Essay #1

Estimates show $1.6 trillion dollars are necessary just to maintain the current state of our infrastructure. Explain how hot-dip galvanized steel can help the crumbling infrastructure. What structural and economic benefits would galvanizing provide for future generations?

The American Recovery and Reinvestment Act of 2009 identified the maintenance and upgrading of the country's infrastructure as critical to our safety and economic health. The link between infrastructure and welfare, seen clearly in previous catastrophic bridge and levee system failures in Minneapolis and New Orleans, displays the peril of ignoring the state of our built environment. The projects that come out of the $787 billion federal stimulus, and those that follow, have the promise to spur the rebuilding of our structural networks for generations to come. Through this infusion of resources, there is great opportunity. The unique characteristics of hot-dip galvanized steel make it an ideal material for tackling the dual challenges of structural stability and economy for our country's renewed prosperity.

The process of hot-dip galvanization displays the benefits of the material readily as they relate to quality. As with any factory-applied process, a high level of quality control is achieved through removing variables of weather and site conditions. Unlike painting or other metal finishes, there is no need to rely on field application, which can be uneven and limited to the exposed exterior surfaces. The total immersion dipping process covers all interior hollow elements and applies uniformly on all corners and edges. Before any high voltage power line towers or suspension bridge cable is delivered, a uniform coating on the steel can be guaranteed through a rigorous, uniform inspection process. This level of reliability is critical given the vast expanse of our country's infrastructure.

Galvanization is also a superior process for achieving strength. The process provides four layers: an outermost layer of pure zinc and three inner layers of an increasing ratio of zinc-iron alloy, which are chemically bonded to the steel. The outermost layer of pure zinc provides the ductility that makes the product malleable and complements the alloy layers that prove to be structurally stronger than the base steel below. Opposed to other finishes which can be characterized as protective layers, galvanization provides a hard shell for the structural member. The protective value of this shell is augmented by the unique self-healing property of the zinc coating. Through cathodic action, the zinc corrodes to protect the base steel if it is penetrated. This quality gives the galvanized steel structure a degree of resistance to the inevitable wear and tear that occurs under real world conditions. The durability afforded to hot-dip galvanization is ideal for the long lifetime of infrastructure investment.

The combined attributes of consistent quality and strength engender the low-maintenance of the material. Low-maintenance is highly advantageous in the structural consideration and selection of materials in infrastructure projects. While the performance of a variety of materials will match up on opening day, it is the reliability of hot-dip galvanized steel over time that meliorates its quality. Hot-dip galvanized steel proves to be a product of remarkable structural integrity. This integrity provides an additional level of safety desired in infrastructure projects.

The benefits of low-maintenance in galvanized steel are as much an economic consideration as they are structural. With the country facing large near-term deficits and long-term debt, it is critical that the materials comprising our next generation infrastructure prove fiscally responsible. The costs of galvanized products are upfront and do not require extensive repair and replacement as do other finishes. Virtually maintenance-free for fifty years in nearly all environments, galvanized steel is a remarkably affordable product with regards to its life-cycle cost. By employing more galvanized steel, we will not burden future generations with the upkeep costs of choices we make today.

Infrastructure projects improve our short- and long-term economic situation by insuring that the financial benefits of installation are spent at home. In the short-term, projects immediately produce jobs on the ground. This is especially true with galvanized steel products as the United States has one of the largest reserves of zinc in the world. And, as a material that can be 100% recycled, there is potential for a continuous industrial loop to be created in this country where old products feed new production. By utilizing local materials and the vast network of local producers of galvanized steel, the investment in our infrastructure is an investment in local jobs at every stage of the process.

The factory production process of galvanization not only provides quality control but also generates efficiency. The highly mechanized process, in a controlled environment, allows products to be delivered with a set price and schedule by a highly skilled and productive work force. By eliminating the unknown and unforeseen conditions of site work, the jobs involving galvanized steel avoid the potential delays and wasted man-hours that make it difficult for governments and municipalities to control costs.

Finally, the most promising economic potential of galvanized steel is its employment in our next generation infrastructure. While it is critical to maintain and repair our existing structures, the goal of policy makers, as seen through the federal stimulus funding, is to drive the economy of the future by laying the groundwork today. New forms of energy production and transmission, through vast arrays of solar energy, wind turbines, and the transmission lines to connect them to population centers rely on galvanized products. These new forms of energy reduce our consumption of foreign energy sources and allow our economy to be more independent and provide opportunities for growth throughout the country. New high-speed rail lines, commuter and light rail trains, as well as new highways and bridges, all rely on galvanized steel products for their installation. These projects reduce the economic waste of traffic delays, allowing people to deliver goods and services in an efficient manner. More than just fixing potholes and mending fences, these forms of infrastructure are an investment in our future, allowing us to be more productive and competitive in the global economy of the 21st Century.

As embodied in the federal stimulus plan, the repair and expansion of the country's decrepit infrastructure is critical to our current and long term health and well being. As these and other projects get underway, the use of hot-dip galvanized steel products have an integral role to play in promoting the safety and stability of our structures, while maximizing the economic delivery of these systems for current and future generations. In doing so, the material not only assures a prosperous and efficient economy but one that provides an environmentally responsive future with ample employment opportunities in the construction sector. In this way galvanized steel proves itself as a responsible actor in truly sustainable development.