14 PREPARATION OF HANDLING EQUIPMENT FOR APPROVAL OF THE OFFICE OF TECHNICAL INSPECTION – CASE STUDY

14.1 Introduction

Development of modern technical systems related to their adaptation to growing needs of the users causes growth of complexity of their particular components. It certainly influences the requirement regarding qualification of the personnel who operates them and is related mainly with ensuring safe working conditions and safety of the surrounding environment [1].

This article presents the procedure of preparation of handling equipment for the approval by the inspector of the Office of Technical Inspection (UDT). This reference was published firstly in the Resolution of the Minister of Economy, Labour and Social Policy from October 29, 2003, regarding conditions of technical inspection in the area of exploitation of selected handling equipment, defining it as: "machines used for moving persons or loads in a limited range" [2].

14.2 Construction and functioning of a skiploader

A skiploader (fig. 14.1) is an equipment dedicated for loading, transportation and unloading containers with the use of chains, fixed on pivots welded to the both sides of the container. The carrier is the chassis of a lorry, usually of maximum load balancing between 12-18 tonnes. Due to use of biaxial chassis and short span, these machines offer sound manoeuvre capabilities and are able to drive through narrow passages, where introducing other loaders may be difficult.

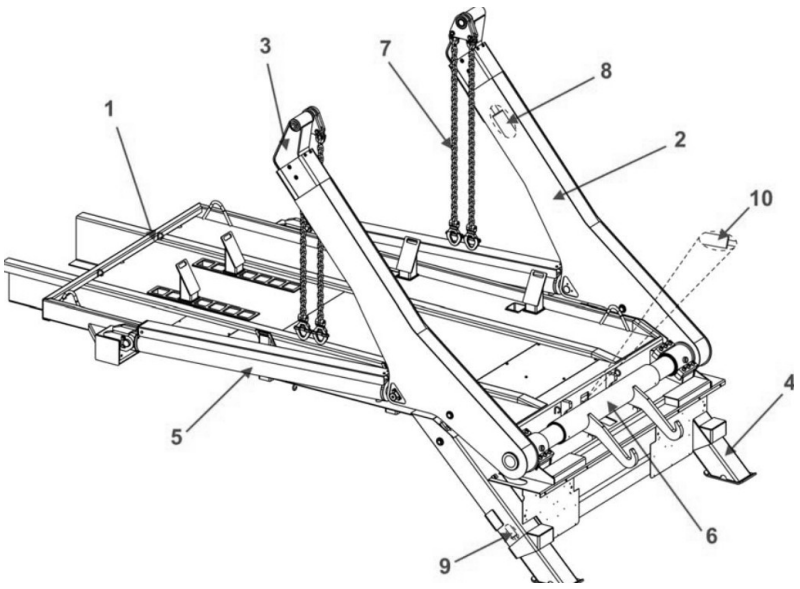


Fig. 14.1 Skiploader [3]:
1 – platform, 2 – tipping arm, 3 – telescopic boom, 4 – stabilizer, 5 – tipping cylinder 6 – tipping hook, 7 – chain, 8 – telescopic arm cylinder, 9 – stabilizer cylinder, 10 – pneumatic cylinder of tipping hook

Working movements of the skiploader (fig. 14.2) are made with the use of hydraulic and pneumatic systems. Hydraulic system is classically powered – by the power transmission output (PTO) [4], and pneumatically steered hook, which locks the container when dumping – from the pneumatic system of the chassis (responsible also for braking system).

