



FRA Hazardous Materials Training Seminar Rail EDI Hazmat

Houston, TX

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Electronic Data Interchange (EDI) in Rail Transportation

- Take away from EDI Training
 - Origin of EDI
 - How EDI is integrated in Rail Transportation
 - How to read Rail EDI Transaction Sets
 - How DOT regulation are supported in Rail EDI transaction sets.



What is EDI?

- Electronic Data Interchange (EDI) is the electronic communication of business information in a standardized format via computer – to – computer exchange between two business partners.
- This process allows one company to send information to another company electronically rather than with paper. The business entities are referred to as “trading partners”.
- EDI enables information to be exchanged much faster, cheaper and more accurately than with paper documents.
- There are two EDI Standards:
 - UN/EDIFACT – An International EDI Standard that was developed by the United Nations.
 - **ANSI X12** – EDI Standards used in America for inter-industry business transactions exchanged electronically.



The Origin of EDI Standards

- In 1975, the Transportation Data Coordinating Committee (TDCC) developed 25 standard transaction sets that covered transportation business. The TDCC was funded by the Department of Transportation (DOT) and primarily supported by the shippers and carriers who dealt with high-volume shipments which required significant manual effort to process.
- In the early 1990, TDCC was replaced with the American National Standards Institute (ANSI).
- Today, ANSI consists of 12 subcommittees known as X12 to govern over 300 EDI Standards.

Communication	Distribution	Education	Finance
Government	Insurance	Materials Management	Product Data
Purchasing	Purchasing Distribution	Transportation	Warehousing



How EDI is integrated in Rail Transportation



EDI in Rail Transportation

- The rail industry uses over 42 EDI transaction sets their daily operations.
- Industry committees that specialize in specific areas manage rail compliance with Government regulations, and ensure that the EDI transaction sets are updated to support the regulations.
- This includes the shipper's bill of lading (EDI 404), rail waybill (EDI 417) and train consists (EDI 418).

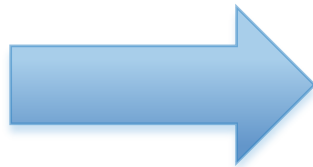


EDI in Rail Transportation cont.

- Rail carriers use EDI (404) to receive shipping instructions from shippers.
 - Directly from shippers computers,
 - Service providers with software for shippers to input shipping instructions.
 - Value Added Network (VAN) which hosts services that include acting as an intermediary between the shipper and carrier.
 - Through rail carrier's website.

CAREFUL: AUTOBILLING AVOIDS CLAIMS, MISROUTES AND CUSTOMER COMPLAINTS (Rev. 11-03)

UNION PACIFIC RAILROAD		AUTOMAIL NUMBER		LENGTH OF CAR		LEAD CAR
DATE OF BILL AND NUMBER	NR	GROUPED	FEINUMBER	1	2	
NAHX 801229						
TRAILER WEIGHT AND NUMBER	LENGTH	PLUM RANGED	BALLY LOT NO.	DATE OF DEPT	APPROX. WEIGHT	
			345321	01/29/04		
GENERAL SA CREW COACH ADDRESS AT STATION						
AT						
ETCS						
TRUCK						
AT						
AT						
CITY	STATE OR PROV.	FROM NUMBER	S-NO	STATE OR PROV.		
Los Angeles	CA		Don	IO		
WRITE IN IF SHIPPER IS AN OWNER OR OPERATOR OF EQUIPMENT		WRITE IN IF SHIPPER IS A SHIPPER OR BARGE/RAIL		FED. RAILROAD OF SHIPPER		
UP		S		Simplot J.R. Don, IO.		
				BEEFICIAL OWNER: UPC 21191		
COMMODITY AND WEIGHT		RECEIVED FROM		RECEIVED BY		
Bandini Fertilizer		Sandy Harmon		Ronn Brew		
Los Angeles, CA						
BEEFICIAL OF USE		RECEIVED FROM		RECEIVED BY		
BATTERY PACKS MUST BE PLACED IN PROPER POSITION AND BE PROPERLY CHARGED		RECEIVED FROM		RECEIVED BY		
SPECIAL DELIVERIES: (Indicate any special conditions, e.g., fragiles, etc. that apply to this car)		RECEIVED FROM		RECEIVED BY		
SS LF AV				Yes		
WORKSHEET NUMBER		RECEIVED FROM		RECEIVED BY		



```

O1*SR*589243*UP*20170124*1700*2725565*X*004010
ST*404*2725565
BX*00*R*NR**UP*L*E
BNX*A**S
M3*R*20170124*1700*LT
N9*BM*ENTER VALUE**20170124*1700
N7*NAHX*80122910*0*N*76200*****RR*****M
F9**DON*ID
D9**LOS ANGELES*CA
N1*SH*SIMPLOT JR
N3*1150 W HWY 30
N4*DON*ID*83204*US
N1*CN*BANDINI FERTILIZER
N3*4139 BANDINI BLVD
N4*LOS ANGELES*CA*90023*US
  
