AIR CARGO HANDLING PROCESS

ABSTRACT

Air cargo business is a very important business for the global air transport market. This means that air cargo handling process is important for any airport or cargo handling agent who provides cargo handling services. This also means competent cargo staff, procedures, cargo information system, developed infrastructure and process management. The objective of research presented in this paper is air cargo handling process and its complex structure. Using scientific methods of cognition, the author explores the structure of air cargo handling process and causality of its structure elements. The result of this research is that process approach to air cargo handling services can improve these services in general and allow providing of complex air cargo handling services and fulfilment of customer requirements. In these circumstances the process approach makes contribution to competitiveness.

KEY WORDS

air cargo; handling process; process approach; handling services; air cargo handling process;

1. INTRODUCTION

As per the IATA (International Air Transport Association) data, 52 million tons of air cargo was transported in 2016 in the world. According to the mass, it is less than 1% of the world trade, however, it presents more than 35% of the world trade value, accounting for the value of around 6.8 US$ billion daily. Air cargo transport realizes 9% of total aircraft operators’ income, being twice the income resulting from first class passengers. Directly and indirectly, air cargo business provides around 32 million of work places around the word.

Air Cargo Handling Process at airports may be rendered by airports themselves, as the case was for instance at Zagreb Airport before it was taken over by the Concessionaire, or by a daughter company founded solely for provisions of airport ground handling services, the case of Zagreb Airport after takeover by the Concessionaire. Pursuant to the Ordinance on Provision of Ground Handling Services (Official Gazette 39/10), when cargo traffic in an airport reaches 50,000 ton annually and exceeds it, the market of these service should be liberalized so that other service providers are enabled to provide services of air cargo handling process under the conditions of the Ordinance and within market competition. In Croatia, but also in the surrounding countries (Slovenia, Bosnia and Herzegovina, Serbia, Macedonia, Kosovo, Montenegro) there are no airports with annual traffic of 50,000 t and more [1].

When it comes to air cargo transport, competition among airports is very strong, especially in relation to intercontinental traffic. Airports winning in this market competition are the ones having: competent staff, appropriate cargo infrastructure, developed route network, good traffic links of the airport with the railway, technology implementing latest developments, quality based on ISO standards, IATA projects such as Cargo 2000 (C2K) management system [2], e-freight technology [3], iQ and the like. Cargo iQ is an IATA interest group with the mission of creating and implementing quality standards for the worldwide air cargo industry. For that reason every handling agent, or air cargo handling service provider, makes efforts to improve quality of the process in all elements, in order to be competitive in the market.
2. AIR CARGO HANDLING PROCESS

Air Cargo Handling Process belongs to core business processes regardless if the airport itself conducts it or it is managed by a specialized organization in the liberalized market conditions.

2.1 Definition of the Process

The word process originates from Latin word *processus*, meaning ... flow, the way in which something becomes or is, development, procedure... [4]. Process is set of interrelated or interacting activities that use inputs to deliver an intended result [5]. Further on, process means transforming or reshaping input values to output ones, however, not in any way but within the framework of set rules and controls and with application of defined mechanisms, or resources, as shown in Figure 1.

![Figure 1 – Context diagram of Air Cargo Handling Process](image)

Process input is always a requirement of customer/user, regardless in which form it is presented (contract, specification, order, etc.). Process output is a product or service with characteristics (quality) that fulfil the customer/user requirements defined at the process input. Rules and controls that must be observed when transforming inputs into outputs can be: international standards, laws and other regulations, contracts, specifications, procedures, work instructions, methodologies and the like. Mechanisms or resources needed for process running can be: competent staff, infrastructure, equipment, financial means, work environment, hardware, software, partners, etc.

2.2 Hierarchy of Air Cargo Handling Process

Any process has its hierarchy, as shown in Figure 2. The Air Cargo Handling Process is a very complex process for several reasons:

- cargo handling activities at arrival (receipt) and departure (dispatch) run simultaneously, so that this process has two sub-processes: 1) air cargo handling sub-process – arrivals and 2) air cargo handling sub-process – departures;
- airside and landside activities run simultaneously;
- physical and documentary receipt and dispatch activities (handling) run simultaneously.
Each of the listed sub-processes encompasses several process steps consisting of numerous activities to be carried out to complete all actions within that process step. In this way prerequisites for transition from one process step to the next are created, in such a way that at least one output from the previous process step is also the input to the following process step, as shown in Figures 3, 4, 5. It is not possible to start activities in a process step unless all activities within the previous process step have been completed.

