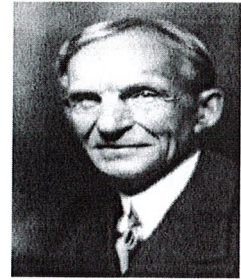


## Henry Ford: Innovator

*Think about it ... It's 1900; the car has been invented. Many people would love to have a car; it would be faster and more comfortable than a horse-drawn carriage or a wagon. A few companies are making them, but cars take a long time to make. They cost a lot of money, so only rich people can buy them.*



### What Is An Assembly Line?

Henry Ford was good at figuring things out. He was an *innovator* – someone who can take other people's ideas and make them much better. He wanted more people to be able to buy cars, so he knew he had to make cars cost less money. He also had to make cars in a shorter time.

He thought about a number of things that would help him reach his goal. He knew about the idea of the *assembly line*, and he thought it could be applied to making cars. Cars could be put together on an assembly line. A conveyor or moving belt would move each car past workers who would each add a part. In other words, many people would work to put each car together. The assembly line had been used before, but Henry Ford wanted to use it on a much larger scale for mass production of the Model T. At that time, only rich people could afford cars. Henry Ford wanted to make a car that the "average working person could afford."

In 1908, Henry Ford's Model T car sold for \$850. This amount was more money than most people earned in a year. Soon, however, the price started to drop. By 1916, the Model T sold for only \$360. Why did the Model T become cheaper? Henry Ford produced the Model T by using mass production on a moving assembly line. Workers stood alongside a moving belt. As the belt carried the cars through the factory, each worker did one task. One worker would attach the gas tank. Another would install and polish the fenders. As a result of this system, the amount of time it took to build a car dropped from 14 hours to 93 minutes. The moving assembly line process made it easier and cheaper to produce a car. It caused the cost of cars to drop, and more people were able to afford to buy cars.

*Did you know that ... the U.S. government asked Henry Ford to make Eagle Boats – submarine chasers for the Navy - during World War I?*

### What Is Vertical Integration?

Another idea Henry Ford had to make cars more affordable was *vertical integration*. Vertical integration meant making or having everything right there at the Rouge Plant when the workers needed it for each car. Ford needed iron made into steel right at the Rouge Plant. He needed rubber made into tires. He needed glass for car windows.

## Appendix #8a

Ford solved these problems by just trying things out. He was called a *tinkerer* or innovator and often said, "Let's try that and see how it goes." His first "try-and-see" was buying the land. He acquired 2,000 acres for the Rouge complex – a mile and a half wide and more than a mile long. He had 93 buildings built, including a tire-making plant, an engine-casting plant, a frame-and-assembly plant, a transmission plant, a radiator plant and a tool-and-die plant. A soybean conversion plant turned soybeans into plastic auto parts. A huge power plant produced enough electricity for the Rouge and another Ford complex. Henry Ford had electricity left over; he even sold some to the city of Detroit. He bought iron mines in Michigan's Upper Peninsula and coal mines in Kentucky so that he could make steel for his cars. He bought a rubber plantation in Brazil to supply rubber for tires. To bring all of these materials to the Rouge, Ford had a fleet of ore freighters and his own railroad company.

**Vertical integration** made the Ford Motor Company self-sufficient, meaning that the company had everything it needed to make cars right there at the Rouge. It did not have to buy materials from other companies. Henry Ford's assembly line and vertical integration worked! His company was making quality cars that people could afford.

### **Waste Not, Want Not.**

Henry Ford did not like waste. He figured out how to *recycle* or find new uses for almost all of the waste from making cars. Waste gas from steel production was used to make tar for roads and gas for lighting. Ore dust (30 tons per day) was recycled and used. Furnace slag (waste) was used as an ingredient in concrete for Ford buildings. Henry Ford is even given credit for inventing the charcoal briquettes that we use in backyard barbecues. He invented them as a way to use the wood scraps that were leftover. Henry Ford was an *innovator* and *visionary*. He found very smart and creative ways for doing things and solving problems.