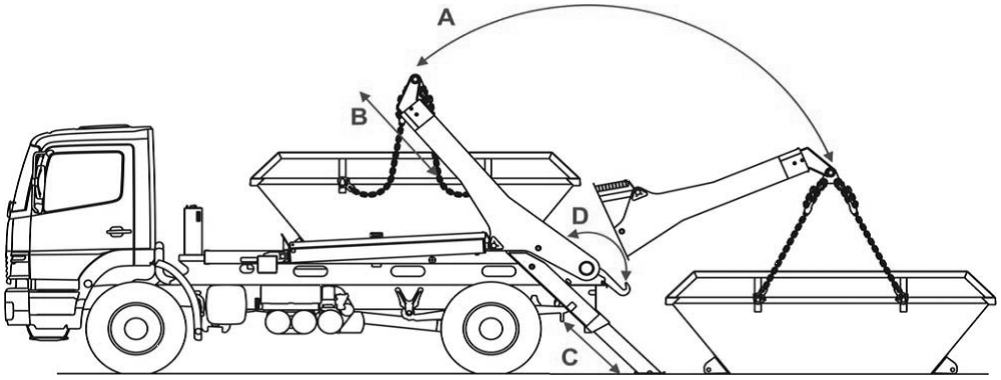


Fig. 14.2 Working movements of a skiploader [3]:
A – Tipping boom for loading and unloading the container,
B – Telescopic boom extending and retracting,
C – Stabilizers extending and retracting,
D – Tipping hook opening and closing (pneumatic movement)

As seen in fig. 14.1 and fig. 14.2, the machine is equipped with two hydraulic cylinders, steering the stabilizers (independently, what enables to balance the machine even on rough terrain), two synchronically controlled cylinders (from one section of the control valve), enabling it to rotate the arms with the container, and (optionally) two cylinders of telescopic arms, which – if embedded – are also usually independently controlled: one can slide to different length than the other.

Additionally, some devices are able to perform so called "accelerated rotation of the arms", which may be done only during loading and unloading of empty container, which is related to the necessity of extending the control valve with additional section.

Control valve of a skiploader usually consists of 5, 6 or 7 sections, if the device is equipped with all the described functions.

14.3 Description of a case

Below is described a process of preparation for the approval of the Office of Technical Inspection of a used skiploader, which was built individually by its user on a used truck chassis (fig. 14.3). Previously it was equipped with another machine.

The skiploader was manufactured in 1991, before entering into force the regulations of Machinery Directive [5]. Preparation for the UDT approval, apart from some reparations and restoring the Operation and Maintenance Manual, required also adapting it to necessary minimum safety requirements of the Machinery Directive [6, 7]. In this case, it was also necessary to embed a hydraulic system with emergency STOP button.

Fig. 14.3 General view of the skiploader described in the article (photograph by Author)

The owner did not possess any technical documentation, but the machine had two name plates (fig. 14.4).

Fig. 14.4 Name plates of the skiploader (photograph by Author)

In Polish legal system this activity is considered to be a modernisation of the device (hydraulic system is modernised) and requires submission of an appropriate application to UDT containing description of existing state and prospective state after modernisation. The following algorithm presented in [8] must be used (fig. 14.5).

