

How Does Freight Flow?

Displaying and Understanding Freight Transport Infrastructure and Connectivity

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A major part of civilization involves getting products and materials from Point A to Point B. Between these starting and ending points are endless possibilities for transport, exchange, transformation, and recycling. A chain of freight may be as simple as bringing apples from an orchard to a market or as complex as creating vehicles from many various materials and transporting them across the ocean for display. Understanding the basics, such as “coal goes from the mine to the power plant”, is not difficult, but what about all the intermediate steps? What other products, transportation, and infrastructure go into the seemingly simple act of bringing coal to produce electricity and every other industry and flow of materials besides? As described in this exploratory essay, I look for a way to understand and present the flow of freight in a way that, though not exhaustive for all industries, products, or locations, at least reveals in an accurate way the complexity of industry connectivity and transport infrastructure.

The first step is to determine what industries will be examined. For a general overview, I consider three industry categories, selecting from major industries in Ohio as described in the Ohio Development Services Agency’s Ohio Industry Series which gives a list of overall categories and detailed reports on each. These three categories provide a core from which I can work forward and backward to discover the web of products and transportation. From the Ohio Industry Series reports, I select an “Advance[d] Manufacturing” industry, steel; a “Chemicals” industry, paint; and a “Polymers” industry, plastic bottles. These industries will provide a wide enough range of products that their differences and similarities can be compared and contrasted.

For each of these industries, their inputs (what materials go in) and outputs (what materials are produced) must be considered to build a full understanding of their place in freight

connectivity. I use steel as an example, deriving information from the World Steel Association. New steel is produced via the blast furnace method, which uses iron ore, coal, and recycled steel. The chains of products form a web: iron, coal, and recycled steel all come from different industries that connect to the steel industry. These industries also have their own inputs from and outputs to various other industries. The output of the steel industry is used in a wide variety of industries including steel construction and steel tools.

The final piece in an overview of freight flow is the transportation that connects the industries. As I want an overview, all I need is information on which methods of transportation (truck, rail, air, etc.) are used for a specific flow of freight. According to the Ohio Rail Development Commission (2019), iron ore and coke are transported by rail and water to steel mills. This produces a small web with three industries, three products and two transport methods: iron ore flows by rail and water to steel mills and coke flows by rail and water to steel mills.

An ideal method of presentation for a web of industry is an interactive website. In its most basic form, it would be a view on the web of freight flow with transport lines of products connecting each industry. More advanced features would include the ability to look up detailed information on each industry or transport connection and the ability to view various reports such as a list of every industry in the web that is connected to the making of a certain product. Through interactivity (moving around, zooming, switching focus, etc.) a viewer of the website would be able to easily understand the web of industry and navigate to whatever information interests them most. By creating this website, I will be forced to understand the industries and their connections as I add information to display.

The number of industries and materials covered by the website is not yet determined. Using three core industries (steel, paint, and plastic bottles) gives a starting point for the web that

goes from natural resources such as iron and coal to final destinations such as construction sites and store shelves. In the event that these industries are not complex enough for an interesting display, it will be a relatively simple matter to add another industry to the web, requiring only research and, when the website is written, a small amount of code. Limiting complexity is also easy: in the event that the industry web becomes too large to handle, simply disregarding very small industry inputs and outputs will trim peripheral industries while maintaining the objective of a general overview.

The methods of discovering and expanding a web of industry are fairly simple, as illustrated above. Deriving additional information above the industries follows similar methods. The web of industry can be displayed visually and interactively. Freight flow can be understood and represented in a web of industry inputs, outputs, and transport connections that are easily navigable in an interactive, informative website.

References

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