Applications of civil engineering to architecture

Civil engineers have been around for centuries, whether they were called civil engineers or not. All around the globe engineers are constantly creating ways to make the lives of people safer and easier. Civil engineers have affected our lives such as the Hoover Dam which brings power to Los Angeles, Las Vegas and Phoenix. Civil engineers designed the pyramids of Egypt, the arch bridges in early Europe, and the present day advanced subway systems and highway systems around the world. Civil engineers design and construct structures. These structures help benefit society and the economy. For instance, structures that make travel easier and bring electricity and water to cities. Civil engineers are overlooked and go unnoticed even though they build these amazing structures that help people. Their role in society is greater than people realize, and civil engineers should not be overlooked.

Civil engineers do not just design things. They “ conceive, design, build, supervise, operate, construct and maintain infrastructure. . . roads, buildings, airports, tunnels, dams, bridges, and systems for water supply and sewage treatment” (Bureau 1). Civil engineers do all these things and they are not just designers. They build bridges and highways, so people can travel faster safely. Civil engineers supervise construction, so everything is within proper building code and people do not get hurt. If they do not do these things a tragedy may occur. For example, a walkway over a road collapsed at a Florida College. Another job civil engineers do is urban renewal. Urban renewal “ is a function of urban planning. . . [urban renewal] has a major impact on the urban landscape” (Gray 26). For example, The Pearl in downtown San Antonio was once an abandoned beer manufacturing plant.

Civil engineers played an important role in the development process. The Pearl is now a tourist attraction and a place where people shop, walk their dogs, and eat amazing food.

Civil engineers designed and built many structures to help people. For example, the Panama Canal, the Brooklyn Bridge, and the Hoover Dam. The Panama Canal was opened in August 1914, but it was first being constructed in 1880 by the French. The French realized it would be too difficult to build the Panama Canal (Brown 24). But, Theodore Roosevelt saw the need for the Panama Canal when it took “ one US. Warship. . . more than 2 months to travel from the West Coast to the Caribbean” (Brown 24). So, Theodore Roosevelt purchased the Panama Canal from the French. The construction continued and was opened in August 15, 1914 and still plays an important role in international trade (Brown 24).

The Brooklyn Bridge was designed and overseen by John A. Roebling. He designed and oversaw many other bridges and an aqueduct. Like, “ the Delaware Aqueduct, 1848; the Niagara Bridge, in 1855; and the Covington—Cincinnati Suspension Bridge” (Brown 18). John A. Roebling’s last project was the Brooklyn Bridge. The Brooklyn Bridge needed to be constructed because the only way to travel between Manhattan and Brooklyn, New York was by a ferry. (Brown 18). However, “ Weather condition[s] often disrupted ferry service. . . and in winter. . . river ice made [the] service impossible” (Brown 18). Because of this the construction of the Brooklyn Bridge was authorized. On May 24, 1883 the Brooklyn Bridge was opened and made travel convenient. People could now travel whenever they wanted to between Manhattan and Brooklyn, New York (Brown 18).

The Hoover Dam was constructed between 1928 and 1936 and is probably one of the most important structures in the Southwest. The Hoover Dam was built to control flooding of the Colorado River, but it did more than that “ it provided water and power to large parts of the Southwest, stimulating agriculture and urban development” (Brown 38). This is why the Hoover Dam is such an important structure. It provides water and power to cities like Phoenix and Las Vegas and many other small cities and towns in the deserts of Arizona and Nevada (Brown 38).

Structures like the Hoover Dam, Brooklyn Bridge, and the Panama Canal are just a few structures that civil engineers have designed and constructed to make travel easier, bringing electricity and water to places that would have less or none, and structures that helped the economy. These structures are breakthroughs in construction and design. The Panama Canal was a huge milestone because it allowed faster travel between the Atlantic and the Pacific Ocean. The Brooklyn Bridge was the first suspension bridge to use steel wire in the bridge and was a standard for suspension bridges that would follow, like the San Francisco-Oakland Bay Bridge and the Golden Gate Bridge (Brown 18).

