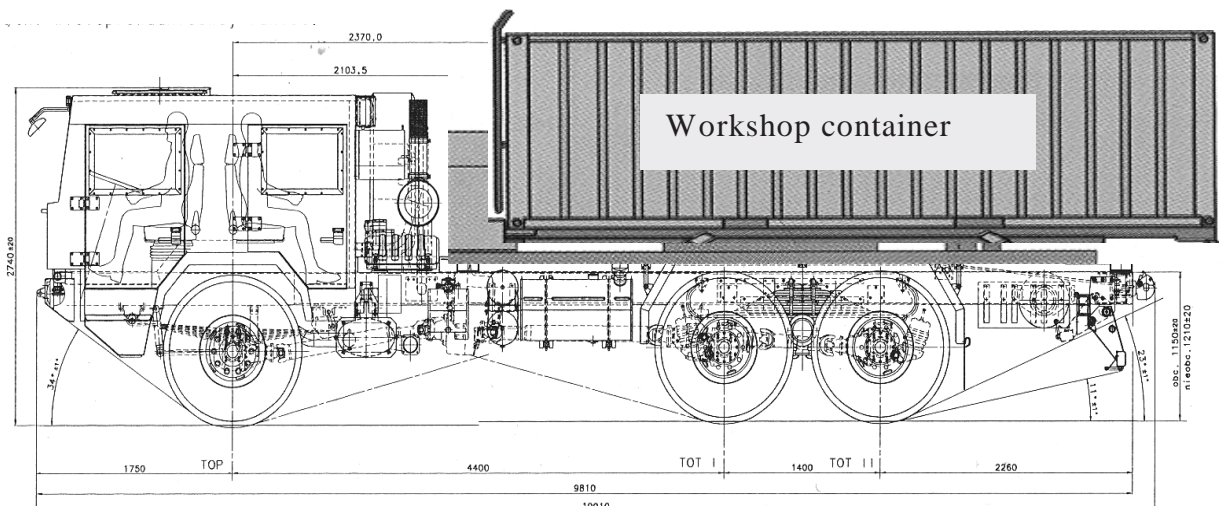


Fig. 5. Vehicle of service and basic repair

Independently of mentioned vehicles logistic support of „Homar” system should enable to carry rockets using rocket transport vehicles (WTR). General view of that kind of vehicle is showed on Fig. 6.

Mentioned vehicle (Fig. 6.) should fulfil following tasks:

- a) Reloading of rockets inside containers from the storage place to loading vehicle place and back,
- b) Reloading of rockets from vehicle to launches and back,
- c) Transportation of rockets from loading place to place of storage or area of launch standing,
- d) Transportation of two containers of rocket caliber 227 mm and one container of rocket caliber 607 mm,
- e) Protection of rocket transportation (kbaAK 7.62 mm and 12.7 mm WKM),
- f) Transportation and reloading of rockets carried by mechanic and driver and specialist of service vehicle.

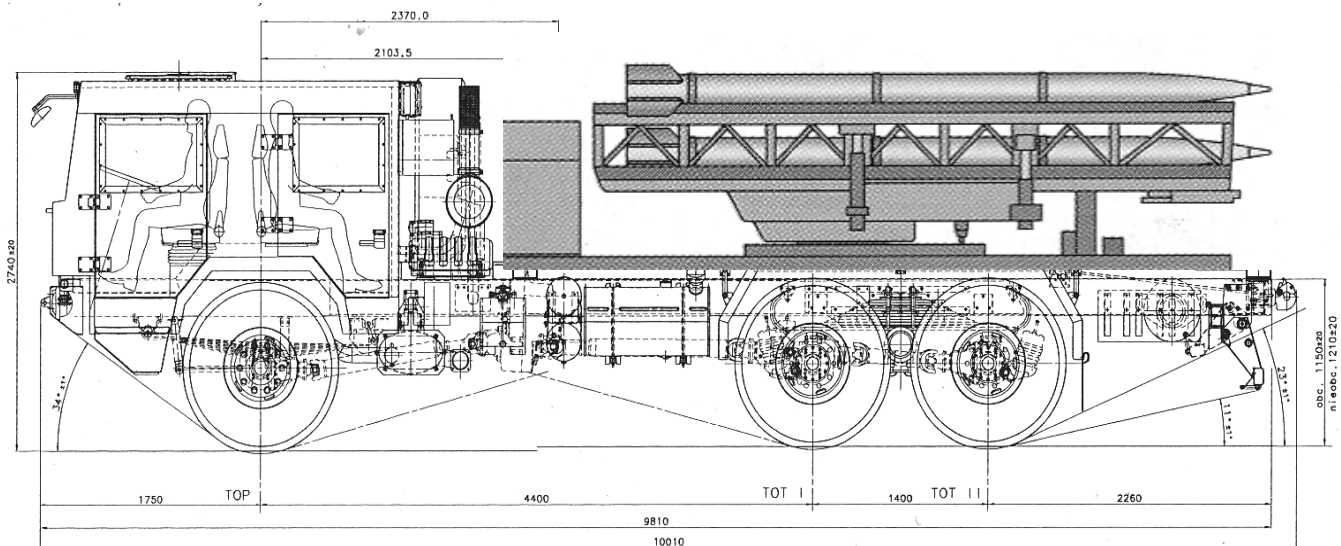


Fig. 6. Rocket transport vehicle

4. Conclusion

Logistic support of „Homar” rocket system should taking into consideration specified stages of life cycle. The main effort of logistic support should be focused on maintenance stage.

In mentioned above stage we can identify processes like: service and repair in repair shop as well as operational conditions. Execution of those activities should be supported by required equipment as well as experts in that area.

In the operational, in forced maintenance conditions it was predicted service and repair support like vehicle of technical support and repair vehicles and vehicles of ammunition transport.

Efficient functioning of logistic support on the respective stages in peace time and in operation should be supported by information system of maintenance management.

References

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