```



EDI in Rail Transportation cont.

- The GS segment references the sender, receiver, date and time the message was created.
 - The sender ID indicates if sent by trading partner's mainframe or rail carrier's web billing software. (Each carrier identifies their web sender ID with a different ID format. i.e. UP's begin with 'X' and KCS's begin with 'E')

GS*SR***APL300***UP*180725*1358*39099*X*003020 (Mainframe)

GS*SR***XTPN704***UP*20180725*1400*46370*X*007030 (Web Customer)



EDI in Rail Transportation cont.

- Origin linehaul carrier receives the EDI 404 (Bill of Lading) and converts into an EDI 417 (Waybill)
- Origin linehaul carrier transmit the (EDI 417) to carriers in the route via the Forward & Store application at Railinc.
 - Non-linehaul carriers receive the EDI 417 from their interchange partner. (Origin switch (EDI 404), destination switch, haulage and special handling carriers)

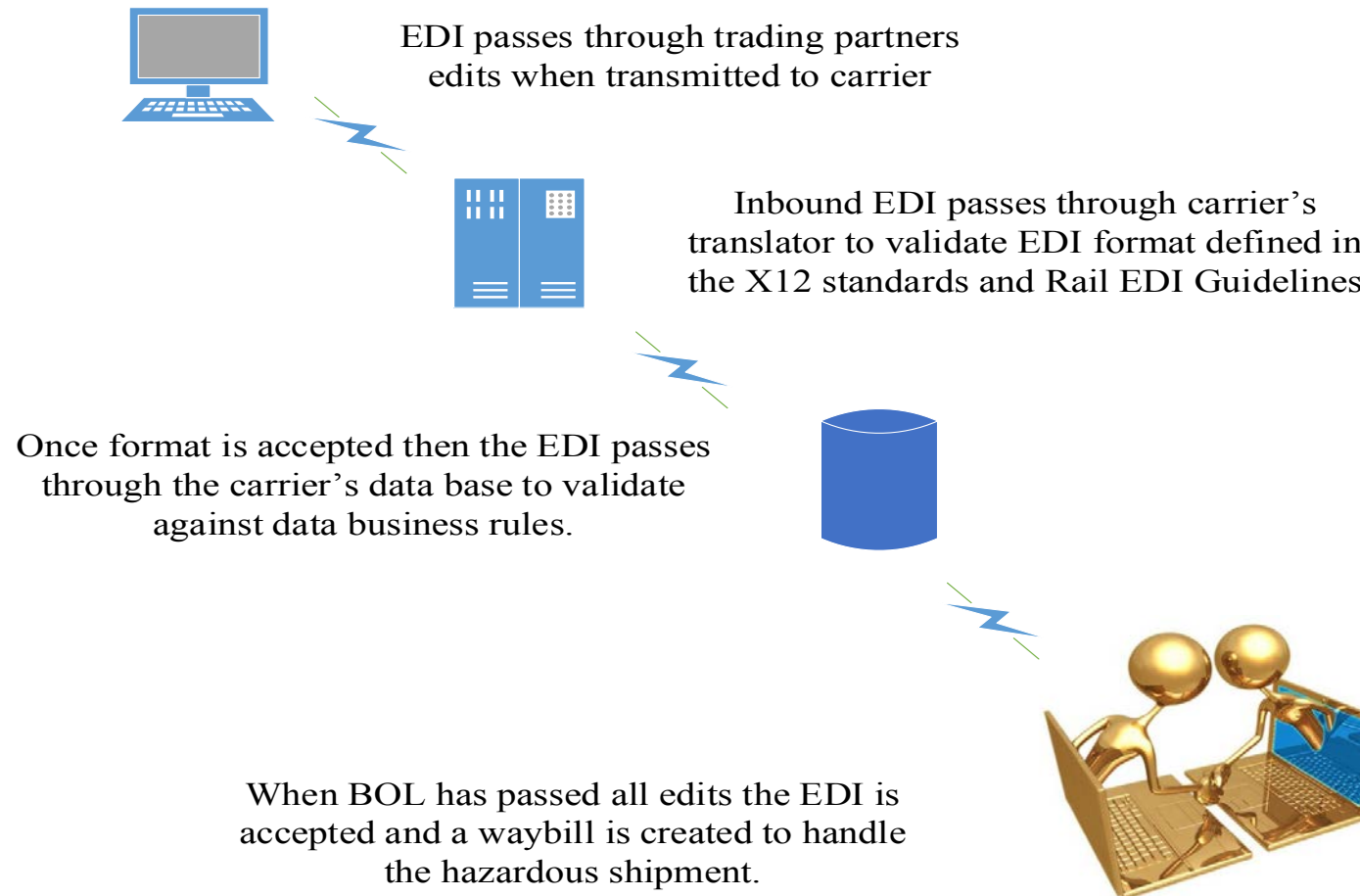
GS*WB*KCS*RRWS*20180725*1400*1264248*X*007030 (RRWS = Forward & Store)