There are also many different types of civil engineering. There are general engineers which do flood control, water supply, and electric and communication supply (Gray 4). A well-known structure designed and built by a general engineer was the Philadelphia Waterworks. Before it was built Philadelphia was going through a Yellow Fever epidemic and people were outraged that the local government was not doing anything (Brown 2). Philadelphia had to fix this problem, so an English General Engineer named

Benjamin Henry Larobe designed a waterworks that would purify the water of Philadelphia and pump water to people. The Philadelphia Waterworks was the only steam reliant waterworks in the country and had one of the biggest steam engines in the country (Brown 2). The Philadelphia Waterworks was a huge success for its time. Another type of civil engineering is a transportation engineer. They design and construct airports, highways and rail systems. A well-known structure that transportation engineers designed and constructed is the interstate highway system in America. Everyone drives on this mass highway system whether they cross it or take it on long road trips. The interstate highway system was a huge success. It grew the nation’s trucking industry since trucks no longer wait at several traffic lights or stop signs (Brown 50). Americans became more mobile. They can drive to one place to another much faster than before (Brown 50). Highway systems boosted America’s economy productivity because manufacturers can move their products around the country faster. (Brown 50).

Other types of civil engineers are environmental engineers, hydraulic engineers, geotechnical engineers and structural engineers (Careers 4). Civil engineers also work with other people like archaeologists to preserve the environment and artifacts (Pierce 1). They also work with other companies, such as telecommunication businesses and athletic equipment (Careers 4). Civil engineers play a big part in how the world works today and why people are healthier and safer than before. “ The accomplishments of civil engineers in America often go largely unnoticed. . .[and] simply take[n] for granted” (Brown 1). Civil engineers should be noticed because they build amazing structures for society. The interstate highway system made travel across the

United States of America much easier, the Philadelphia Waterworks brought pure water to the city of Philadelphia. The Brooklyn Bridge made it easier and much faster to travel between Brooklyn, New York and Manhattan (Brown 18). The Panama Canal made it much faster for ships to get to the Atlantic Ocean to the Pacific Ocean. The Hoover Dam brought water to major cities like Los Angeles, Las Vegas, Phoenix, and many more towns in Nevada, California, and Arizona. (Brown 38). Civil engineers designed and constructed all these structures, but they do " more than just creating, designing, constructing, maintaining" (Careers 4). Civil engineers take everything in the environment in consideration when they build structures. They also understand the preservation of the environment and the protection of the people (Careers 4). Civil engineers lay the foundation for all buildings and structures (Careers 4). Without their input and participation in the building of these structures our world would not be the same. That is why we should not overlook the importance of civil engineers.

Annotated Bibliography

Research Question: Are Civil Engineers important to society and the environment?

Brown, Jeff L. " Landmarks in American Civil Engineering History." *Civil Engineering* 72. 11

(2002): 92-171 . *ProQuest* https://proxy. nvc. alamo. edu: 2271/docview/228507862? accountid= 5482. Accessed. 18 Nov. 2018.

Jeff Brown, author of “ Landmarks in American Civil Engineering History” wrote about several structures civil engineers designed. He explained how these structures are useful to society and the positive impact these structures have on the environment. He also said that civil engineers go unnoticed despite these important structures they helped design and build. He wrote about different water treatment plants such as the Milwaukee Metropolitan Sewage Treatment Plant, Chain of Rocks Water Treatment Plant, and the Philadelphia Waterworks. He also wrote about notable bridges, railroads and roads civil engineers built. Some of these are the Trans Continental Railroad, Eads Bridge, Brooklyn Bridge, New York City Subway, San Francisco-Oakland Bay Bridge, and highway systems. Brown also wrote about important canals and dams. Such as the Hoover Dam, Erie Canal, Panama Canal, and the Fort Peck Dam.

I plan to use this source to show that civil engineers build structures for the benefit of society. In addition to having a beneficial impact on society, civil engineers assist in providing safe and interesting structures to look at. Such as the Empire State Building in New York and the Sunshine Skyway Bridge in Florida. I also want to show that without these structures our society might be different or at least would not have advanced as quickly as it did. For example, the Trans Continental Railroad provided fast travel from the eastern part of America to the western part of America. Also, without the Hoover Dam many people would not have water in the Nevada and Arizona area. I may use this source as the main argument in my paper that civil engineers are important to the environment and society.

Bureau of Labor Statistics, U. S. Department of Labor, “ Civil Engineers”, *Occupational Outlook*

Handbook , https://www. bls. gov/ooh/architecture-and-engineering/civil-engineers. htm. Accessed. 18 Nov. 2018.