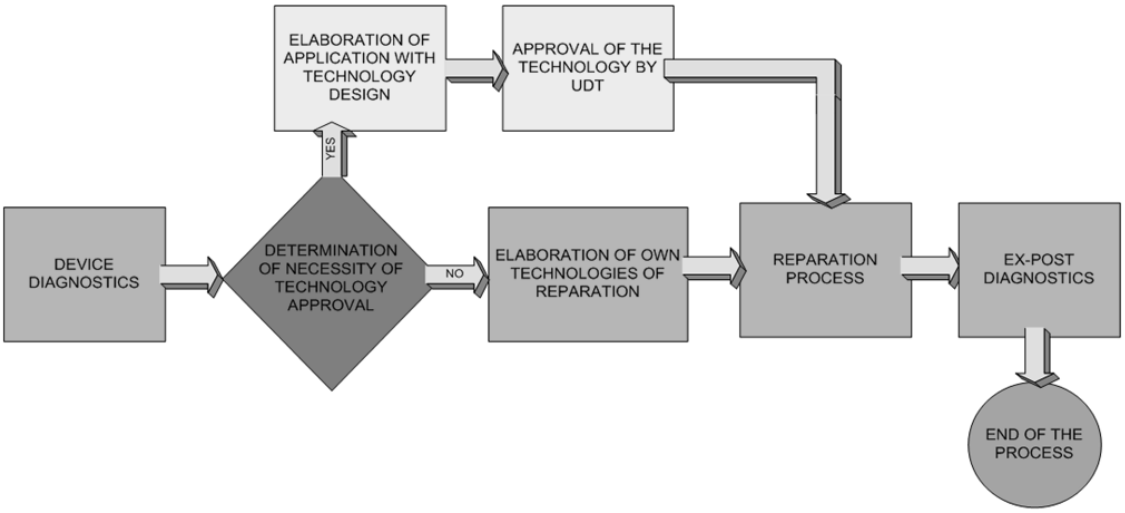
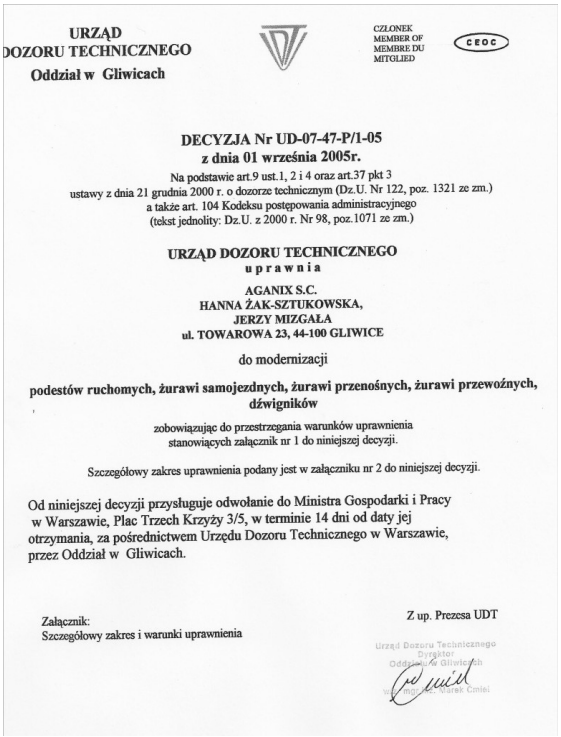


Fig. 14.5 Algorithm of activities of a company authorised for performing reparations and modernisations of handling equipment [8]

The application for performing modernisation may be submitted only by the enterprises, which are authorised by UDT (fig. 14.6).



URZĄD
DOZORU TECHNICZNEGO
Oddział w Gliwicach

CZŁONEK
MEMBER OF
MEMBRE DU
MITGLIED
CEOC

DECYZJA Nr UD-07-47-P/1-05
z dnia 01 września 2005r.

Na podstawie art.9 ust.1, 2 i 4 oraz art.37 pkt 3
ustawy z dnia 21 grudnia 2000 r. o dozorze technicznym (Dz.U. Nr 122, poz. 1321 ze zm.)
a także art. 104 Kodeksu postępowania administracyjnego
(tekst jednolity: Dz.U. z 2000 r. Nr 98, poz.1071 ze zm.)

URZĄD DOZORU TECHNICZNEGO
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do modernizacji

podestów ruchomych, żurawi samojezdnych, żurawi przenośnych, żurawi przewoźnych, dźwigników

zobowiązując do przestrzegania warunków uprawnienia
stanowiących załącznik nr 1 do niniejszej decyzji.

Szczegółowy zakres uprawnienia podany jest w załączniku nr 2 do niniejszej decyzji.

Od niniejszej decyzji przysługuje odwołanie do Ministra Gospodarki i Pracy
w Warszawie, Plac Trzech Krzyży 3/5, w terminie 14 dni od daty jej
otrzymania, za pośrednictwem Urzędu Dozoru Technicznego w Warszawie,
przez Oddział w Gliwicach.