GS*WB*KCS*DGNO*20180725*1401*25009*X*005010 (Direct exchange with delivery carrier)



EDI in Rail Transportation cont.

EDI messages go through two validation levels before successfully processing (or transmitting from) a carriers system



EDI in Rail Transportation cont.

EDI Syntax edit example:

LFH segment did not meet minimum required data.

```
LS*1
LH1*BX*1*UN3268**4966333*LB*5
LH2*9*P
LH3*SAFETY DEVICES*D
LFH*ADI*
PER*HM*CCN ERG171*TE*18004249300
N1*SH*MERCEDES-BENZ USA LLC
N3*4303 LAKESIDE PKWY
N4*GRAPEVINE*TX*76051*US
N1*CN*MERCEDES BENZ USA LLC
N3*13470 INTERNATIONAL PKWY
N4*JACKSONVILLE*FL*32218-9438*US
LE*LH1
```

Operating System business rule edit example:

LH2 segment is missing the Hazardous Classification which is business rule requirement to support Regulations.

```
LS*670
LH1*C4*1*NA1993**4914849*GA*29341***III
LH2**P*COMBUSTIBLE LIQUID (1993)
LH3*COMBUSTIBLE LIQUID,*D*NOS
LH3*N.O.S.*D*NOS
LFH*TNM*(#2S15 FOR EXPORT)
LFH*TEC*(DIESEL FUEL)
LE*670
```



Minimum Shipping Requirements

- Shipper (SH)
- Consignee (CN)
- Payer of Freight (PF)
- Equipment Initial & Number
- Load/Empty Status
- Rail Origin & Destination
- Routing
- Payment Method (Prepaid, Collect, Rule 11)
- STCC # and Commodity Description
- HazMat information and emergency phone numbers
- Piece Count (Quantity/Units)
- Weight and Unit of measure