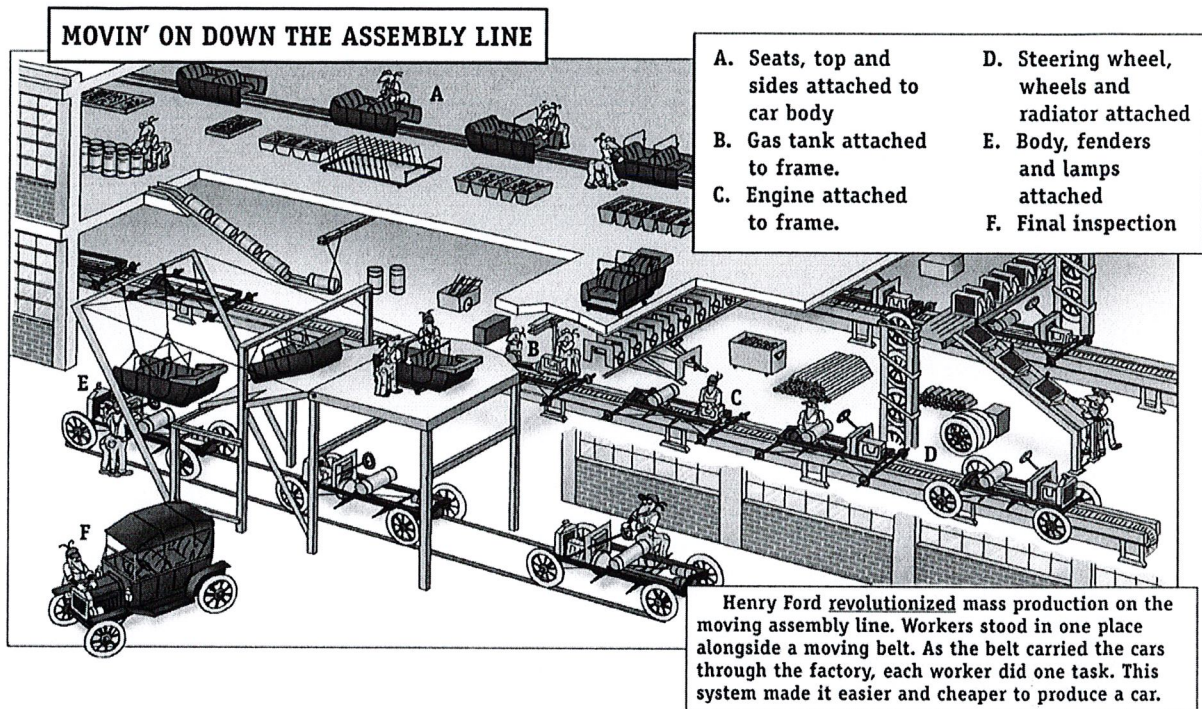
*Did you know that ... Henry Ford had fire and police departments and a hospital at the Rouge because so many people (up to 100,000) worked there?*



### Appendix #8b

MC4 #4 Appendix

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During the 1900s, only rich people could afford to buy cars because they cost so much to make. Henry Ford's goal was to produce a car that the average family could afford. He did just that in 1908 with the production of the Model T. It was a reliable and dependable car that most people could afford. The Model T became the best selling car in the world. One of the reasons Henry Ford could make Model T's for less money was because he mass-produced them by using a moving assembly line in his factory.

Instead of having his workers go to the car, he had the car come to them. Henry Ford had his workers stand in one place alongside a moving belt. As the belt carried the cars through the factory, each worker did one task in assembling the car. With the moving assembly line, Model T's could be built faster and sold at a lower price. Soon, even people working on the assembly line could afford to buy them. In 1914, Henry Ford's cars were so popular that he needed more people to help make them. He decided to pay workers five dollars a day. Although his idea was to pay a fair wage to attract and keep a reliable labor force, the \$5 workday was perhaps one of the first steps to develop diversity in the workplace.