Załącznik:
Szczegółowy zakres i warunki uprawnienia

Z up. Prezesa UDT

Fig. 14.6 UDT Administrative decision, authorising the enterprise to perform modernisations of some devices subject to technical inspection

The fundamental mistake of the owner was individual embedding of the device, since – according to the law – he was not allowed to do so. It is interesting, that in case of new devices, no authorisation is required.

The scope of works – apart from elaboration of the aforementioned application – comprised:

- Identification of the manufacturer (as the device had two name plates),

- Elaboration of Maintenance and Operation Manual,
- Performing other reparations which were not accomplished by the owner during embedding of the device.

It was determined, that the skiploader was manufactured by Dutch company NOOTEBOOM (the name plate on the right-hand side), on behalf of Swedish MULTILIFT company (the name plate on the left-hand side) (fig. 14.4).

On ending their cooperation technical documentation was forwarded to another Dutch company, TECHNAMICS B.V. This enterprise, after acquisition by HYVA, keeps manufacturing these machines under the brand name HYVALIFT. The access to technical documentation was granted. It was not subject to significant alterations and could be used directly today as well. One alteration, regarding introduction of emergency STOP button, was added to the hydraulic scheme of device.

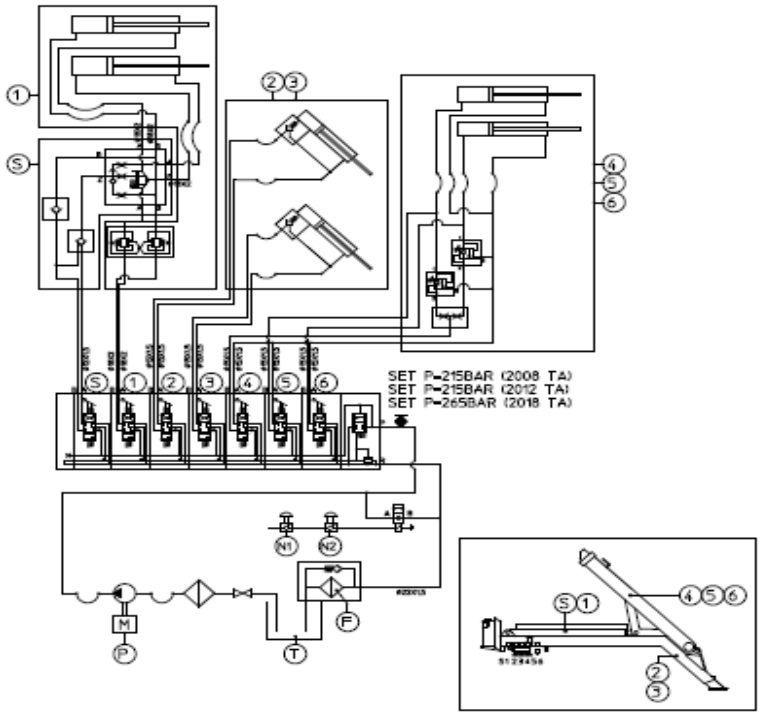

Fig. 14.7 Hydraulic scheme of a skiploader [9]:
1 – system of arm rotation cylinders with a section
of the control valve controlling arms' rotation,
2, 3 – stabilizer cylinders and responding of them sections of the control valve,
4, 5, 6 – telescopic arm cylinders and responding of them sections of control valve,
S – fast rotation of arms valve with hydraulic lock

Another reparations, i.e.:

- Replacement of sealings in the cylinders,
- Replacement of pivots and sliding bushes,

- Embedding pneumatic hook rotation control valve did not require any additional agreements to the technology, and were performered by the repairing company, basing on its own technology and experience.

During the in-situ research it was determined, that there was a damage in the control valve section, responsible for accelerated movement of the arms, when loading empty container (position S, fig. 14.7). Internal leakage prevented from hermetic closing the lock under load, causing slow but continuous descending of the container.