How to Read Rail EDI Transaction Sets

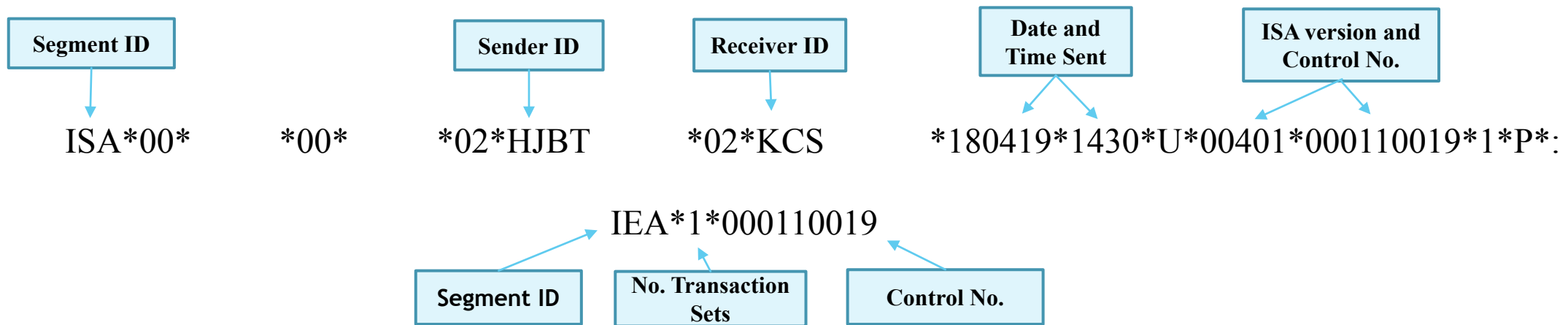


EDI Format Basics

~ *Interchange Control Header and Trailer*

... equates to an envelope!

- **ISA** to start the interchange and **IEA** to end
- TRAINII or pound (#) header is another option within Rail.
to start the interchange and **\$0000EOM** to end



The ISA segment contains the communications sender and receiver IDs and used to switch messages.

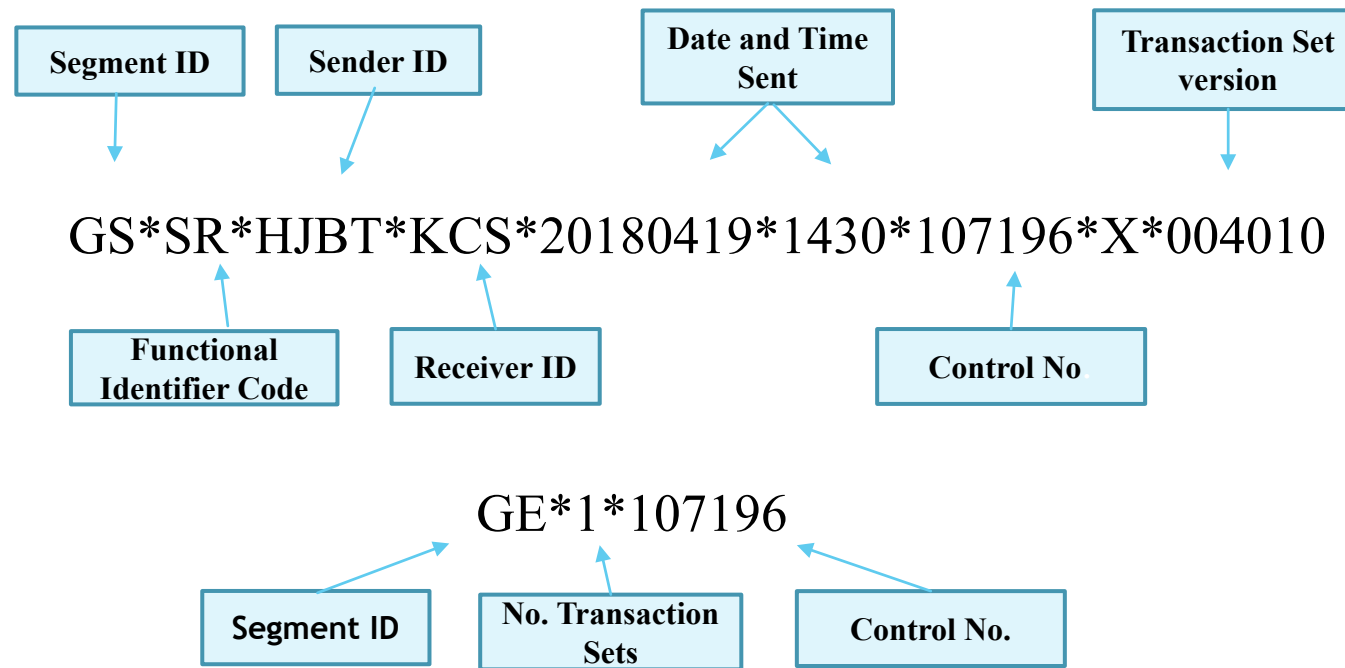


EDI Format Basics

~ Functional Group Header and Trailer

There can be one or multiple functional groups within one ISA envelope

- **GS** to start the Functional Group and **GE** to end



The Functional Identifier Code equates to a Transaction Set number.
(i.e. SR = 404 and WB = 417)

