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Atkins and Jeepo: Model engineers with rigor and compassion

There are few negative character flaws apparent in Atkins and Jeepo as they invent a bicycle-powered water pump in chapters 17 and 18 of *The Ugly American*. The two characters are very blunt in speech, but they are both high-functioning engineers throughout the entire process, taking careful attention to the success of the design from the planning to idea-pitching to manufacturing to sales. The technical and communication skills required throughout these stages, as well as the passionate desire to fulfill the product, evidence that Jeepo and Atkins are strong role models for engineers and the process a realistic example of the engineering design method.

Because the story is given in a narrative format, the personality of the characters must be inferred through their actions.

A straightforward way of determining the quality of an engineer is to observe how well they follow the principles of engineering design. A good engineer should methodically lay out any major engineering project in the same rigorous manner as in the engineering design process. The following section organizes the relevant actions of the two main engineers into the broad subcategories of the engineering design process, and analyzes the actions in each subgroup as a whole.

A. Needs assessment

At the beginning of chapter 17, Atkins argues with several diplomats about the necessity of building roads. He believes that the major problem at hand is that other, more necessary infrastructure, such as "first, a brick factory. Cheap, easy to run, and it would give them building materials. Second, stone quarries back in the hills … Third, … a model canning plant … Fourth, … run little finger-roads back through the jungle so the coastal people can get to good land" (177-8). At this point, Atkins has already surveyed the Vietnamese "boondocks" (backcountry) and prepared a report based on this experience; he also has prior knowledge with "practical engineering" and "heavy construction" (177). He presents this assessment of the *real* problem at hand. Unfortunately, the diplomats are unwilling to change their assumption that the most important problem at hand is road construction, and Atkins is stubborn. As a result, this engineering project fails, but Atkins does perform a thorough needs assessment.

For the engineering problem of the bicycle, Atkins is given the problem of raising water in Sarkhan by Ambassador MacWhite. The problem (need) is very clear here and Atkins does not evaluate it further.

B. Problem formulation

While Atkins is quick to jump to a potential solution for the water raising problem when he draws out a design for a water pump, he learns what the real problem is: the people of Sarkhan are poor and will not be able to easily have access to the parts common for more developed nations. He knows at the beginning that Sarkhan is a poor nation and that it does not have the industry like in the U.S.; when Emma suggests that he spend some of his own wealth to invest in the modern technology, he refuses because part of the problem is to create a sustainable, local means of manufacturing: he says, "if the pump is going to work at all, it has to be their pump, not mine" (180). Later on, the problem statement is further narrowed when Jeepo informs him about the nature of the bikes in Sarkhan, which are too worn-out after use: this leads to another redesign of the problem statement to use something other than decommissioned bicycles.

Throughout the entire process, Atkins is thinking about the problem with a knowledge of the design specifications firmly in his mind, which allows him to create a feasible design using locally-abundant bamboo, Jeep parts, and in-commission bicycles.

C. Abstraction and synthesis

Atkins is observed breaking the problem down into three steps soon after moving to Sarkhan: “First, it needed cheap and readily available piping” (182), a problem he fixed with bamboo. The second problem was with the pumping mechanism, which he solved by finding the abundance of abandoned military Jeeps. And the third was the source of power, which he discovered through a suggestion by his wife to use bicycles. These were specific, functional blocks that, when the source of their materials was conceived, were synthesized into the complete model.

D. Analysis, reflection, and iterative design

On the first demonstration of the water pump, Jeepo tells Atkins that “[the pump] will not be a sensible machine for [Sarkhan]” (188), and cites the lack of suitable bicycles for the design (because bicycles either are used for transportation or are too damaged to be converted into the power source for these pumps). The two men immediately get to work, brainstorming ways to lower the cost of resources (such as only using the necessary part of the bike), and settle on a method that uses bikes but does not force deconstruction of the bike, and thus allowing ordinary working bikes to power the pump. At the end of the story, the two engineers are pictured arguing over another modification to the bike. They are not afraid to make improvements to the original design of the pump based on a noticeable flaw.

