The Value of Good Design for Passenger Rail

Cesar Vergara has developed potential designs for new railcars for restored service between Cleveland, Columbus and Cincinnati.

By Cesar Vergara

Does good design and imaging help produce a successful rail service? Can good industrial design help the rail industry beat the odds and produce products that develop loyalty, and pride of both the user and the employee?

Starting the virtuous circle of good service through design is no easy task. It requires designing trains, stations and infrastructure that communities like to look at, and both passengers and employees understand how to use and inhabit for a few hours a week. This allows employees to feel proud of their system and provide better service, thus making the passengers feel welcome and important. The passengers, then, find the system more attractive and take better care of it.

As witnessed with unmanned stations in Germany's Deutsche Bahn system, vandalism remains a stubborn problem. However, designing and building unsightly structures that can withstand the abuse of a few for the punishment of the majority is an outright capitulation. Experience has shown that well-designed trains and stations remain looking good much longer if well-maintained indefinitely. This is the case in Mexico city, where the subway – one of the busiest in the world since its inauguration in 1968 – was designed in an attractive way, and continues to look good even as it grows in unison with the world's largest metropolis. Washington, D.C.'s Metro system would be another good example. It is a well-designed system that is operating above capacity, but still provides stellar service in a very impressive architectural system. When it comes to passenger rail, I am a strong believer that if it costs a million bucks, it should look like a million bucks.

Designing equipment and infrastructure that is attractive not only builds a legacy for generations to come, but improves neighborhoods and communities for people who don't even use the system. The Fairmont Corridor bridges of the Massachussetts Bay Transportation Authority's commuter rail lines in the Dorchester neighborhood of South Boston are a fine example of infrastructure that is very attractive and built within the original budget.

As a result, even though industrial design and architecture constitute a fraction of one percent of the cost, they account for 100 percent of the system's perception. Why is it then, that most passenger rail agencies consider the application of industrial design only as an afterthought?

This phenomenon is rooted in an engrained culture of designing trains from an engineering perspective, which of course yields regulation-compliant vehicles that can be well-maintained. The problem is that passengers don't like them, and as a commuter of many years in both the U.S. and Europe, I am sure I speak for the majority

The Quantum Leap

The quantum leap that is now required of the passenger rail industry is to design trains from the point of view of the end user. And the users are not only the passengers. One must also think of the onboard employees, the maintenance employees and the communities traversed by the system. It is, in some ways, reverse-engineering. Envision a fabulous system based on the users needs first and back-engineer it to see how close you can come to reaching that goal.

All outstanding designs are user-based. A perfect example are Apple computer products. Never has a

company been so successful by demanding, bending and pushing the envelope of technology to ensure the product feels intuitive and natural to the user. We can do the same thing for public transportation. It is one of those cases where engineering is made to be subordinate to industrial design, when in reality, design makes engineering become more user-friendly.

The Forgettable Journey

Often, the very definition of what good design really is runs counter to conventional wisdom and everyday definitions. Designed objects produce sensory responses from people. In the case of a transit system, these are often a cacophony of sounds and sensory overload.

Imagine if you could access the relevant information – such as schedules or paying for your ticket – with ease; navigate the station and train without difficulty; enjoy the train ride by using your electronic devices, reading or relaxing; and then transfer to another mode of transport and arrive to your final destination without any problems. That would be a great journey. It is also probably one you will forget as soon as you complete it. This is the task of planners, architects and designers: create the visible envelope – or skin – of a complex system and deliver this type of journey.

To do this, you must make the passenger feel smart by making the equipment easy to use and you will have earned their thanks. Make them feel comfortable and you will have earned their support. Make them feel safe and you will have earned their most coveted vote – the one of confidence. From the schedules, websites and station signage to the way the seats feel in both the station and the train to the comfort of being able to easily reach a baggage rack, it is important that the details are not the details, they are the project.

Engineers and planners would argue, well, of course the rail industry works hard to provide these attributes in all they do. This is true, but the passengers do not know anything about this. The enormous sums spent in building railcars engineered with crash impact management, advanced signaling systems and positive train control are engineering wonders that remain invisible to the passenger, and hopefully always will.

Industrial design and architecture, as the last layers, are entrusted with creating the only visible envelope for the passengers. It is the ambassador discipline that tells the passengers this is a high-tech product engineered to keep you and the rest of the passengers safe.

Like a person that displays radiant health, the skin of the system – the industrial design– also portrays and displays system whose inner workings are in top order. By designing the train poorly, we are failing to convey the hard work of engineering that goes into the vehicles. It costs as much to produce a shabby-looking vehicle as it does to produce a beautiful one. It is the same amount of metal and plastic, period. That is why design is so important. It is the discipline by which the industry combines all that it does to deliver a quality envelope of transportation to the passenger

The Process of Industrial Design

A dissertation on how industrial design is applied to best advantage can be long and tedious. Suffice it to say that industrial design is the mortar that bonds the disciplines of marketing and engineering.

