Intermodal **Connects**





Introduction to Intermodal Rail

March 8th, 2022 2:00 PM EST



Housekeeping





- Audience will be muted
- A question & answer session will follow the presentation
- Submit questions by clicking the Q&A icon at the bottom of your screen
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INTRODUCTION TO INTERMODAL ON RAIL

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WHAT IS INTERMODAL?

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Intermodal in general is defined as the movement of finished goods or raw materials involving more than one mode of transportation.

Rail Intermodal is normally thought of as a shipment in a container or trailer moving over rail plus one or two other modes:



Rail

Motor Carrier

Ocean

WHY LEARN INTERMODAL?



- Intermodal is growing much faster than other rail segments
- The decline in carload traffic, particularly coal, has put an increased importance on intermodal for the rail industry
- > The growth of e-commerce has put an increasing focus on intermodal.
- Intermodal operate in specific lanes on a more scheduled basis
- > Intermodal groups at the railroads are often separate services.
- > Intermodal customers often operate on contract agreements with performance incentives.

WHO ARE THE RAILROADS?



Top 7 are the Class I U.S. Railroads (\$489.94 MM or more annual U.S. revenue).

Rail- roads	Where?	Miles Operated
BNSF	Western U.S.	32,445
UP	Western U.S.	32,236
NS	Eastern U.S.	20,602
CSX	Eastern U.S.	19,420
CN	Canada/Mississippi R.	25,363
CP	Canada/Midwest U.S.	17,318
KCS	Midsouth US/Mexico	6,389
Regionals	All over N.A. (~25)	17,866
Short Lines	All over N.A. (~600)	32,758
Total		204,397



COMMON INTERMODAL TERMS



ISO & Domestic Containers



ISO containers refer to those containers that are 20, 40, 45 and 48' long and carried international on ships between countries and continents. Only a fraction of them ever move in North America.

Domestic containers refer to the 53' (and some 60') containers that move solely within North America.



BCO – Beneficial Cargo Owner

The Beneficial Cargo Owner is the ultimate owner in the shipment in the container. Unlike carload shipments where the shipper and consignee are the main rail waybill customer parties, the BCO fills that role in intermodal. The BCO books the shipments either direct or through a third party. The BCO may or may not be on the rail waybill.

The BCO for intermodal would be companies such as WalMart, Home Depot and Dollar General. Amazon and WalMart have invested in the own container fleets.





Freight Forwarder/Intermodal Marketing Company/Broker

All three of these are third party (3PL) entities that book and manage intermodal shipments on behalf of the shipper or BCO. These parties can manage the pickup (dray), book the rail shipment, and the delivery to either the destination BCO or the port of debarkation.



The advantage to a shipper or BCO using these services is that it allows them to focus on their core competency (manufacturing, retail, etc....) and spend less on transportation management.

These 3PL companies rarely show on a rail waybill.



NVOCC – Non-Vessel Owning Common Carrier

NVOCC's are entities that book a block of space (measured in TEU's) on an ocean Carrier's ship and voyage. This allows the NVOCC to get a discount for buying the capacity in volume and guarantees the ocean carrier the revenue for the space whether it is filled or not.

The NVOCC then markets that space to BCO's, shippers and 3PL's that need to ship internationally.

Examples include Expeditors, DSV, Panalpina, and Damco





Drayage or Dray Carriers

Drayage is the act of getting the container from the customer dock to the rail ramp (or port) or from the rail ramp to the customer docks (or port). This is the role of motor carriers in intermodal and is also referred to as the:

"First Mile" – Customer dock (or port) to the railroad ramp

-or-

"Last Mile" – From the railroad ramp to the customer dock or port





TYPES OF EQUIPMENT

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INTERMODAL FLAT CARS – TWO MAJOR TYPES





(Articulated) Intermodal Well Cars



Articulated Intermodal Spine Cars



- Intermodal cars can be a single car or be articulated.
- Articulated cars come in sets of 3 or 5 "platforms" that are counted as a single car.
- Intermodal well cars can carry 1 to 3 containers in a single well.
 Articulated spine cars may carry 1 or 2 trailers or 20' containers.



TTX – "The Railcar Pooling Experts"

- Owned by the Class I's, FXE and Pan Am, TTX provides and manages the pooling for the majority of the intermodal well, spine cars and other flat cars to the rail industry.
- The other flats are used mostly for auto racks, military and farm equipment, trash containers and sometimes shipping containers.
- Cars are assigned to pools determined by railroad size. This allows the railroads a flexible fleet of cars that can change with market conditions.





CONTAINERS & TRAILERS – MAJOR TYPES



Dry Van ISO Containers



Domestic Containers

20 foot



ISO "Reefer" Container



40 foot

Trailers



ISO Liquid Tank Container

20 foot



53 foot

60 foot



Pup Trailers



53 foot 28 foot Containers may sometimes be referred to as "boxes" or "cans" in the industry.