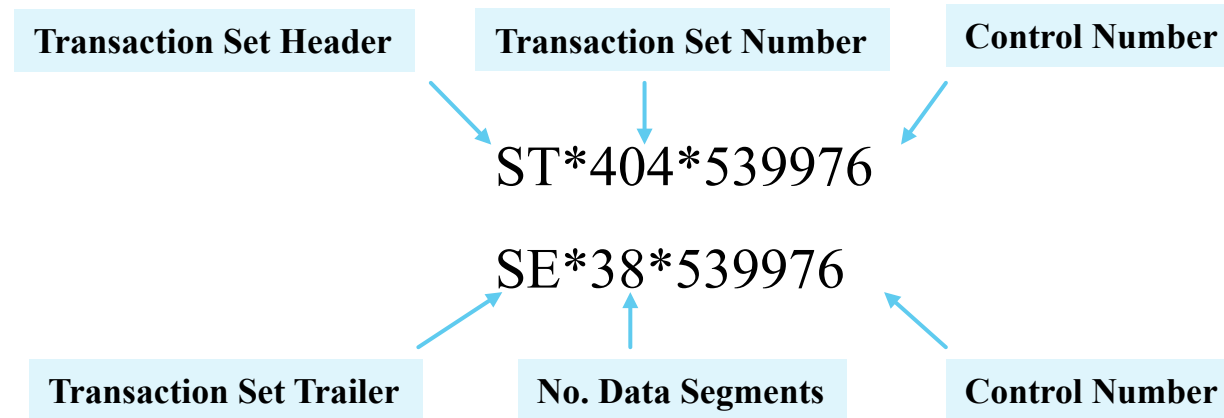


EDI Format Basics

~ *Transaction Set*

... equates to a paper document!

- **ST** to start the Transaction Set and **SE** to end



Within the Transaction Set are **Data Segments** (lines of information)