All good industrial design is based on good criteria. Designing trains and stations based on accurate criteria yield fabulous transportation systems. Criteria created on findings based on customer focus groups and the agency's experience is highly effective. It is a cause and effect process: establish the goals and mission, let the designers and architects make proposals based on that criteria and check the concepts point by point against the original criteria. Chances are if the proposals meet or exceed all criteria, the concepts are sound. If the concept appears unfamiliar, it is a good sign, because innovation inherently has a large degree of newness to it.

Based on properly-conducted customer focus groups, transit executives are empowered to provide a list of features and amenities that the industrial designer uses a road map to arrive at a solution. The industrial designer works as part of the engineering team to develop concepts that are both attainable and maintainable.

It is important to note that criteria

Vergara worked with planners and engineers in Massachussetts to add style to the Fairmount Corridor commuter rail bridges.

– for example, design should use existing colors –unleashes creativity. Instructions – such as that color shall be green – chains it down. The industrial designer has a hard enough challenge conceptualizing vehicles and stations that the passengers will find attractive, while ensuring compliance with statues and standards established by governmental regulatory agencies, without being constrained by a narrow set of design instructions.

Compromises: Insurmountable Challenges or Opportunities for Innovation?

Given that one department's solution creates another department's problem, industrial design is a great mediator creating solutions that satisfy all departments' needs, while making vehicles safe and compliant. Team work is the key word, and industrial design offers early and concrete proposals that mesh all the needs going into the project. What's more, the industrial designer and architect work directly with the engineering teams to provide renderings, animations and mock-ups that eliminate guess work as to which direction the design is moving.

Compromises are difficult but necessary. A good example would be accessibility compliance in commuter rail cars. An accessible lavatory occupies the space of up to nine seats in a three-by-two configuration. The space required to maneuver a wheelchair is simply that large. By making the lavatory ample, a better space is provided for all users, including passengers with children and people with other disabilities. When I first started my career as a train designer in Sweden almost three decades ago, the Swedish railroad had a motto: what is necessary to a few is convenient for all. This perspective is still my core value when designing rail vehicles and facilities.

A recent experience with seating is another good example of a compromise. The design of the M8 commuter rail cars – built by Kawasaki for the Metro North Railroad – required a certain number of seats, with a pre-determined pitch same as other cars built by Bombardier. One of the main points in the criteria for these vehicles was to provide a comfortable seat that had as much knee room as possible. But how can more space be provided without increasing the pitch? As a result of the hard work the engineering team and Multina – the seat manufacturer – the seats' lumbar support was used to advantage in the seat back to create more knee room, without increasing the pitch.

Vergara's recently completed designs for new diesel multiple unit (DMU) vehicles in Ohio.

A Train is a Moving Building

Is the train a moving station or is the station a stationary train? As a longtime participant in the Watford group of architects and railroad industrial designers, I have learned from my peers in Europe and Japan that the appearance of the infrastructure, station and rolling stock is of upmost importance to the communities and their future development. This goes beyond urbanism. The infrastructure should be sensitive to the invasive nature of railroad track and strive to improve the urban landscape. The station building should – by its mere size – convey the message to all that it is a train station. Last but not least is the train itself should be geographically

relevant and exciting to see.

The need to have financially self-sustaining stations is necessary. However, the worrisome new development approach of creating what amounts to a shopping center at the station entrance is not a good trend. Now that many new stations are going to be built in the U.S. to support high-speed and intercity passenger rail projects, this important aspect of design that cannot be ignored. In the coming field trips that rail leaders and planners will take to Europe and Asia, it is also important to remember lessons learned and things to avoid. Making the passenger feel helpless because they cannot find the station creates a bad first impression. The demographics of an aging society demand facilities that are convenient for all.

When a new station is proposed or planned, a series of approvals, environmental impact studies and processes are undertaken. Town and cities have boards that approve quality architecture that will enhance the urban, suburban and outlaying landscapes. If an unattractive building is proposed, usually the community will react and make the necessary changes happen.

How would a community react to a plan that proposed 100 moving buildings, each 700 feet in length, 16 feet in height and 11 feet wide? What if these buildings were all outfitted with very visible lights, and noisy bells and whistles? Would the community not like to have a say? Given this description of a typical suburban rail fleet, it is safe to say that most times people do not have a say, and communities end up with equipment that makes them wish they had trains like those in Europe or Asia. It is time to approach this subject seriously.

As a general rule, if the landscape or cityscape is attractive, the train seldom helps its appearance. If the landscape is very beautiful, the infrastructure looks best when no train is traversing it. These are the reasons why exteriors have to be made as attractive as possible. My formula is to make a promise with an attractive exterior, and keep the promise with an attractive interior. From the exterior carbody to the vestibule to the baggage racks, the train is the ambassador of all the other work, resources and investment that go into making the system safe and reliable. It has to look good.

It is thus possible to start a virtuous circle where passengers, employees and communities all appreciate and like transportation systems for the services they provide, as well as for the way that they improve their neighborhoods and communities. Pride of ownership and loyalty are back in style, and it is the new way forward for creating attractive and functional transportation systems based on the needs of the passengers. Visionary industrial design will lead the way in creating these systems.

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One of Vergara's signature concepts was for the Talgo equipment used on Amtrak's *Cascades* Trains between Vancouver, Seattle, Portland and Eugene.