## Appendix #10

MC4 #4 Appendix

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## “A New Green Way of Doing Things”

Ford Motor Company is trying something new at the Ford Rouge Center in Dearborn, Michigan. The complex is getting anew look inside and out. Inside the new Dearborn Truck Plant, the latest technologies and machinery have been installed to build the best vehicles possible. Huge roof monitors and **skylights** make the plant brighter for employees while reducing energy bills.

Ford is trying very hard to make the **Rouge Center** a beautiful and environmentally responsible place to work. One of the most interesting projects is the world’s largest **living roof** on top of the Dearborn Truck Plan final assembly building. This living roof will be like a ten-acre garden on top of the factory. **Sedum**, a groundcover that comes up every year and requires very little water and care, has been planted on the roof.

There are many reasons for building this type of roof. Not only is it prettier than the usual type of roof, it also saves money and helps clean the air. The living roof helps keep the plant warmer in the winter and cooler in the summer, reducing energy costs. The sedum on the roof traps dust, absorbs **carbon dioxide** and makes **oxygen**. All of these functions help improve the quality of air around the plant.

The most important reason for building the living roof is to reduce the amount of storm water that flows into the Rouge River. Ford has also made changes to the surface of the parking lot. Porous pavement allows rainwater to be filtered and cleansed as it passes through the concrete surface instead of just running off into the river. As the living roof and the new pavement collect the storm water, it is channeled into the wetland-like ditches called **swales** for more filtering before it flows into the Rouge River.

Special plants have been planted to try and help clean up the soil which was affected by years of steel production. The plants may also continue to help keep the soil healthy. This experimental, biological process of using plants to help clean the soil is called **phytoremediation**.

All of these **innovative** ideas help the company clean air, water, and soil, and they can save money in operating costs. More importantly, they help make the Ford Rouge Center an environmentally responsible place for workers, visitors, neighbors and wildlife.

Appendix #17

## “Swales Are Swell”

Once people thought wetlands were just smelly old swamps. Now we know that wetlands are very important. They help maintain the balance of nature and are home to many plants and animals.

Wetlands act as sponges to hold water and prevent flooding. Bulrushes and other wetland plants help filter storm water runoff. Wetlands are so important that some people even create artificial ones. At the Ford Rouge Center, people have done just that. Special ditches called swales have been built and seeded with hundreds of native wetland plants. These swales act as wetlands by slowing down the flow of storm water runoff and filtering particles from the storm water before it flows into the Rouge River. Some of the filtered water in the swales evaporates into the atmosphere. Plants that grow in these swales also attract birds, butterflies and wildlife.

### Appendix #19

## More Ford Innovations: “The Revitalized Ford Rouge Center”

*Think about it ... your company owns a manufacturing complex and factory that is over 80 years old. Some people think you should build a new and better factory complex somewhere else. But you think it would be better to renew and improve the Rouge factory complex built by your great-grandfather because of its legacy and history. In 1999, Bill Ford unveiled his plan to revitalize the Ford Rouge Center.*



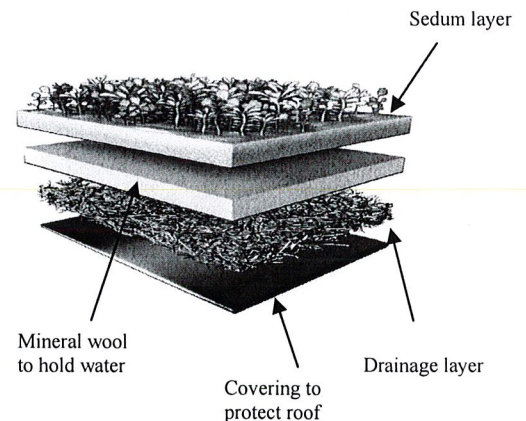
### Sustainable Design – “Bringing New Life To The Ford Rouge Center”

Because Bill Ford respected the workers, past and present, and because of his great-grandfather’s example, he decided to “bring new life to the Rouge.” Bill Ford’s great-grandfather, Henry Ford, had reduced the price of cars so that most Americans could buy them. Henry Ford made this possible by innovation with the *assembly line* and *vertical integration*. Bill Ford realized his vision of **revitalizing** and **renewing** the Ford Rouge Center through *sustainable design*. This means doing things at every level of manufacturing that will be good for the workers and the environment, while building quality cars and trucks. Bill Ford renewed the Ford Rouge Center by turning a *brownfield* area into a *greenfield* area (an environmentally friendly area).