Intermodal Equipment – The Chassis

- The chassis is a rubber-tired trailer under-frame on which a container is mounted for transport in the intermodal facility, out on the street or on the highway transport. They come in 20, 40, and 53 foot sizes.
- Chassis used to be owned by the ocean carriers but are now largely owned by private pool companies.
- Motor carriers pay a daily per-diem (\$15-25) for use of the chassis.
- Who should actually pay for chassis repairs is an on-going hot topic in intermodal.







THE RAILROADS AND INTERMODAL

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- All seven Class Is play a role in both international and domestic intermodal.
- Some regionals and a few short lines also participate in rail intermodal.
- Railroads work with third parties or truckers to handle the drayage (over the highway) parts of the move, but sometimes they provide door to door services.

Intermodal traffic now makes up more than half of all Class I shipment volume. Coal used to be King. Intermodal is now King.

2019 AAR North American Shipment Statistics (all roads)

Shipment Type	Total Shipments
Intermodal	13,723,570
Carload	12,992,404

TWO MAJOR TYPES OF INTERMODAL MOVES

International (ISO or IPI) Containers



Import/Export Intermodal Move Within N.A.



- Import containers come into a port via ocean carrier, are taken off the vessel, immediately or eventually loaded on rail cars, and then moved to any of various destinations.
- At the destination intermodal ramp (aka terminal) the containers are "de-ramped" from the train, placed on a chassis, and "drayed" to the end customer via a specialized trucker known as a drayage carrier.
- Export containers arrive at an intermodal terminal via a drayage carrier, are taken off the chassis, "ramped" onto a train, and moved to a port (or nearby) by rail.
- At the port, the container is "de-ramped" from the railcar, and eventually or immediately loaded onto an ocean vessel.

TWO MAJOR TYPES OF INTERMODAL MOVES

Domestic Containers and Trailers



Domestic Intermodal Moves



- Domestic containers and trailers move solely in continental North America.
- Intermodal operations for domestic containers and trailers are mostly similar to those for international containers, with some major differences:
 - Trailers, of course, do not need chassis.
 - The domestic move customers do not include the ocean carriers.



There are differing combinations of intermodal trains:

- All Domestics Containers and Trailers These are normally the hottest trains on the railroad(s) and often have performance guarantees and penalties. They are referred to as 'Z' trains or 'priority intermodal' and cost more to use.
- All ISO containers or a combination of lower priority Domestic and ISO containers.
- "Bare Tables" all empty IM cars or all empty trailers and containers being repositioned.
- **Mixed** In the era of Precision Scheduled Railroading(PSR), some intermodal is starting to run combined with car load.





- "Double stack" refers to stacking 2 or 3 containers in a single well (i.e. a lowered area) in the flat car.
- This was made possible with invention of a flat car with wells, allowing container traffic on rail to become economically viable for the railroads.
- Trains with well cars are referred to in railroad lingo as a 'stack train' or just 'stacks'.



- One to three containers can be loaded in a well.
- The number of containers in a single well depends on their weights and weight limit of the well car.
- Originally container moves were referred to as 'COFC' or Container on Flat Car.





- Truck trailers riding 'piggyback' on rail cars was where railroad intermodal began.
- Originally this was referred to as 'TOFC' or Trailer on Flat Car.
- Trailers are typically loaded onto spine cars (another type of flat car). They can be carried in a well car if necessary.
- Railroads have moved away from wanting to carry trailers because they cannot be stacked.
- The percentage of trailers has dropped from 80% to less than 20% since the mid-1980s.
- Trains carrying trailers (and sometimes containers) are still known in railroad lingo as a 'Piggyback' or 'Pig' Train.



WHY DO TRUCKING COMPANIES MOVE ON RAIL



There are several reasons:

- Distance Economics double stacks are less expensive than trucks for shipments moving >1,000 miles*
- Flexibility having a choice of not employing over the road drivers
- **E-Commerce** The 'Amazonization' of the economy, accelerated by pandemic driven factors.



INTERMODAL LANES

- The railroads schedule and measure their intermodal trains in origin ramp to destination ramp lanes. In N.C., only Charlotte and Greensboro have ramps.
- Some larger metropolitan areas have more than one ramp and lane available.
- When customers schedule shipments they need to be aware of the facility, service level and lanes that fit where they're trying to ship.

Examples of Lanes:

UP – Global 2 (Chicago) to Los Angeles BNSF - Los Angeles/Long Beach to Chicago BNSF - Seattle to Minneapolis CSX - Jacksonville to Memphis NS - NY/NJ (Elizabeth, NJ) to Chicago CN – Montreal to Vancouver





RAILROAD INTERMODAL RAMPS

- All of the railroads that carry intermodal have intermodal facilities that are referred to as "Ramps" or "Terminals". The term "Ramp" dates back to when intermodal shipments were trailers that were loaded on a flat car using a ramp up to the car.
- Ramps are most often stand alone facilities close to interstate highways. They can also be located next to or be part of a regular yard.