What activities from individual process steps is defined by written procedures representing documented basis of each process step. Procedures define and describe each activity, according to the sequence of execution. Control points are also defined at which something is measured, evaluated, controlled, or at which it is decided if the activity has been performed in compliance with the requirements or not. If the answer is YES, the process may continue, if the answer is NO, certain activities are repeated until the requested quality level has been achieved. Control points serve to manage the process, so that it does not happen that the final results, in this case the service, does not comply with user requirements. In such case, it would be too late for any improvement, and only a conclusion could be made that a non-compliant service has been provided, with all consequences such as non-quality costs, loss of reputation, fall of competitiveness, etc.

A procedure clearly specifies the responsibility for carrying out and the responsibility for control for each activity by indicating a work position, not a name, because work positions are relatively constant, and the specific responsible person can change in line with work allocation.

How many written procedures are needed for documenting a process step depends on complexity of the process, or the process step in question. However, at least one written procedure should be used to define the flow of activities within a process step.

### 2.3 Air Cargo Handling Process Decomposition

When talking about the Air Cargo Handling Process, the input is the requirement of the cargo owner or its agent, to carry out the air cargo transport from point A to point B, in a safe way and in good time. The process output should be completion of the air transport service from point A to point B, in accordance with the requirements set by the cargo owner or its agent. Rules and controls for running
the process are: international documents regulating air traffic and aircraft cargo transport, customs regulations, security regulations, special regulations for individual cargo types such as for instance the IATA – Dangerous Goods Regulation (DGR) for transport of hazardous substances, cargo handling contracts with aircraft operators, contracts with customers and their agents or forwarders, national laws and regulations, internal quality procedures, work instructions, methodologies, etc. Mechanisms or resources needed for conducting this process can be: competent workers possessing all required licenses for handling certain cargo types or managing special equipment, infrastructure including storage area with all necessary types of special sections (cold chambers, security vaults, storage rooms under temperature regime, area for DGR goods, human remains storage (HUM), live animals storage (Live Animals Regulation – LAR), special equipment (forklifts, weighing devices, pallets, dollies, thermometers, refrigerators, security screening equipment, etc.

Figure 3 – Diagram of Air Cargo Handling Process decomposition

Figure 3 shows a diagram of Air Cargo Handling Process decomposition. Process input is the customer requirement. In the first process step Requirement analysis (A-0.1) the customer requirements are analysed, or the capability of the process to meet these requirements. If the analysis shows that the process is not capable to meet these requirements for any reason, the requirement is rejected and the customer officially informed about this. If the requirement can be fulfilled, the next process step Resources and organization planning (A-0.2) starts. In this process step resources for carrying out the Air Cargo Handling Process in compliance with the customer requirements are planned. The work is organized so that the process can run without setbacks. After all activities in this process step have been completed, it is possible to proceed to the next process step, Preparation of cargo and documents (A-0.3). Preparations for physical handling and documents handling is carried out within this process step. Preparation for physical handling includes preparing necessary equipment units and storage positions for later physical manipulation of the cargo, forming ULD (Unit Load Devices), loading onto dollies and the like. Preparation of documentary handling includes planning of documentation and issuance of documents accompanying the shipment, such as for instance Cargo Manifest, Air Waybill, UCD (Unified Customs Declaration) and some other documents accompanying individual types of shipment or cargo (DGR, perishable goods, live animals, etc.). Upon physical and
documentary preparation of the cargo, the process step **Cargo handling process (A-0.4)** follows. Air cargo handling is carried out in this process step, meaning physical and documentary handling, running simultaneously on the airside and landside. This process step is therefore complex and needs to be further decomposed (marked with a slanted line in the upper left corner of the graph in Figure 3).

### 2.3.1 Air Cargo Handling Sub-process (Arrivals) – Airside

On the airside, upon aircraft (AC) arrival, the **Unloading cargo from aircraft (A-4.1.1)**, as shown in Figure 4, is carried out. Shipments, either in containers, on pallets, in bags, in cages or loose, are unloaded onto dollies located beside the AC.

![Figure 4 – Further decomposition – air cargo handling sub-process (arrivals) – airside](image)

After all shipments have been unloaded and loaded on the dollies, and after the AC crew has taken over the accompanying documents, cargo is transported to the cargo warehouse by special tractors. The transport is performed on the base of appropriate procedures. The transport enters the cargo warehouse.