C. Implementation

The manufacture of the product is carried out very smoothly, most likely due to the previous experience of Atkins in construction. A warehouse is promptly rented out, workers are hired, and a sales plan is devised as soon as eight models are constructed. Because of the locally-reproducible design and fair working conditions, construction is not hindered at all. A final step in the implementation is to spread the knowledge of the pump’s construction throughout Sarkhan, which serves as a form of documentation and dissemination of the knowledge, encouraging other engineers to construct and improve on the pump.

Throughout the entire engineering process, Atkins (and Jeepo when he is introduced to the project) remains very professional and demonstrates various aspects of good engineers: being open to new ideas (such as the use of the bicycle as power); having sufficient technical, mathematical, and scientific knowledge (to create an efficient pump); working fairly in teams and have a proper amount of argumentative discourse (“they were the only times that the Surkhanese had ever seen one of their own kind arguing fairly and honestly, and with a chance of success, against a white man” (193)); and being knowledgeable of worldly problems (Atkins attempts to aid the foreign nations Vietnam and Surkhan). The latter is perhaps the most important: Atkins feels obliged to help others, with the best interest of the locals in mind, as opposed to others with a monetary or political mission (such as the diplomat’s narrow-minded vision to build roads when that is not the best decision). And Jeepo and the workers have a personal stake in the situation simply because they are Sarkhanese. Jeepo goes as far as saying

that “neither I nor [Atkins] shall license or patent the idea of the pump” (192) so that the idea can help as many people as possible, and that their engineering motive is not a purely economic one. With Atkins’ compassion and the Sarkhans’ personal interest in the solution, the engineers are driven to create a quality, feasible solution that could be easily manufactured and distributed to the areas of need in Sarkhan; the bicycle-powered water pump meets all of these criteria.

The main downside with viewing Atkins and Jeepo as “the engineering profession at its best” is that their communication skills are not refined: Atkins displeases the diplomats at the beginning and Jeepo is very blunt towards the headman. While both of them are experienced and have reason to be stubborn, being able to communicate openly and non-argumentally (and compromise towards a solution) with clients and employers is an important skill in being an engineer. However, it appears as though Atkins is attempting to improve his communication skills by learning from Emma.

Works Cited

Lederer, William J, and Eugene Burdick. *The Ugly American*., 1958. Print.

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Case History: Jeepo-Atkins Company in Sarkhan

Project Overview

The terrain in Sarkhan is hilly, and raising water from the rivers to the hillside paddies is difficult work. The common method of raising water is by using dip lifts, which requires many hours of work per day to water the fields. The technology for advanced powered pumps is not available in many of the rural regions of Sarkhan.

The Problem

The process of lifting water makes villages high above water and those with multiple levels of fields spend a large amount of time and effort raising water for their fields. For example, the village of Chang ‘Dong has eight levels of paddies and has remained poor because of the inefficiency of bringing water to all of the levels. Because of the hilliness and lesser wealth in the countryside of Sarkhan, either importing materials or completed pumps from abroad is impractical; therefore, a solution to increase the efficiency of raising water must be locally manufactured and sustainable.

The Solution

A manual bicycle-powered water pump was designed to fit all of the criteria. Piping is to be constructed of locally-abundant bamboo. Pistons and cylinders from abandoned military-authority jeeps, common around the villages of Sarkhan, are used for the suction mechanism of the pump. Human-powered bicycles power the pump. At first, a specially-converted bicycle was connected directly to the pump; a change in the design allows any working bicycle to be placed in a bamboo rack and power the machine. The construction of such a machine only requires parts that can be found locally (bamboo, jeep parts, and bicycles) and is not very difficult to manufacture with common construction tools.

The Result

24 pumps were made in the first batch in only six weeks, without any hindrances and adhering to the design. These were displayed by the engineers as samples to other communities in Sarkhan. Future deliverables will include informative pamphlets describing the design of the pump to allow construction by other engineers.

Benefits

The bicycle pump greatly helped the first community it was delivered to (Chang ‘Dong) by lifting in “a few minutes … more water than [they] could lift by [their] old methods in five hours of work.” In addition, the current design uses working bicycles, a common tool for transportation, as a source of power (without affecting its ability to transport people). This both frees up time for farmers to perform other tasks and reduces the amount of effort and strength necessary to lift water.

Farmers who are in desperate need of help lifting water may receive a pump and pay back the cost over a three-year loan. This allows for immediate aid to some farmers who are experiencing more severely the problem addressed.