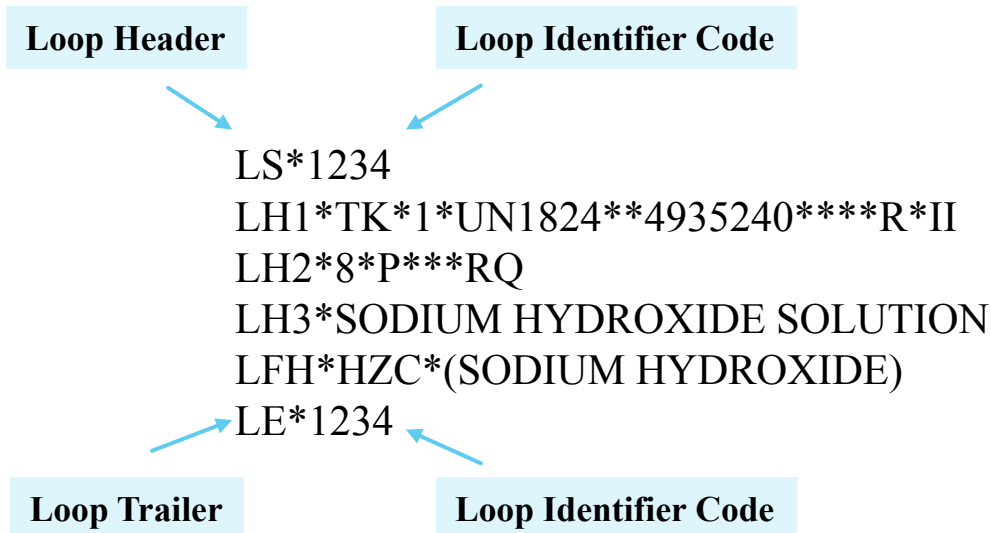


EDI Format Basics

~ Loop Structure

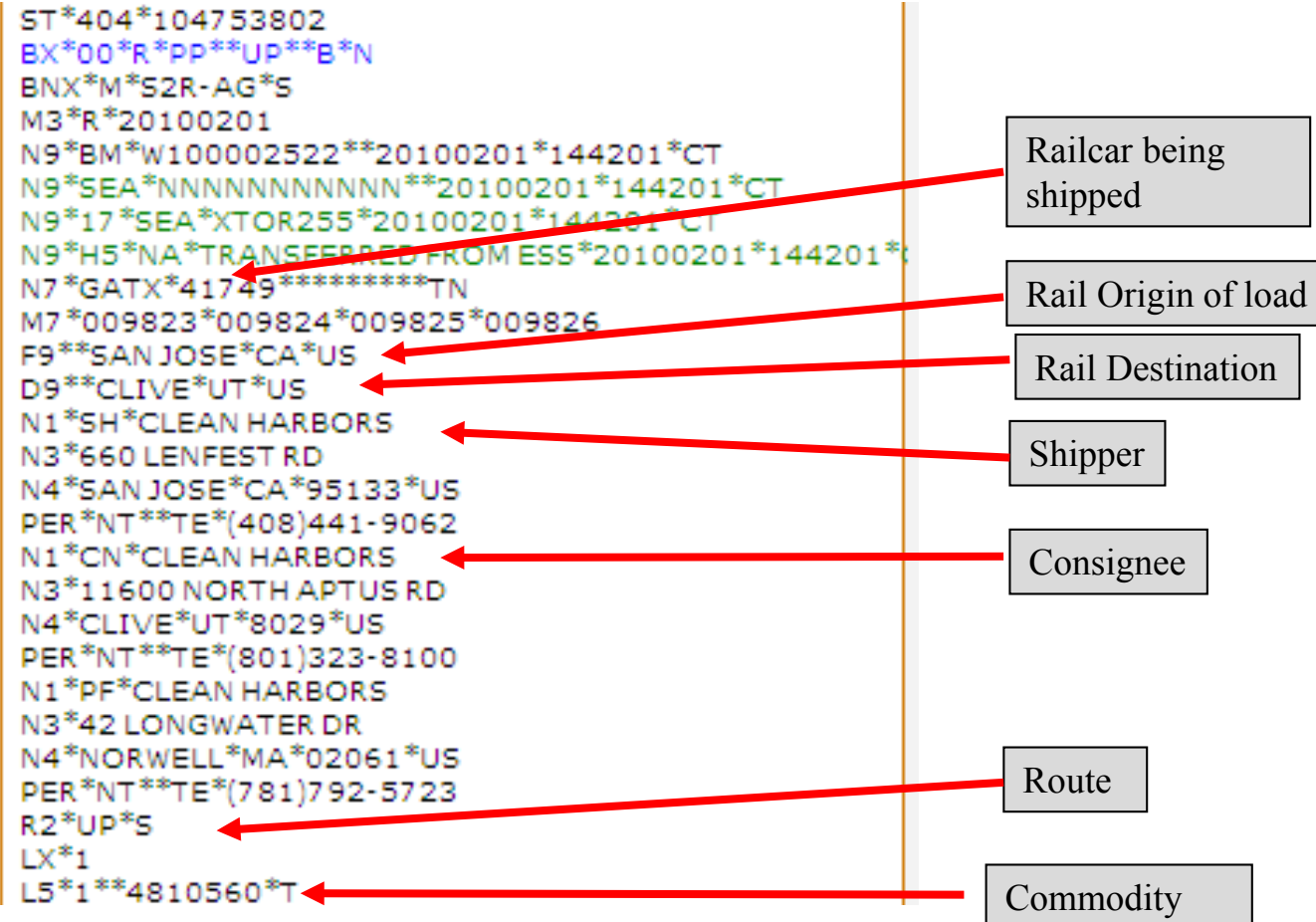
Some data segments assume special relationships with other segments and are referred to as “Loops”.

- Loops are either mandatory or optional. If an optional loop is used, then the first segment becomes mandatory.
- Loop headers (start) begin with “LS”.
- Loop trailers (end) begin with “LE”.
- Hazardous materials shipping descriptions are transmitted using LH loops.



EDI Format Basics

Key attributes for rail bill of lading.



How DOT regulation are supported in Rail EDI transaction sets



Where is EDI addressed in the regulations?



49 CFR

Subchapter A – Applicability, General Requirements,
and North American Shipments
Section 171

- 171.8 **Electronic data interchange (EDI)** means the computer-to-computer exchange of business data in standard formats. In EDI, information is organized according to a specific format (electronic transmission protocol) agreed upon by the sender and receiver of this information, and transmitted through a computer transaction that requires no human intervention or retyping at either end of the transmission.”

49 CFR

Subchapter C – Hazardous Materials Regulations
Section 172

- 172.202 (b) “... Shipping descriptions for hazardous materials offered or intended for transportation by rail that contain all the information required in this subpart and that are formatted and ordered in accordance with recognized **electronic data interchange** standards and, to the extent possible, in the order and manner required by this subpart are deemed to comply with this paragraph.”