### 2.3.2 Air Cargo Handling Sub-process (Arrivals - Departures) – Landside

On the landside in the cargo warehouse and at the forwarder’s, handling activities (arrivals) and handling activities (departures) run in parallel, as shown in Figure 5. Upon arrival of transport with shipments from the AC in the cargo warehouse, activities contained in the **Breakdown ULD’s (A-0.4.2.1)** process step are carried out. It is determined which shipments are issued to end users or their forwarders at the concrete airport, and which continue their way further on, to other destinations. After that, activities within the second process step **Incoming checks and administration (A-0.4.2.2)** begin. Entry control of received shipments is carried out, or alignment with the accompanying documentation. It is established if there are damaged deliveries, packaging or the like. If such shipments are found a Record on Defective Cargo (complaint) is made. The next process step follows, named **Sorting and documentation (A-0.4.2.3)**. In this process step activities related to arrivals and departures run simultaneously. Shipments having the relevant airport as the ultimate destination are placed on storage positions or immediately taken out from the warehouse and issued to end users or their forwarders. At the same time, in the same warehouse and at the same forwarders, sorting and preparation of documents related to departure are carried out. Preparation and **Outgoing checks and administration (A-0.4.2.4)** are completed. Shipments are checked, possible damages determined, and issuance of all required documents to accompany the shipments confirmed. Customs formalities are performed if applicable.
This is followed by the process step Security check (A-0.4.2.5). The security check of shipments is carried out in compliance with procedures prescribed by international organizations regulating air traffic security, but also with procedures adopted by individual countries or airports, depending on risk assessment. Upon the security check activities of the Build ULD’s (A-0.4.2.6) process step are started, and in this step unit load devices are formed, weighing and loading onto dollies carried out to prepare the cargo for transport to the AC.

2.3.3 Air Cargo Handling Sub-process (Departure) – Airside

After the transport is prepared, activities from the process step Transportation to aircraft (A-0.4.3.1) take place. As in case of arrival, transport is performed according to a special procedure. Loading cargo into AC is also carried out in accordance with a special procedure. Loading is supervised by responsible persons all the time. When loading is completed, the documentation accompanying the cargo is submitted to the AC crew.

Upon successful completion of this process step, it is possible to go on to the final process step, as shown in Figure 3, Final activities (A-0.5). Activities such as document distribution, report making,
communication among process participants, records, preparing invoices for the provided services, etc. are conducted within this process step. The process output is air cargo handling service, with its characteristics or quality fulfilling customer requirements received as process inputs.

3. TYPES OF CARGO AND DOCUMENTATION

It is considered that air transport is used for higher value goods that withstand the transport price, generally higher for air transport than for other modes of transport. This is mostly true, as already explained in the introduction of this paper.

3.1 Air Cargo Types

In exceptional situations, due to various circumstances, such as: delivery time, contract penalties, urgency or other contract obligations, goods that would in usual circumstances be transported in another way (truck, ship, railway) are also transported by AC. For this reason, various goods are transported by air, as for instance: IT components, other technical goods, perishable goods (food and agricultural products); weapons, explosives, dangerous goods, but also goods such as: construction joinery, metal elements and assemblies, live animals, animals for zoos, transformers, cars, pesticides, machines and devices, human remains, value shipments (gold, money, noble metals), human organs for transplantation, etc. For individual types of cargo special rooms are provided in warehouses, and the air cargo handling process for such types of goods runs under special procedures. Equally, workers manipulating certain cargo types, either at the forwarder’s or in the organization providing handling services, should be trained and licensed for manipulation of that cargo type.

3.2 Cargo Documentation

Each cargo shipment in air traffic is accompanied by appropriate documents. Cargo Manifest and Air Waybill are documents accompanying every type of shipment. These are unified forms applied in the whole world, containing information on the shipment and other data related to participants in the process, such as data relating to the point of departure and destination. Beside the mentioned ones, other documents can be issued if needed, to accompany a shipment: Mail Manifest (for mail), UCD – Unified Customs Declaration, Record on Defective Cargo, NOTOC – Notification to Captain (Special Load), Unit Load Device - ULD, Request for sanitary examination of imported shipment, DGR – Dangerous Goods Checklist, Live Animals Acceptance Checklist, etc.

4. CONCLUSION

Air Cargo Handling Process is a core business process at airports regardless if they provide ground handling services themselves or engage special cargo handling companies. This is a complex process due to activities running simultaneously: in arrival and departure, in airside and landside, physical handling and documentary handling. This process forms integral part of the process structure of the organization managing it, the structure consisting of: management processes, core business processes, support processes and measurement, analysis and improvement processes. Certain assumptions must be fulfilled for managing this process in the required manner: 1) name, model, document and implement business processes in the management system; 2) establish process oriented organization; 3) have competent staff; 4) be integrated in the global cargo business network since it is a global air traffic activity. The objective is to fulfil customer requirements, meaning that the objective is service quality as the process output. The reason for this is that today there is competition among airports and cargo handling companies and the selection criterion is primarily their quality. The position of a handling company in the global market depends on this. The task of the air cargo handling process management is therefore to reach the level of management that guarantees process reliability and fulfilment of customer requirements in all elements of quality (safety, punctuality, conscientiousness,
courtesy, transparency, innovation). Meeting the listed requirements contributes to increase of competitiveness. By establishing and implementing process approach it is possible to perform the most complex cargo handling even in situations when it looks impossible at first sight.

REFERENCES