Universidade do Porto
Faculdade de Engenharia
FEUP

Procter & Gamble

Western Europe Central Outbound Logistics

Internship Report:

Pallet Labelling and ASN – Advanced Shipping Notification

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Licenciatura em Gestão e Engenharia Industrial
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To my manager, Daniela Lavinio, a special regard for all the trust and friendship with which she guided me in this internship. She has been a most valuable teacher and will always be a role model.

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To all the people that cooperated with me during my internship, for all the patience and priceless knowledge they shared with me.

SUMMARY

The internship at Procter & Gamble, Central Outbound Logistics Group, hereby presented, covered two major projects as goals: Pallet Labelling and ASN – Advanced Shipping Notification.

The Pallet Labelling Project refers to the creation and application of the standard logistics label to all finished product pallets produced in Procter & Gamble, according to the international standards by UCC/EAN.
This internship covered the final phase of implementation of the capability of labelling in Western European sites, as well as the necessary consulting support to the other P&G functions, in what concerns labels and labelling.

ASN- Advanced Shipping Notification is a specific EDI (Electronic Data Interchange) message sent to the customer stating the description of the shipments being dispatched. The scope of this internship was the documentation of the work processes in the DC's and data gathering on the ASN situation in Western Europe, both from the P&G systems and warehouses standpoints and from the customers' requests.
The objective was to fully understand P&G capability to create and send ASN messages and the customers' capabilities, requests and plans in this area.

The objectives set concerning both projects were fully met.
Thanks to the work developed during this internship all Western European Sites had launched the Pallet labelling project, or were in the final phases of implementation.
As for ASN, the situation was fully clarified, which allowed the creation of a rollout plan in order to meet the business needs.

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CHAPTER 1: INTRODUCTION

This report describes the internship developed within Procter & Gamble, Western Europe Central Outbound Logistics Group.
The internship corresponds to the last curricular semester of the *Licenciatura em Gestão e Engenharia Industrial* by the Engineering Faculty of the University of Porto, and took place the period between September 18th, 2000 and February 28th, 2001. It was held in P&G headquarters in Rome, Italy.

The scope of this internship covered two major projects: Pallet Labelling and ASN-Advanced Shipping Notification.[1]

The next chapter is dedicated to introduce Procter & Gamble, its history and structure, as well as the department in which the internship was developed – Central Outbound Logistics Group.

Chapter 3 consists of the Pallet Labelling project, starting with an introduction to the project in general and following with a description of the work developed.

In chapter 4 the other major project undergone is described. The chapter begins with a general overview of ASN and continues with the description of the scope of this internship regarding this particular project.

Finally, in the last chapter, the results of the work developed are analysed. There is also room for a critical analysis of these results and a personal approach on the internship.

[1] Due to company confidentiality the documents produced cannot be included in this report. For the same reason, most of the findings during the development of the projects won't be described in this text

CHAPTER 2: PROCTER & GAMBLE

2.1: THE COMPANY

Procter & Gamble (P&G) was founded in1837 in Cincinnati, Ohio, USA. With innovative strategy and an intimate understanding of consumer needs, this small family-run concern was to become one of the world's most important consumer-goods businesses. By 1999, P&G was distributing more than 300 brands to more than five billion consumers in 140 different countries, generating total sales of more than 38 billion dollars and providing jobs to some 110000 employees. It had become the leader in numerous market sectors: from detergents to household cleaning products, from personal healthcare to pharmaceutical products, from paper manufacture to food products.

Figure 1 – Ivory

Figure 2 - Crisco

Since its founding, the company's continued determination to launch new products – and to improve the existing ones – had been the real key to its success. In fact, by 1999 the company was investing more than two billion dollars annually in research and development – 4.5% of total sales. Some 8000 researchers were at work in the company's 22 research centres throughout the world, and their efforts had led to more than 3800 new patents every year.

Figure 3 - Tide

It was during the 1980's that P&G became a truly global company, strengthening its presence in existing businesses, investing in new industries, and expanding its presence internationally. To speed up this process, the company had followed an external growth strategy, making a series of acquisitions. The acquisition of Norwich Eaton Pharmaceuticals and the takeover of Richardson-Vicks, for example, had helped P&G consolidate its position in the pharmaceutical industry.

Figure 4 - Vicks

P&G continued to expand throughout the 1990's, acquiring other companies such as Noxell, Max Factor and Ellen Betrix, and consequently fortifying its position in the household cleaning and personal healthcare product sectors. In the process, the company's international (out of the USA) activities came to account for almost half of total sales.

Figure 5 – Max Factor

P&G first started up business in Europe in 1924, with the acquisition of Thomas Hedley in Great Britain. By the eve of the year 2000, it had become one of Europe's top industrial groups, with total sales amounting to more than 12 billion Euros. By 1999, the European market accounted for some 30% of P&G's total sales, with more than 28000 employees in 35 manufacturing plants and 6 research and planning centres, and more than 100 brands in 31 European countries. By taking advantage of the cumulative expertise of its numerous local affiliates, P&G had found a way to successfully adapt global policies to the needs of specific markets.

Figure 6 – Some of P&G most famous products

2.2: THE ORGANIZATION – CENTRAL OUTBOUND LOGISTICS GROUP

The assignment of this internship was held within the Western Europe Central Outbound Logistics Group, under the direct management of Daniela Lavinio.

Outbound Logistics Central Group provides the other P&G functions with logistics expertise and consultant but, most importantly, leads European programs for the finished product logistics costs optimisation for all product categories and all Distribution centres in Western Europe.

Among the key responsibilities of the group there is the coordination and implementation of logistics projects at a European scale (pallet labelling being an example) and the definition of the European design of the distribution set up in Western Europe in the coming 2-5 years. The Group also studies plans to improve the P&G Customer Service level and the Supply Chain efficiency through logistics projects held in partnership with strategic customers.

CHAPTER 3: PALLET LABELLING PROJECT

3.1: INTRODUCTION

Background and motivation

Today, consumers are confronted with product identification on a daily basis, usually without even noticing. The simplest example of all is the bar code scanner used at a retail point of sale identifying the product and assigning the corresponding price.

With the advent of Electronic Commerce it has become imperative for business communities to develop the ability to identify, track and trace unit loads across and along supply chains. In the future, business will be global, making the supply chains become more complex therefore the tracking and identification ability is a key element for achieving fast, efficient and reliable operations.

Unit loads – identification and tracking

When we talk about unit loads in the Supply chain we mean, depending on the context, either consumer unit (a bottle of bleach, for example), trade unit (a case containing several bottles of bleach) or logistic unit (a pallet containing several cases of bleach).