How Rail EDI supports Hazmat Regulations

- 172.202 Description of hazardous material on shipping papers

- (a)(1) Identification Number

- (a)(2) Shipping Name

- (a)(3) Hazard Class/Division Number

- (a)(4) Packing Group

- (a)(5) Total Quantity

- (a)(7) Type and Number of Packagings

- (d) Technical Name

- 172.203 Additional description requirements

- (a) Special Permit

- (b) Limited Quantities

- (c) Hazardous Substance/Reportable Quantity Notation

- (d) Radioactive Material Information

- (e) Empty packagings

- (g)(2) DOT-113 Tank Car

- (g)(3) Maximum Operating Speed

- (k) Technical Name

- (l) Marine Pollutant Notation

- (m) Poison-Inhalation Hazard and Hazard Zone Notation

- (n) HOT Notation

- (o)(2) Control and Emergency Temperature

- (p) Non-odorized Notation for Liquefied Petroleum Gas



EDI 404 – Shipping Instructions (Bill of Lading)

172.202 (a)(1), (a)(2), (a)(3), (a)(4), (a)(5) and (a)(7)

L5*1*HAZARDOUS MATERIAL*4907680*T
LS*800
LH1***BX*1*UN1298**4907680*KG*5***II**
LH2***3*P**
LH2***8*S**
LH3***TRIMETHYLCHLOROSILANE*D**
LE*800
PER*HM*ACME CHEMICAL*TE*1234567890

LH302 contains the qualifier for the regulator authority regulating the commodity (C = Canadian, D = US and I = International).

LH202 qualifies the value in LH201 as primary (P) or subsidiary (S). For the hazard class “combustible liquid” the value sent is “COMBUSTIBLE LIQUID”.



EDI 404 – Shipping Instructions (Bill of Lading)

172.203(a)

L5*1*DANGEROUS GOODS*4918511*T
LS*800
LH1*DR*80*NA1463**4918511*PG*40000***II
LH2*5.1*P***RQ
LH3*CHROMIC ACID, SOLID*D
LFH*HZA*(CHROMIC ACID)
LFH*HE***12345**
LE*800
PER*HM*ACME CHEMICAL*TE*1234567890



EDI 404 – Shipping Instructions (Bill of Lading)

172.203 (c)

L5*1*HAZARDOUS MATERIAL*4909230*T

LS*800

LH1*TK*1*UN1230**4909337*****II

LH2*3*P***RQ

LH3*METHYL ALCOHOL*D

LFH*HZC*(METHYL ALCOHOL)

LE*800

PER*HM*ACME CHEMICAL*TE*1234567890



EDI 404 – Shipping Instructions (Bill of Lading)

172.203(d), (d)(4)

L5*1*RADIOACTIVE MATERIAL, LOW*4929133*T
LS*7000
LH1*CH*1*UN2912**4929133*LB*8225
LH2*7*P
LH3*RADIOACTIVE MATERIAL, LOW*D
LH3*SPECIFIC ACTIVITY*D
LH3*(LSA-I)*D
LFH***RAM*NUCLIDES:AM-241/PU238/PU239/PU-240**
LFH***RAM*/PU-241/TC-99/TH-228/TH-2*30/TH-232/U-234/U-235/U23**
LFH***RAM*8*CHEMICAL / PHYSICAL**
LFH***RAM*FORM:SOLID/PU/U/TH OXIDES*FISSILE EXCEPTED**4N*34.9003**
LFH*RAM*EXCLUSIVE USE: NO*LOADING, UNLOADING,
LFH*RAM*OR SHIFTING OF LADING*ON RAILCAR WITHOUT THE
LFH*RAM*APPROVAL OF THE*CONSIGNOR OR CONSIGNEE
LFH*ADI*MAINIFEST NUMBER XC019873*18011 RADIOACTIVE LOW
LFH*ADI*SECIFIC ACTIVITY(LSAI),7*FISSILE EXCEPTED, LEU
LFH*ADI*YARD DEBRIS INTERMODAL*WP019873. MBQ 34.9003,
LFH*ADI*MCI .9433
PER*HM*CCN16092*TE*8004249300