The typical facility will have:

- entrance and exit gates
- arrival/departure yards for trains
- loading and unloading tracks
- lift devices to load/unload units to/from flats
- storage tracks for empty cars
- storage for containers, trailers, chassis
- maintenance areas







Intermodal Terms - Transloading

Transloading in intermodal represents transferring the contents of ISO containers to domestic containers. Most commonly, the process involves "repacking" the contents of 3 ISO containers into 2 domestic containers.

All the Class I's maintain or work with transloading facilities near ports. They are called ICTF's or Intermodal Container Transfer Facilities.

ISO Containers are hauled either by rail or more commonly by truck to the ICTF where they are "repacked" into domestic containers.

Transloading offers cost and speed advantages.



BEGINNING THE CYCLE



Intermodal Ramp Lift Cranes



Gantry Crane

The crane spans the rail(s) and a lane for the container/trailer to be driven underneath it. The equipment is then lifted onto the car.

Side Lift Crane

The crane works by lifting the trailer of container from the side and then over onto the rail car.



Inter-Box Connectors (IBC's)

When containers are stacked on a well car Inter-box connectors are placed between the containers to lock them in place. The 53' foot domestic containers have locking points that line up with the ends of a 40' ISO container (red circles on picture).



HOW DO CONTAINERS STAY CONNECTED?

53' Well Cars



40' Well Cars



53' Spine Cars





THE RAILROADS AND INTERMODAL



Container Types and Sizes





20 Foot Dry Van	ISO Container
Length:	20 feet
Height:	8 ft. 6 in.
Width:	8 ft.
Tare Weight:	5,000 lbs.
Cargo Capacity	60,000 lbs.

40 Foot Dry Var	n ISO Container
Length:	40 feet
Height:	8 ft. 6 in.
Width:	8 ft.
Tare Weight:	8,000 lbs.
Cargo Capacity	58,000 lbs.



Container Types and Sizes





40 Foot ISO "Re	efer" Container	
Length:	40 feet	
Height:	8 ft. 6 in.	
Width:	8 ft.	
Tare Weight:	10,000 lbs.	
Cargo Capacity	60,000 lbs.	

20 Foot ISO Liqu	id Tank Containe
Length:	20 feet
Height:	8 ft. 6 in.
Width:	8 ft.
Tare Weight:	7,500 lbs.
Cargo Capacity	6,800 gallons
Cannot be double-stacked	



Container Types and Sizes



53 Foot Domes	tic Container
Length:	53 feet
Height:	9 ft. 2 in.
Width:	8 ft.
Tare Weight:	10,000 lbs.
Cargo Capacity	57,000 lbs.

Domestic Container	
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DS.	
DS.	





Trailer Types and Sizes



53' Trailer

May be either dry van or refrigerated. Employed when the shipper desires flexibility of road vs rail or when trucking companies do not own containers.

28' 'Pup' Trailer

Have become much more common with the "Amazonization" of last mile package delivery. Allows greater flexibility in delivery of smaller loads in a more expedient manner.



Intermodal Flat Cars



Intermodal Well Cars

- Used in transporting containers.
- Designed to have two containers "double stacked" one of top of the other.
- Can either be a single car or an "articulated" car of three or five (only on 40') "wells".



Articulated Intermodal Spine Cars

- Primarily used in transporting trailers on rails but may carry a single container on each deck.
- These cars are <u>always</u> articulated in sets of 3 or 5 platforms.

The intermodal flat is <u>not</u> usually named on rail waybills.





What makes a car "articulated?"

- Multi-well intermodal flat cars and spine cars are said to be articulated when three to five platforms are considered a single car in Umler and railroad systems.
- The ends of each car have normal trucks (units containing the axles, wheels, and couplers for a rail car).
- The platforms in the middle of the articulated car share a truck highlighted in red to the right.



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Railroading Operations

When you're new to the industry, it can be difficult to piece together how railroads operate. You've probably experienced a train blocking your car's path, but do you know why?

This is just one of the many complexities that make the railroad system drastically different than the motor carrier or shipping industries, so it's important that even other transportation industry veterans take the time to learn about rail.

The Loaded Railcar Shipment Cycle

Once you've learned the fundamentals of who the railroads are and how they operate, it's time to learn how a loaded rail car moves.

If you're responsible for managing shipments, it's important to understand how the carload shipment cycle happens and exactly what each event means for you.

Intermodal Rail Operations

Carload shipments move commodities that are essential to everyday life in North America, but what about those essentials that don't move by carload? For example, you wouldn't ship clothes or electronics in a boxcar.

Intermodal is a separate business unit with a distinct vocabulary and event cycle.

Customized Training

If you're struggling with something that doesn't fall into a standard course offering, let us know.

We'll leverage our experts in multiple areas and create a customized training course that is tailored to your specific needs.



Q&A

Enter your questions using the Q&A button







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