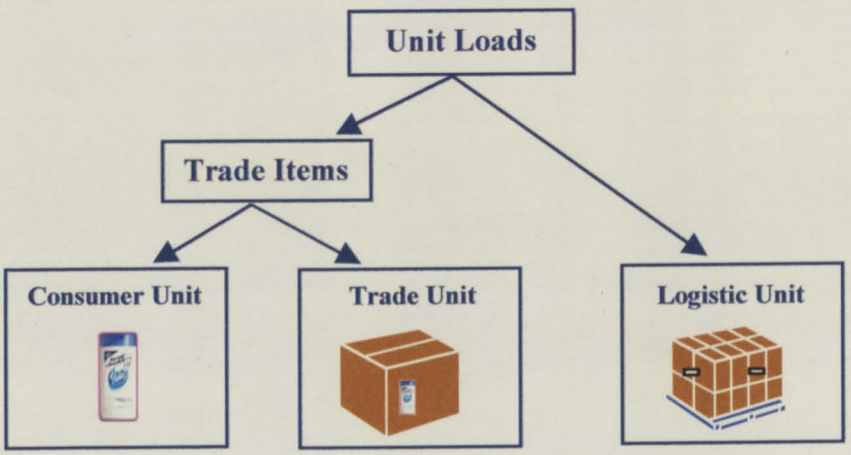


Figure 7 – Different Unit Loads

The first two – consumer and trade units – are also called trade items, and are identified and tracked using different numbering structures and bar code symbologies from the logistic unit.

This report is focused on the finished product pallets though a short description of the standard way to identify and track consumer and trade units will be given in the following paragraphs.

Standards – numbering structures and bar code symbologies

When considering standards for labelling, there is the need to differentiate two very important concepts that are commonly confused: numbering structures and bar code symbologies. A numbering structure is always a set of numbers. A bar code symbology, however, is the graphical depiction of these numbers in bars and spaces and is not human readable.

There are specific numbering structures and bar code symbologies for all types of unit loads, as is described in the following paragraphs.

Trade items – numbering structures

There are different numbering structures that can be used to identify trade items. These different formats can all be considered as Global Trade Identification Numbers (GTIN).

EAN/UCC-8	An 8-digit numbering structure generally used for small consumer units with too little space for EAN-13 bar code symbology.
EAN/UCC-13	13-digit numbering structure used for both consumer and trade units.
UCC-12	12-digit numbering structure used in North America for consumer units.
EAN/UCC-14	14-digit numbering structure only used for trade units.

Table 1 – Numbering structures for trade items

When coding trade items a number of basic principles must be applied:

- Each different trade item must be allocated a separate, unique GTIN
- The GTIN does not carry any information except for variable measure items. In order to ensure data alignment, the brand owner who is responsible for assigning the GTIN must communicate information related to the trade item to all business partners.
- An assigned GTIN must never be changed as long as the item is not modified.

	Indi-cator	EAN/UCC company prefix →					and	← Item reference						Check Digit
Numbering Structure	1	2	3	4	5	6	7	8	9	10	11	12	13	14
EAN/UCC-14	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14
EAN/UCC-13		N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13
UCC-12		0	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12
EAN/UCC-8							N1	N2	N3	N4	N5	N6	N7	N8

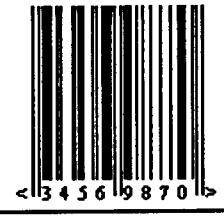
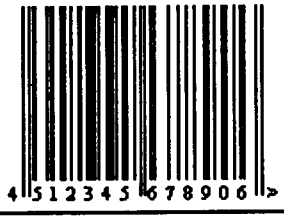
Table 2 – Construction of the codes for trade items

Trade items – bar code symbologies

The GTIN's mentioned above can be represented by different bar coding standards. Table 3 relates the different numbering structures to the corresponding bar code symbologies that allow their graphical depiction. Table 4 then provides an example for the most common bar code symbologies.

Numbering Structures	Bar Code Symbologies
EAN/UCC-8	EAN-8
UCC-12	UPC-A; EAN-13; ITF-14; UCC/EAN-128
EAN/UCC-13	EAN-13; ITF-14; UCC/EAN-128
EAN/UCC-14	ITF-14; UCC/EAN-128

Table 3 – Correlation between numbering structures and bar code symbologies

EAN-8	
EAN-13	

UPC-A	
ITF-14	
UCC/EAN-128	

Table 4 – Bar code symbologies for trade items

Logistic units – numbering structure

In the case of the finished product pallet, advanced supply chain operations foresee that the pallet it's identified as soon as it is produced by applying on it a barcode label containing an unique identification number, this label stay fixed to the pallet in every pallet movement till when the pallet arrive to the final customer destination and it's broken into single cases

The unique pallet number, also called SSCC (serial shipping container code) it's a non significant 18 digits number:

Extension digit	EAN/UCC company prefix and Item reference	Check digit
N1	N2 N3 N4 N5 N6 N7 N8 N9 N10 N11 N12 N13 N14 N15 N16 N17	N18

Table 5 – Construction of the SSCC code

- The extension digit is assigned by the user according to internal needs
- The company prefix is allocated to the manufacturer by EAN/UCC Organizations. The item reference number is assigned by the manufacturer and is structured according to internal needs in such a way to guarantee uniqueness.
- The check digit is calculated according to the EAN/UCC algorithm

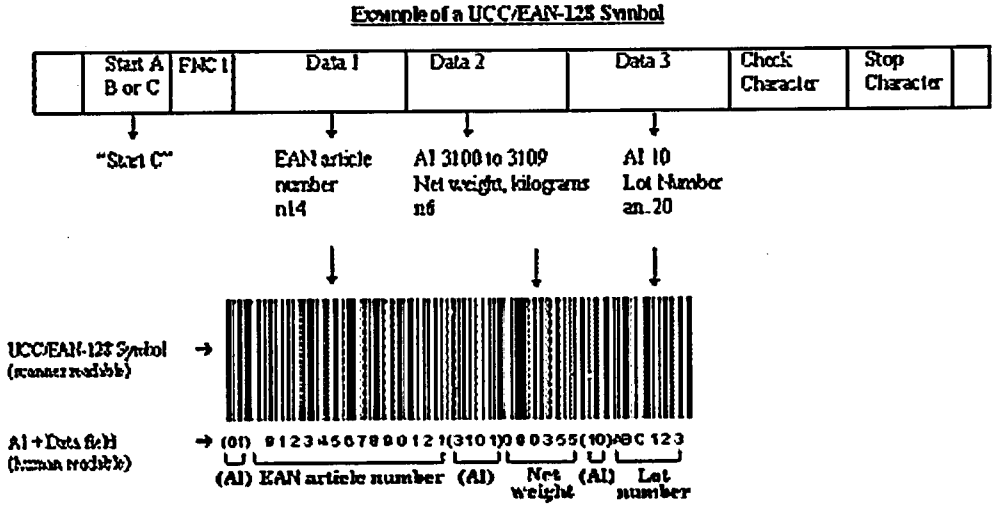
Logistic units – bar code symbologies

The UCC-EAN 128 is the bar code symbology of the UCC-EAN Logistics Label. It is the most complete, compact and reliable mono-dimensional bar-code symbology available today; it allows concatenation and selective decoding. Its reliability is achieved thanks to two independent self-checking features:

- **Concatenation** – This means that more than one data can be encoded in the same bar code string by using the standard UCC-EAN 128 Application Identifiers (AI's). Each AI is a numeric prefix that uniquely defines the type of the data that follows and it's represented between brackets in the human readable translation of the bar code.

- **Selective decoding** – This means that each data can be selectively decoded just by programming the scanner to recognize the relevant AI of the total string.

UCC-EAN 128 AI's are global standards therefore their meaning is the same worldwide. For example AI (10) always means: lot number follows.



UCC/EAN-128	 (01)04601234567893

Table 6 – Bar code symbology for logistic units

Consistently tracking a logistic unit requires that, at any point in time, information about the SSCC can be captured through the scanning of the barcode, kept up to date and made available to associate it with its content (identity, quantity and various dates), its current location and its history.

This information will typically be used when performing many daily operations such as receiving goods, allocating goods, transporting goods, cross-docking, managing inventory quality status, etc.
It will also be used when dealing with partial pallets, managing stocks with restricted usage and in exceptional cases like performing withdrawal or recall operations.

Pallet label and labelling

UCC-EAN organizations have established clear guidelines and principles about the identification of the unit load (pallet); these guidelines specify that the standard way of identifying an unit load is the so called UCC-EAN Logistics Label which is a standard bar-coded label having a certain layout and containing the key information about the pallet in both human readable and barcode forms.

In line with UCC-EAN standards P&G has developed its own label that will be called from now simply standard pallet label. This label is fully compliant with the new UCC-EAN Standards for Logistics Units Labelling and received the certification of conformity in March 99.

The usage of the logistics label lies on a philosophy of unique identification and tracking from the creation of the pallet and throughout the whole supply chain.

Following this concept, the pallet label is generated at the production sites and applied immediately after the pallet is created and applied by automatic or manual machines

depending on the speed of the production lines. From this moment on, the pallet will be identified and processed in the supply chain using this label and its SSCC unique number.
At every point of the supply chain bar code scanners are used to acquire the information on the label into the computer systems.

Standard label for full homogeneous pallets

Full homogeneous pallets are the ones that contain a single kind of product. In this case the standard pallet label for can be described as follows:

Top section - this section contains the company name or symbol plus the needed information to identify the pallet in human readable form. It's used as a backup in case the bar codes are not readable.

Middle section – this section contains all the above-mentioned information about the pallet in bar code form (UCC-EAN 128 bar code)

Bottom section – this section contains only the SSCC (Serial Shipping Contained Code

The only mandatory part

1) Human readable part: although in an advanced environment it would not be needed, as all the process would be automated, in reality there is still the need to include this part.
The reasons for this include that not all markets or market segments will migrate at the same pace, so goods produced need to match different needs, and also that even if a company is fully automated in some of its locations, it may happen that some distribution centres are equipped with a lower level of data automation. Another important reason is the eventual unread ability of the bar codes due to handling conditions (leading to torn or wrinkled labels). In this case, the human readable part provides the information needed to handle the pallet.

2) Barcode part: this is the core of the label, the part that allows automation of processes by merely scanning the information coded. In an advanced environment, only the bottom bar code, containing the SSCC would be needed, as all the remaining information would have been communicated by other means – EDI (see chapter 4 on this report) – beforehand.
For roughly the same reasons as for the inclusion of a human readable part, it is not yet feasible to reduce the information to the SSCC, therefore the standard label includes additional bar coded information.

Standard label for mixed pallets

In the case of mixed pallets – pallets that contain many different products assembled together, the full A5 label cannot be used, as the data included would have to refer to multiple products, which would be impossible to include in the limited space of the label. Hence the usage of a label that contains only the SSCC bar code. The remaining information is connected to the SSCC only in the computer systems.

Figure 8 – Example of label for mixed pallets

Procter & Gamble pallet labelling

In line with the key manufacturers in Europe, in 1998 P&G started the pallet-labelling project, to fulfil customers request and to improve efficiency of its supply chain. The objective was to label 100% of all P&G finished product pallets produced in Europe and sent to customers.

P&G believes in the standardization of work processes and technologies across the European countries, and this is the reason for developing a common layout in line with UCC-EAN guidelines. An example of the standard P&G label (for products not requiring Best Before Date) is shown below.

Figure 9 - Example of P&G standard label

Since then, most of P&G production sites, as well as some key DC's (Distribution Centres) were equipped with the machines necessary to apply the standard labels to all produced – or received, in the case of the DC's – pallets, and were applying the labels as a part of their normal processes. The process followed to roll out the labelling project was first to focus on the big production sites and then to implement in smaller sites.

In September 2000 the project was almost completed, although there were still some smaller sites missing. These were sites that, though representing small volumes in terms of number of pallets shipped to the customers, are quite complex regarding the layout and number of different products.

3.2: OBJECTIVES

The objective of this internship towards this project was to assure that labelling concepts were fully understood by key counterparts in the plants and DC's and to provide expertise and technical support to facilitate the completion of the project in its final phase of implementation in all P&G Western Europe sites.

This was achieved by closely working with local and central Technical Departments, namely Central Engineering.

3.3: APPROACH

Phase 1: Preparation and training

The first step was to learn about UCC/EAN 128 bar coding and labelling standards, and to collect information about the status of the project implementation within P&G. There was the need to become a pallet-labelling expert in a very short time, and to learn the work processes of the producing sites and DC's.

A thorough study was thus conducted using several documents and materials available, both P&G internal documents and external official documents – UCC/EAN standards, web page, etc. Trainings on the job and orientations with key people involved in

logistics within P&G and in this project in particular were also extremely important to acquire expertise on all the matters involved.