EDI 404 – Shipping Instructions (Bill of Lading)

172.203(e)

L5*1*VINYL CHLORIDE STABILIZED*4905792*L
LS*0700
LH1*TK*1*UN1086**4905792****R
LH2*2.1*P***RQ
LH3*VINYL CHLORIDE, STABILIZED*D
LFH*HZA*(VINYL CHLORIDE)
LFH*TNM*(VINYL CHLORIDE BULK)
LE*0700
PER*HM*CONTRACT: 9368*TE*8004249300



EDI 404 – Shipping Instructions (Bill of Lading)

172.203(g)(2)

L5*1*DANGEROUS GOODS*4905735*T

LS*800

LH1*TK*1*UN1038**4905735

LH2*2.1*P

LH3*ETHYLENE, REFRIGERATED*D

LH3* LIQUID*D

LFH*D13*DOT-113, DO NOT HUMP OR* CUT OFF CAR WHILE IN

LFH*D13*MOTION

LE*800

PER*HM*ACME CHEMICAL*TE*1234567890



EDI 404 – Shipping Instructions (Bill of Lading)

172.202 (d) & 172.203(k)

L5*1*DANGEROUS GOODS*4907825*T
LS*800
LH1*TK*1*UN1993**4907825*****II
LH2*3*P***RQ
LH3*FLAMMABLE LIQUIDS, N.O.S.*D
LFH*HZC*(DIMETHYLETHYLAMINE)
LFH***TEC*(DIMETHYLETHYLAMINE)**
LE*800
PER*HM*ACME CHEMICAL*TE*1234567890



EDI 404 – Shipping Instructions (Bill of Lading)

172.203 (I)

L5*1*CHLORINE*4920523*T

LS*800

LH1*C4*1*UN1017**4920523*LB*163050

LH2*2.3*P***RQ

LH2*5.1*S

LH2*8*S

LH3*CHLORINE*D

LFH*HZC*(CHLORINE)

LFH*TNM*(CHLORINE)

LFH*MPI*(CHLORINE)

LFH*PIH*POISON-INHALATION-HAZARD**B

LE*800

PER*HM*ACME CHEMICAL*TE*1234567890



EDI 404 – Shipping Instructions (Bill of Lading)

172.203(m)

L5*1*HAZARDOUS MATERIAL*4921016*T

LS*800

LH1*TK*1*UN1809**4921016*****I

LH2*6.1*P***RQ

LH2*8*S

LH3*PHOSPHORUS TRICHLORIDE*D

LFH*HZA*(PHOSPHORUS TRICHLORIDE)

LFH***PIH*POISON-INHALATION**

HAZARDB**

LE*800

PER*HM*ACME CHEMICAL*TE*1234567890

For Inhalation Hazard the LFH01 will reference 'INH' and the LFH02 will contain "INHALATION HAZARD".



EDI 404 – Shipping Instructions (Bill of Lading)

172.203(n)

L5*1*DANGEROUS GOODS*4934223*T
LS*800
LH1*TK*1*UN2214**4934223*****III
LH2*8*P***RQ
LH3*PHTHALIC ANHYDRIDE*D
LFH*HZC*(PHTHALIC ANHYDRIDE)
LFH***HOT*HOT**
LE*800
PER*HM*ACME CHEMICAL*TE*1234567890



EDI 404 – Shipping Instructions (Bill of Lading)

172.203(o)(2)

L5*1*DANGEROUS GOODS*4918986*T
LS*800
LH1*BX*1*UN3113**4918986
LH2*5.2*P*******CE*5*CE*15**
LH3*ORGANIC PEROXIDE TYPE C, *D
LH3*LIQUID, TEMPERATURE*D
LH3*CONTROLLED*D
LFH*TEC*(TERT-AMYL*PEROXYPIVALATE)
LE*800
PER*HM*ACME CHEMICAL*TE*1234567890



EDI 404 – Shipping Instructions (Bill of Lading)

172.203(p)

L5*1*DANGEROUS GOODS*4905752*T
LS*800
LH1*TK*1*UN1075**4905752
LH2*2.1*P
LH3*PETROLEUM GASES, *D
LH3*LIQUEFIED*D
LFH***NOD*NON-ODORIZED**
LE*800
PER*HM*ACME CHEMICAL*TE*1234567890



Thank you