The website, Bureau of Labor Statistics, shows data for multiple jobs. The Bureau of Labor Statistics shows data on what civil engineers do, how much money they earn, how to become one, and how the job is performing overall. The Bureau of Labor Statistics also provides information on the work environment, state and area data, and similar occupations. The Bureau of Labor Statistics goes into deep detail on the skills people interested in engineering need. Skills such as decision-making skills, leadership skills, math skills, problem-solving skills, speaking skills, and writing skills. The bureau also provides information on what licenses, certifications and registrations are required to become a civil engineer.

I will use this source in the beginning of my paper to show the audience what a civil engineer does. I will include information on how to become a civil engineer, descriptions of the work environment, the skills needed, and what licenses, certifications, and registrations are needed to become a civil engineer. I want to inform the reader of my paper that civil engineers have an important and an impactful role in our society as well as to our environment. I want to include specific details that support my idea of the beneficial impact civil engineers have on our society.

“ Careers in Civil Engineering.” Institute for Career Research, 2009. *EBSCOhost* ,

proxy. nvc. alamo. edu: 4443/login? url= http://search. ebscohost. com/login. aspx? direct= true&db= nlebk&AN= 293559&site= ehost-live. Accessed. 18 Nov. 2018.

This source provides details about careers in civil engineering that include what civil engineers do, the history of civil engineering, personal stories of civil engineering, and positive and negative factors of civil engineering. The personal stories are from people that have different careers within civil engineering. They discuss what they do and who they work for. They also tell why civil engineers are important and why it is an exciting career. These personal stories also highlight the positive factors within civil engineering. They say it is an exciting career because they do things that are considered impossible and turn them into the possible. They also discuss some negative factors within the career of civil engineering. They say that civil engineering is stressful and frustrating. They take measures to ensure that everything is precise. If it is not, something may go wrong, and people might get hurt.

I plan to use part of this source in the beginning of my paper to describe in more detail what civil engineers do. Then, I plan to use the information from the personal stories about the positive and negative factors to show why civil engineers are important. It is a stressful job and if something goes wrong, engineers can put people in harm’s way. For example, bridges can fall and hurt people like the one that recently happened at Florida International University. The job could also be exciting and rewarding because you can help people. For example, engineers can help people in areas that do not have clean water or good transportation. This source may be used to support my view on why civil engineers are important to society.

Gray, Kevin. “ Civil Engineering Technology”. Vol. 1st ed, *Global Media* , 2007. *EBSCOhost* ,

proxy. nvc. alamo. edu: 4443/login? url= http://search. ebscohost. com/login. aspx? direct= true&db= nlebk&AN= 233363&site= ehost-live. Accessed. 18 Nov. 2018.

The author of this book, Kevin Gray, writes about many different things civil engineers do, the history of the different planning civil engineers do such as urban planning and regional planning. Kevin Gray says urban planning was once solving city problems through physical design. Then, it changed to include economic, social and environmental planning. Urban planning also became renewing the inner city. He also says when civil engineers are planning they focus on aesthetics, safety of people, and the environment.

This source will be used to show the effects civil engineers have on urban planning and regional planning. Engineers need to include aesthetics, safety of people and the environment when designing structures. This shows they care about the environment and society. The success of these designs greatly effects the overall security of human structures and natural structures. I will also show how civil engineers revitalize communities through their designs which can impact the economic wellbeing of social communities.

Pierce, Charles E, and Pérez-Mejía Ari. “ Review of Archaeological Preservation and Civil

Engineering Professional Practice.” *Journal of Professional Issues in Engineering Education and Practice* , vol. 140, no. 1, 2014. https://nvclibrary. on. worldcat. org/search? databaseList= 1708%2C2483%2C638&queryString= engineering+and+society+challenges+of+professional+practice#/oclc/ 5711420845. Accessed. 18 Nov. 2018.

The authors in this article state that civil engineers and archeologists, often work together. The authors state that civil engineers are the first to find archeological remains and they must follow procedures to secure the safety of the remains. The article states many laws that the government passed to help preserve and protect these archeological sites. For example, The Antiquities Act established protection for archaeological remains on federal lands and provides establishment of national monuments. The article also states that in the 1970s many archaeological sites were destroyed during construction related activities. The article also states the ASCE, American Society of Civil Engineers formed a committee on the preservation of archaeological sites called the task committee on social and environmental concerns within the construction division.

I may use this source to show that civil engineers do care about the preservation of the environment and social concerns. I want to show that many laws were passed by the American and England government with the help of civil engineers, archeologists, and environmental engineers to keep the archeological sites and environment safe and would not be harmed or destroyed.

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