Having developed the theoretical knowledge, it was then necessary to proceed by contacting all the sites (plants and DC's) in order to get an update on the status of the project, for the ones implementing it, the technical difficulties encountered, for the sites already in production, and expected schedule for the ones that hadn't begun implementing the project.

These initial contacts were also crucial to establish the communication for the following phases, as they served as an introduction to all the counterparts involved.

Phase 2: Implementation

Due to the variety of departments in the plant or DC on which this project impacts, multi-disciplinary teams were thus formed to conduct the implementation.
For each implementation, the working team would include, besides Central Outbound Logistics and Central Engineering, representatives from the site's IT, production, logistics or other departments, according to the specific needs of each installation.

The teams would therefore be different for each implementation, varying from 4 to 10 members.

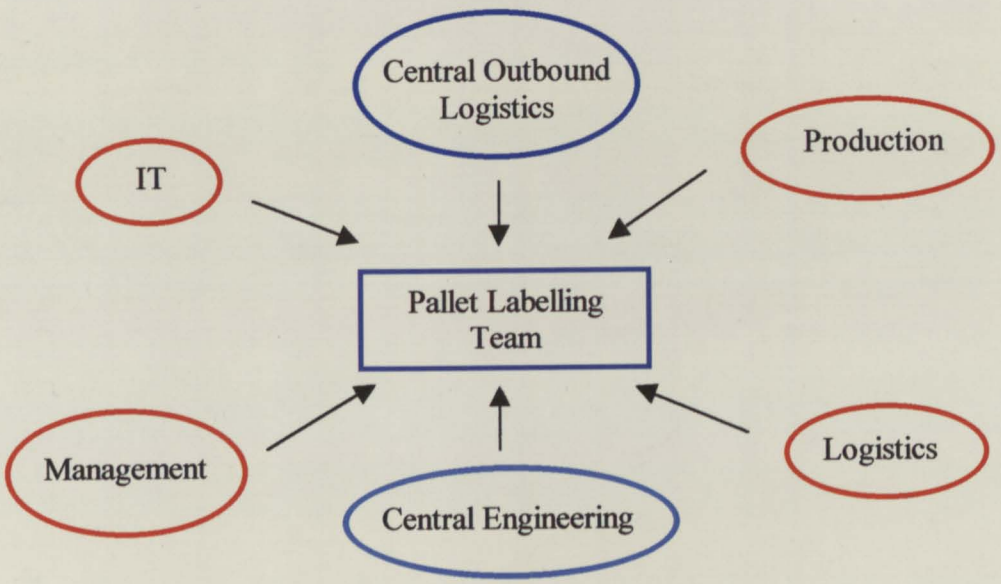


Figure 10 – Implementation team

Central Outbound Logistics and Central Engineering had a coordination role in the whole process. This coordination meant organizing and facilitating the needed meetings – calling the meetings, defining the agenda, leading the actual meeting, etc.

For each of these meetings, a log would be made and shared with all the team. An example of such a record is shown below.

Phone meeting / Video Conference

Plant: Plant B
Date/Time: 25th January 2001
People attending

Ana Pinto	Central OL
Adam Vilalta	Central Engineering
Mr. X	IT
Ms. Y	Production

Agenda:

- previous meeting action plan
- description of status
- questions
- action plan

Notes:

Previous action steps accomplished
Delay of equipment supplier - 1 week
Database ready, downloads decided

Next Action Steps

Action	Who?	By when?
Preparation of conveyors	Ms. Y	Jan 31
Installation of equipment	Plant	Jan 31
First tests	Plant	Feb 1, 2
Validation of tests	Ana Pinto	Feb 3
Next meeting	All	Feb 5

Figure 11 – Example of meeting log

Throughout the rollout of the project, there were several types of meetings, which reflected the development of the project. Obviously, depending on the situation, there could be the case of meetings that combined various types.

Initial Meetings

The initial meetings had the objective of sharing the concept of pallet labelling, its importance for the company and its impact on the site, as well as roughly defining the phases of the implementation to follow.

Kick-off Meeting

After the first phase of training and clarification it is time to kick-off the implementation of the project. It implies decisions on:

- which type of equipment to install
- what is the best layout (without impact on the productivity of the site)
- if and how to interface the labeller(s) with other equipment
- how to create and update the labeller's database
- what is the schedule of implementation (CPS)

Follow-up Meetings

As said before Central Outbound Logistics had a coordination role, rather than an active physical implementation one. In this role, one of the crucial actions for the smooth implementation of the project was a good follow-up.

This meant regular contacts to enquire on the development of the project, mostly between Outbound Logistics and the team leader in the plant, but also follow-up meetings including the whole team.

The follow-up meetings took place throughout the whole implementation process.

The purpose of such frequent contacts (weekly or even daily when there were difficulties to solve) was to monitor the installation, making sure that the CPS was being followed and that any possible questions or technical problems were solved in the shortest period of time.

Wrap-up Meeting

Finally, after the installation was completed and all the tests performed and validated, the projects was officially launched. This final meeting's purpose was to wrap-up any pending questions and to perform a preliminary evaluation on the process of installation. Extremely valuable knowledge was gathered during the installations, which allowed future smoother processes.

Following these lines there is a description of the installations followed during the period of this internship. For confidentiality reasons, no details about the site are revealed, and all the sites will have generic designations.

Site A

In September 2000, site A had labelling equipment installed and fully operational. The labels applied were, however, not fully compliant with P&G's pallet labelling specifications.

In this case, the work developed consisted of adjusting the layout and contents of the labels being applied to all the production to include the information needed by site A – in its normal production processes – and still be in line with the standards.

September 2000
- initial meetings

October/November 2000
- regular follow-up meetings
- several tests and adjustments

December 2000
- validation of the label
- launch of project

Site B

At the beginning of the time scope of the internship site B, although having installed the equipment and conducted most of the implementation, was facing technical problems with the interface of the labeller with the conveyor system and also in the process of updating the labellers' database.

These problems constituted a roadblock and led to a postponement of the project, coinciding with the less active summer period.

In September 2000 there was the need to re-evaluate the status of the project and to overcome the technical problems and also a certain resistance from the site to conduct major changes – due to allocation of resources.