In order to lower the reparation costs it was decided to unmount the valve system "S", replacing it with ordinary hydraulic lock. This enabled to lock the loaded container in any position, resigning this way from ability to perform accelerated movements with empty container. Emergency stop button was embedded by the levers of the control valve, in a way that the operator had free and comfortable access to it anytime (fig. 14.8).

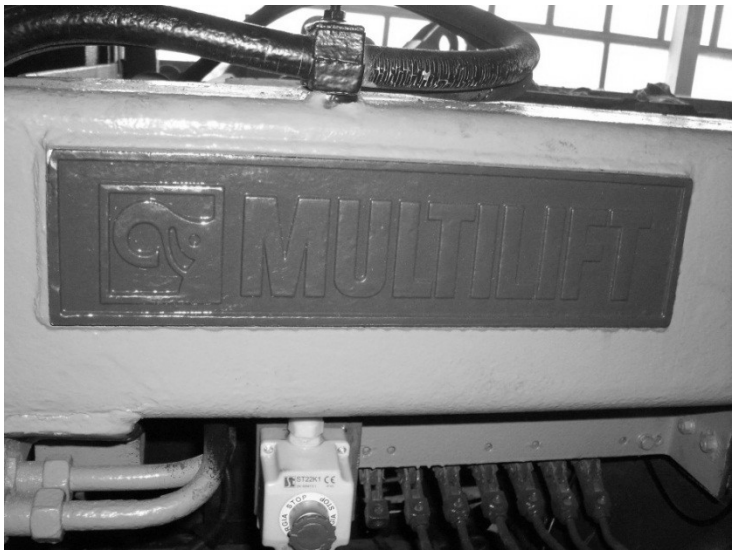

Fig. 14.8 View of the levers of the control valve with STOP button visible (photograph by Author)

14.4 Conclusions

From the describe above case can be derived the conclusions, of which the author would like to emphasize the following.

Firstly, knowledge of legal documents and consequences for the owners or operators of handling equipment is largely insufficient. It is hard to determine reasons of this state. On the one hand the regulations and legal acts are easily accessible, for example due to their publication on the UDT website. On the other hand the reason for this is widespread self-embedding of the devices are costs – both related to technical documentation, as well as of bringing the machine to approval of UDT. Endeavours to virtual savings ("I'll do it myself, and later the things will be managed somehow") are ubiquitous, particularly in the sector of small and medium-sized enterprises.

Secondly, the regulations are more and more difficult to be omitted. Diagnostic stations hardly ever prolong the registration certificates without showing valid UDT approval, but still this phenomenon happens. The Police and Road Transport Inspection Office underline the necessity of having valid documents, but – referring to the author's experience – their activities are often limited only to checking the maximum load of the vehicle and their technical state, without inspecting the embedded machines. This influences safety of both their operators, but also of other users of roads.

Finally, there is a serious inconsequence of the regulations, including the ones resulting from the EU directives. Anyone can install a new handling equipment on a new chassis, without having any authorisations or certificates. On their own responsibility they can also mark it with the CE sign. From the Machinery Directive one can derive that such an installation is considered as manufacturing and the responsibility for product safety and optional CE signing is held by the manufacturer, that means – installer of the equipment.

The author does not know any case, that someone individually performed such installation. New machines are manufactured by specialised companies. In the area of used machines, which are illegal in the perspective of regulation, this activities are common and do not seem to have a lowering tendency.

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[6] Dyrektywa UE 2009/104/WE (poprzednio: 89/655/EWG) "Sprzęt roboczy (narzędzia pracy)".
[7] Rozporządzenie ministra gospodarki z dnia 30 października 2002 r. „W sprawie minimalnych wymagań dotyczących bezpieczeństwa i higieny pracy w zakresie użytkowania maszyn przez pracowników podczas pracy".
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