The rollout of pallet labelling project in site B can be schematically described as follows:

September 2000
- information on the status
- identification of roadblocks

October 2000
- weekly follow-up meetings
- different proposals for solution of technical problems

November 2000
- weekly follow-up meetings
- test of solutions (effectiveness vs. impact on resources)

December 2000/January 2001
- weekly follow-up meetings
- beginning of label tests

February 2001
- wrap-up meeting
- launch of project

Site C

The installation of pallet labelling in site C was followed from the beginning, according to the following timings:

October 2000
- initial contacts
- kick-off meeting at the site, with the analysis of layout and decision on the equipment and database management

November 2000
- regular follow-up meetings
- preparation of production lines' layout to include the labelling process
- creation of the labellers' database

December 2000
- Installation of equipment

January 2001
- regular follow-up meetings
- database adjustment
- first label tests

February 2001
- wrap-up meeting
- launch of project

Site D and Site E

These two sites have installed pallet labelling from the beginning during the period of this internship. They followed procedures very similar to the one described for site C.

The challenge in this kind of installation was to perform a good follow-up to allow an efficient process and prevent delays.

Like for site C, sites D and E completed the installation in February 2001, launching the project for all production.

Site F

This was the last site to initiate the project as it hadn't been part of the initial scope.

In December 2000 the first contacts were conducted and the process was followed as described for the previous sites.

By the end of February 2001 site F had assigned the team in charge of the pallet labelling project, had identified all the key phases and timings and was ready to proceed with the implementation according to a normal CPS

"Contractors"

The term "contractors" refers to the third parties that produce or manipulate P&G products. These are external companies, which are not part of P&G nor are part of any joint ventures with P&G.

In this case the project was conducted through P&G counterparts for these contractors, but was in every aspect similar to that of an installation in a P&G site. A key role was played by involving the counterparts on the preliminary phase of understanding the strategic importance of pallet labelling.

By the end of February 2001 the major contractors had agreed to equip their facilities with pallet labelling

On going work

After the final meeting the project was considered launched for a given site. From then on, it was assumed that all the production of that site was labelled according to standards. However, as for any industrial process, during the normal functioning of pallet labelling questions would eventually arise that needed expert clarifications.
This was the case of malfunctioning labellers, wrong data printed on the label, absence of labels on pallets shipped from equipped plants or DC's, etc.

Dealing with these situations by being the single point of contact in Europe for questions regarding bar coding, labels and labelling, was also an important part of the internship here described.

CHAPTER 4: ASN – ADVANCED SHIPPING NOTIFICATION

4.1: INTRODUCTION

This project is included in a much broader project – EDI (Electronic Data Interchange). In fact, as explained below, ASN is a particular kind of EDI message.

EDI messages are electronic messages exchanged between supplier and customer to simplify and accelerate the data exchange in normal supply chain operations.

The existing EDI messages can be grouped according to the following main areas:

ORDERS	- customer purchasing order
PRICAT	- price and product data exchange
DESADV	- instruction to dispatch
INVOICE	- invoice

The scope of this document covers only DESADV, which is a message specifying details for goods dispatched or ready for dispatch under agreed conditions.

There are two different levels for the DESADV message:

- Simple DESADV: only article numbers and quantities are provided and key information on the delivery
- ASN message: the shipment details are provided at a single pallet label, which means that each individual pallet is described with its SSCC and its contents (article numbers included in the pallet). The key information on the delivery is also included.

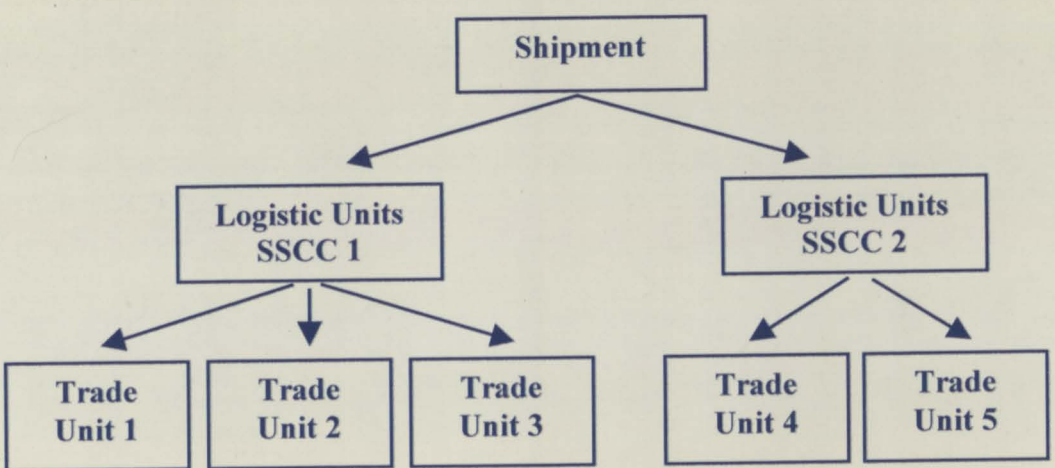


Figure 12 – Example of hierarchy within an ASN

4.2: OBJECTIVES

The purpose of the work developed was to assess the ASN capability of all P&G DC's in WE in order to develop a rollout plan to equip all WE P&G DC's with ASN capability in the next 3-5 years time.
While assessing this a manual which explains ASN processes was developed, which included the detailed description of the work processes behind the creation and sending of ASN messages in the different warehouse environments; the impact on these work processes of the different computer systems used in each warehouse and the customers' scenario on ASN – requests, expectations, dimension of the shipments – for each country (by contacting P&G business partners for the customers) were also described.

4.3: APPROACH

Phase 1: Getting expertise

As in any new project, the first phase involved getting expertise on the subject, both by studying materials and by attending specific trainings on EDI, ASN and warehouse systems.

An important step was the validation of all the conclusions reached by presenting them to the experts and getting their input, which means that although this was not considered teamwork, there was the need to interact with people from different departments, in this phase as a trainee only.

It is important to note that though there was already information on ASN available, it was scattered and didn't cover all the aspects of this process.

The information gathered can be divided in different steps:

Message Structure

ASN is a data message, with the appearance of a text file, which follows certain agreed rules on to which data it contains and in which order, so that both systems – the sender and the receiver – can understand and process the data.

These rules are defined in the international standard for EDI messages, released by EAN/UCC, called EANCOM®. EANCOM® is a subset of the UN/EDIFACT language, for commerce and consumer goods.

All P&G EDI messages, including ASN, are in line with EANCOM®. Anyhow, whenever P&G and a customer start the ASN project, there is an alignment process to

make sure that the P&G message can be processed by the warehouse systems of the customers and that the customer's and P&G messages are aligned.

ASN process

The creation of the ASN message is done in the sending warehouse, where the physical products that are being sent are scanned so to create their electronic identity. These "virtual pallets" are uniquely identified by their SSCC and their contents are fully described in the warehouse system.

The scanning of the pallets implies that they are correctly labelled (see chapter 3 in this document), and that the sending warehouse is equipped with some sort of scanning devices (hand held scanners, automatic scanners, etc.)

The list of pallets is then linked to the order, therefore creating a unique document that states details of the order and the customer as well as of the full description of the products being sent to fulfil that order.

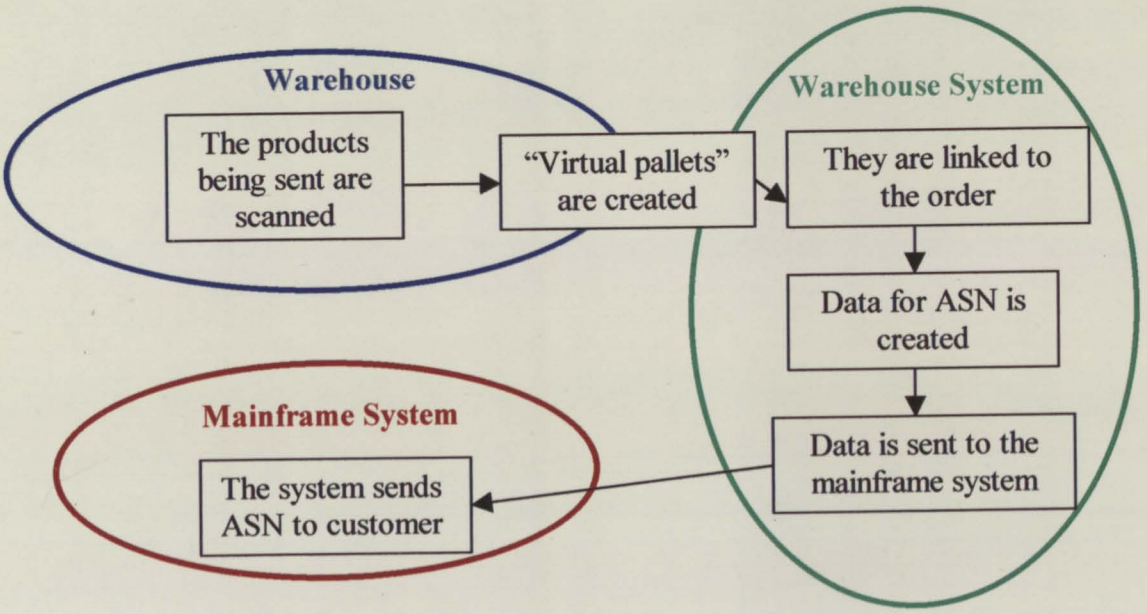


Figure 13 – Creation and sending of ASN in the systems

The mainframe system in P&G Europe gathers and processes information of all the processes of the different sites, as well as communicates with outside systems such as the customers'.

As shown before, the warehouse system has a predominant role in the ASN process, as it is the creator of the data for ASN by linking the physical warehouse process to a virtual handling of all the products. The simplicity of this process varies quite a lot from system to system.

P&G warehouses use either SAP or a self-developed radio frequency system called RTCIS – Real Time Control Information System.
Third parties involved in ASN have their own warehouse systems with different technologies

When the shipment is ready to be delivered, the ASN message is sent to the customer. This means that the customer will have beforehand a list of everything that is going to be delivered, allowing him to perform operations such as storage planning and cross-docking as well as confirming which products are being delivered and in which quantities.

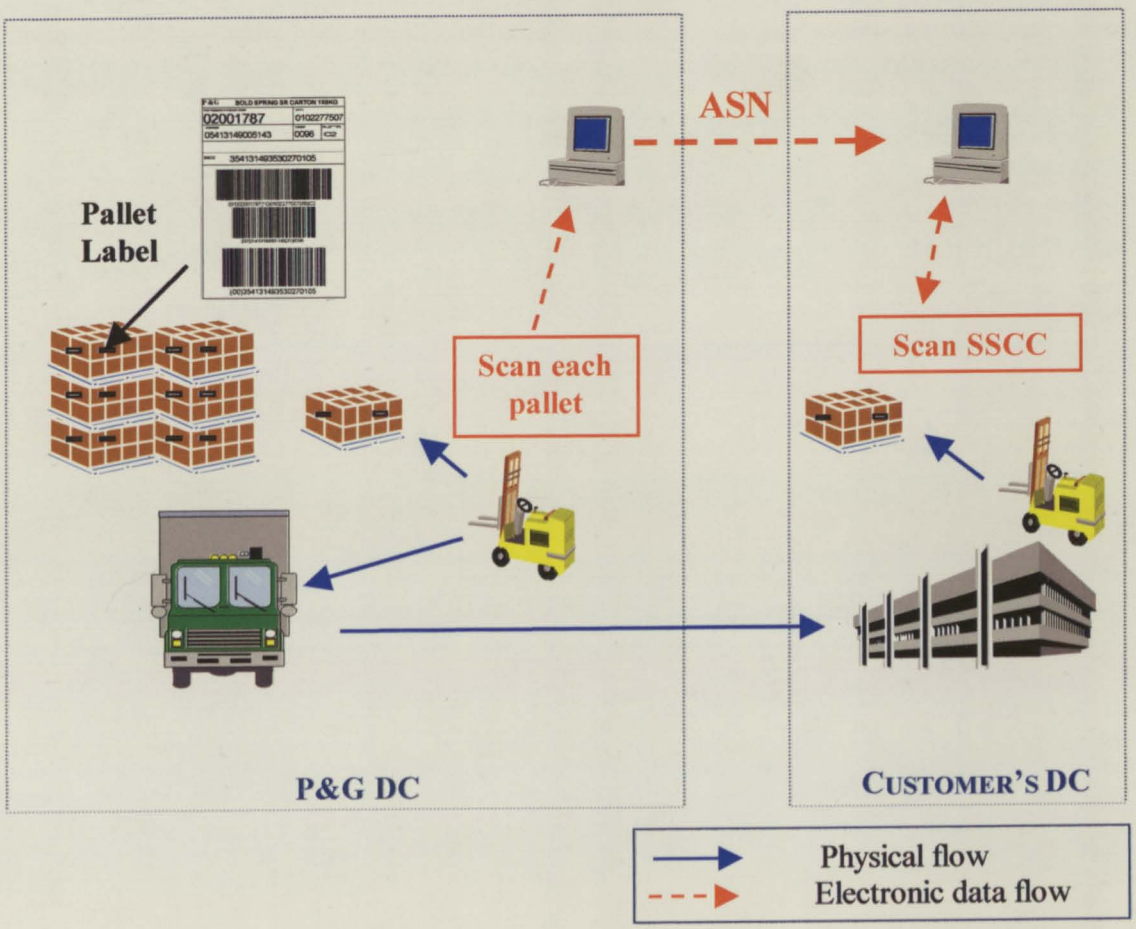


Figure 14 – Electronic data flow vs. physical flow

When the shipment arrives to the customer, the SSCC's of the pallets are scanned in order to match them with the ASN message already received. Immediately the system will validate all the information regarding the contents of the shipment that had been received through ASN. This means that the unloading process is much more efficient and accurate.

The process of scanning the goods at arrival naturally implies that the receiving warehouse is also equipped with scanning devices, as occurred with the sending warehouse.

Business Cases

There are several business cases to consider when thinking about ASN and its processes. In fact, the complexity of the creation and sending ASN messages depends on the type of shipment being sent.

Full pallets – the case of full homogeneous pallets is the simplest, as the process of acquiring all the needed information about its contents is limited to scanning the standard pallet label, which has all the necessary information.

Mixed pallets – mixed pallets are created according to the orders. The difficulty of the process is to create the pallet in the system as well as physically. It means inserting into the system the details of all the products being assembled in each pallet and connecting it to the SSCC that is applied to the resulting pallet.

Mixed loads – having a mixed load means that pallets referring to many orders are put together in the same truck. As the correct pallets need to be delivered to each customer, there is the need to differentiate the orders as soon as they are loaded in the truck. This applies to the case where, in the same truck, there are orders requiring ASN together with others not requiring the message.

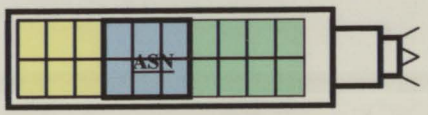
In reality, the above factors can be combined leading to the following business cases:

Case 1

1 truck = 1 ASN shipment → full pallets only

Case 2

1 truck = many shipments (1 ASN + other non-ASN) → full pallets only



Case 3

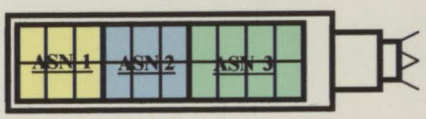
1 truck = 1 ASN shipment → full and mixed pallets

Case 4

1 truck = many shipments (1 ASN + other non-ASN) → full and mixed pallets

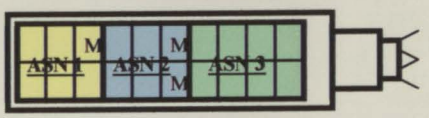
Case 5

1 truck = many shipments (many ASN) → full pallets



Case 6

1 truck = many shipments (many ASN) → full and mixed pallets

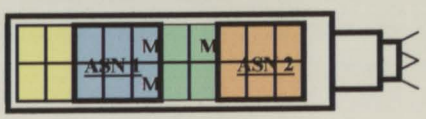


Case 7

1 truck = many shipments (many ASN + many non-ASN) → full pallets

Case 8

1 truck = many shipments (many ASN+many non-ASN) → full and mixed pallets



Phase 2: Understand the business need for ASN

The advantages of working with ASN are very clear for the customers' side. In fact, if a customer receives ASN from the suppliers he is able to match in advance delivered goods with the purchase order, book the stock in their inventories and more efficiently and timely plan the distribution towards their further delivery points therefore optimising the inventories.
Furthermore, receiving processes are much faster and more accurate because received goods are immediately checked - registered by scanning instead of making visual goods check and manual data keying – thus leading to a reduction of unloading costs.

On the supplier's side, the major advantage of being ASN capable is the competitive advantage that being among the top equipped suppliers can allow, resulting in key partnerships with customers.

Although at present ASN is a quite advanced concept and majority of WE customers have not yet implemented it, it's realistic to believe that in the coming future more and more customers will get equipped to handle it; therefore it can be concluded that in a medium term, not being ASN capable will be perceived by the customers as not being advanced in logistics and can affect supplier relations and negotiations with them.

There was, therefore, the need to thoroughly clarify the situation concerning P&G's customers in Western Europe, so to evaluate the timings for a rollout plan of ASN.

Contacting the customers' counterparts in P&G for each country and assessing the present situation concerning ASN, as well as the expected short- to mid-term developments were the actions taken to achieve that goal.

The information was gathered and interpreted taking into account not only each national perspective, but also the cross-national aspects of the supply chain – customers being replenished by DC's in other countries, for instance – to allow the elaboration of a rollout plan (see phase 4).

The challenge, in this particular phase, was to gather all the necessary information without disclosing the delicate information considering the capabilities for sending ASN.

Phase 3: Analyse and document the warehouse processes

Another component to analyse was the impact of implementing ASN as a normal procedure in the warehouse processes. In other words, it was important to understand what changed in the warehouse physical processes in order to be able to send ASN.

As was explained above, the sending warehouse needs to include the scanning of the pallet labels in its work processes to be able to create the ASN messages. Furthermore, in the case of mixed loads, there is the need to differentiate the pallets of each shipment to avoid delivering them to the wrong customer.

Again here, the change in the processes without ASN depends strongly on the warehouse system present.
In a real time radio frequency controlled system, like RTCIS, the normal processes already include the data creation and exchange needed for the creation and sending of ASN. In this case the impact, at the warehouse operations level, of handling ASN shipments is minimum.
On the other hand, in an SAP environment there is the need to include extra steps in the process of handling the shipments, in order to create all the information in the system (see creation of "virtual pallets" – Figure 11).

To better clarify these differences a manual was created based on the information collected both with the systems' experts and the warehouse people.
This manual describes the processes involved in the execution of an ASN shipment in each existing warehouse system environment, and for all the possible business cases.

Phase 4: Create a rollout plan for ASN

Together with Daniela Lavinio and after analysing all the information gathered in the previous phases, a plan was created to define which approach to follow in equipping all WE P&G warehouses with ASN capability in the next 3-5 years time in order to match the business needs defined before. An estimate of the type /number of resources needed to implement the project was also made together with related installation costs. The plan was sent to top management for approval.

CHAPTER 5: CONCLUSIONS

5.1: RESULTS

In what concerns Pallet Labelling, all the projects handled were concluded, meaning that all sites were either in production or in the final phases of implementation of the project by the end of February 2001.

There was also a good support activity developed during these 6 months, allowing the clarification of the standards and a fast and effective response to the questions raised. The key counterparts involved in pallet labelling were, by the end of this internship more competent on the concept behind pallet labelling and were able to perform the related processes more efficiently.

As for ASN, by the end of the internship a document gathering all the information had been prepared and served as a basis to create a rollout plan for ASN. The document can also be used in the future as a start up, non-technical manual for ASN implementation, as it summarizes quite effectively the processes in the warehouse that are involved in this project.

To sum up, the objectives were clearly met. The work developed was considered valuable and provided good results for the company.

5.2: PERSONAL EXPERIENCE

As a personal experience this internship was a fabulous opportunity. To be integrated in a company of the size and importance of P&G, developing a work in international projects, gave me an extremely valuable experience that has contributed to my personal growth.
The scope of learning covered not only the technical aspects of a job in logistics, but also the personal skills of communication and behaviour that working with so many different cultures and levels of management allowed.

An important factor was being abroad, living and working in a different country, which broadened my horizons in a way only possible with the first hand experience of a different culture.

I would like to point out the high trust that was put on to me from the very beginning. An internship in P&G is a real job, with real responsibilities, and that is shown from the very first day. However, there is never the feeling of being abandoned in a task without preparation. It is a challenge to our personal capabilities and to our day-to-day learning skills.

Appendix 1

Glossary & Abbreviations

This glossary provides a list of important definitions and abbreviations that are used in this report.

AI
(Application Identifier)
The numeric prefix that defines the data following it in a UCC/EAN–128 bar code symbology. These are used to provide information such as product dates, weights and lot/batch numbers, as well as article number, on traded units.

ASN
(Advanced Shipping Notification)
Standard electronic message from supplier to retailer providing information about a shipment that is to be dispatched. (See DESADV)

Bar Code Symbology
The bar code corresponding to a numbering structure. (See Numbering Structure)

DC
(Distribution Centre)
A point in the supply chain where the product flows are interrupted and where load disassembly, reassembly and storage can take place prior to shipment to the next point of the supply chain.

DESADV
(Despatch Advice)
EDI EANCOM® message that gives information about the expedition of goods (quantities, delivery schedule, etc.) in the conditions accepted between partners.

EAN International
(Efficient Article Numbering Association)
Global organization responsible together with the Uniform Code Council (UCC) for numbering and communication systems.
Global Mission: "To improve supply chain management and other business processes that reduce costs and/or add value for both goods and services. EAN international and UCC develop, establish and promote global, open standards for identification and communication for the benefit of the users involved and the ultimate consumer."

EANCOM®
EAN International's EDIFACT subset for trade and distribution.

EDI
(Electronic Data Interchange)
EDI is the exchange of structured data in standardised message formats via electronic means between computer applications of trade partners. EDI allows business partners to exchange vast amounts of information with great speed and accuracy.

EDIFACT
(Electronic Data Interchange for Administration, Commerce and Transport)
A set of internationally agreed standards, directories and guidelines issued by the United Nations (UN/EDIFACT) for the electronic interchange of structured data.

GTIN
(Global Trade Identification Number)
Numbering structure applied for all UCC/EAN trade items identifiers (EAN/UCC-8, UCC-12, EAN/UCC-13 and EAN/UCC-14).

Numbering Structure
A numeric sting built according to global standards for the unambiguous identification of consumer, trade or logistic units.

Pallet Label "Logistic Label"
EAN standard for labelling of pallets with unique serial number – the Serial Shipping Container Code – and other standardised information using UCC/EAN-128 bar code symbology.

Radio Frequency
Stands for wireless communication specifically in a warehouse when a terminal on a lift truck is connected in such a way to the warehouse management system.

SSCC
(Serial Shipping Container Code)
A unique serial number of 18 digits, used to identify any transport units (typically pallets) containing a uniform product or combinations of different products. It can only be depicted in an UCC/EAN-128 bar code symbology, and is widely used together with an EDI advanced shipping notification.

Supply Chain
All business activities needed to satisfy the demand for products or services from the initial requirements for raw materials or data to the final delivery to the end user.

UCC
(Uniform Code Council)
North American Numbering Organization that establishes and promotes multi-industry standards for product identification and related electronic communication.

UPC
(Universal Product Code)
The American numbering structure and bar code symbology corresponding to the EAN/UCC-13.

Appendix 2

Synopsis of Application Identifiers

Application Identifier	Significance
00	Serial Shipping Container Code (SSCC)
01	Global Trade Item Number (GTIN)
02	GTIN of trade items contained in a logistic unit
10	Batch or lot number
11	Production date
12	Due date
13	Packaging date
15	Minimum durability date (Quality)
17	Maximum durability date (Safety)
20	Product variant
21	Serial number
22	Secondary data for specific health industry products
23n	Lot number (transitional use)
240	Additional product identification assigned by the manufacturer
241	Customer part number
250	Secondary serial number
30	Variable count
31nn – 36nn	Trade measures and logistic measures
337n	Kilograms per square metre
37	Count of trade items contained in a logistic unit
390n	Amount payable – single monetary area
391n	Amount payable – with ISSO currency code
400	Customer's purchase order number
401	Consignment number
402	Shipment identification number
403	Routing code
410	"Ship to – Deliver to" EAN/UCC Global Location Number (GLN)
411	"Bill to – Invoice to" EAN/UCC Global Location Number (GLN)
412	"Purchased from" EAN/UCC Global Location Number (GLN)
413	"Ship for – Deliver for – Forward to" EAN/UCC Global Location Number (GLN)
414	Identification of a physical location, EAN/UCC Global Location Number (GLN)
415	EAN/UCC Global Location Number (GLN) of the invoicing party
420	"Ship to – Deliver to" postal code within a single postal authority
421	"Ship to – Deliver to" postal code with 3-digit ISO country code
422	Country of origin of a trade item
8001	Roll products – width, length, core diameter, splices

8002	Cellular Mobile Telephone Identifier (CMTI)
8003	Global Returnable Asset Identifier (GRAI)
8004	Global Individual Asset Identifier (GIAI)
8005	Price per unit of measure
8006	Global Component of a Trade Item Number (GCTIN)
8007	International Bank Account Number (IBAN)
8018	Global Service Relation Number (GSRN)
8020	Payment slip reference number
8100 – 8102	UCC coupon extended code
90	Information mutually agreed between trading partners
91 – 99	Company internal information