### Grass On The Roof?

Have you ever heard of a “*living roof*”?

Almost 10 and a half acres (the size of eight football fields) of sedum was planted on top of the Dearborn Truck Plant at the Ford Rouge Center. Why? First, the sedum and the layers beneath it filter and control rainwater runoff, allowing clean water to go back into the Rouge River and also be used for irrigation. These layers (see diagram) also serve as insulation, keeping the factory underneath warmer in the winter and cooler in the summer. The roof can save energy costs. With this insulation, the roof will probably last twice as long as an ordinary roof. All of this will pay for the cost of the roof and perhaps even save Ford money in the long run.



### A Parking Lot With Holes In It?

Yes! And it is better for the environment. Parts of the parking lot at the Dearborn Truck Plant have miniature holes in it. This is called *porous pavement*. Porous pavement helps filter the rainwater and melting snow that flows into the Rouge River. Water from rain and melting snow are filtered through the porous pavement. The cleaner water then goes into ditches called *swales* containing wetland plants that help further clean the water.

## Appendix #14a

The water is cleaned when it is filtered through sand, gravel and the roots of the plants. The plants and the cleaner water in the wetlands and river also attract insects, plants and animals.

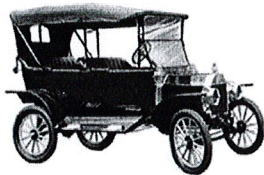
### Plants That Clean The Soil?

Yes! It's called *phytoremediation*, an experimental biological process where special plants may help clean the soil. Usually impacted soil would have to be dug up and carted off to a special landfill. But the people at the Ford Rouge Center are **experimenting** with hundreds of special plants like New England aster, prairie dock and Joe Pye weed. These plants have been planted to clean the soil. If the process proves to be successful, they won't have to dig up the soil. This will save money and keep the soil healthy. The plants also attract birds, butterflies, other insects and wildlife.

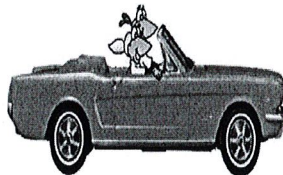
*Did you know that ...  
Ford Motor Company is  
the second largest  
automaker in the world  
and that its brands  
include: Ford, Lincoln,  
Mercury, Mazda, Jaguar,  
Volvo, Land Rover and  
Aston Martin?*

### Like Great-Grandfather, Like Great-Grandson!

Bill Ford's great-grandfather, Henry Ford, made cars affordable for many people by revolutionizing the *assembly line* and developing *vertical integration*. Henry Ford solved problems through innovation. Bill Ford is following in his great-grandfather's footsteps – he is an *innovator* and *visionary*, too. He is helping Ford improve the way it builds quality cars and trucks by overseeing new lean and flexible manufacturing technologies at the new Dearborn Truck Plant and other Ford factories. Bill Ford also revitalized the Ford Rouge Center and made it environmentally responsible by *innovating* – using smart and creative ideas to do things in new and better ways.



1914 Model T  
2004 F-150 Truck



1964 1/2 Mustang



*Did you know that ... Ford Motor Company officially observed its 100th anniversary on June 16, 2003?*

## Appendix #14b

MC4 #4 Appendix

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## "MY NAME IS FORD, I WORKED AT FORD, AND I DRIVE A FORD.": A FORD TRADITION

On June 16, 1903, Henry Ford founded an automotive company. Three days later, Roosevelt Ford was born. He was the son of a poor sharecropper in the steamy cotton town of Clinton, Mississippi.

While Henry created the Ford Motor Company, it was Roosevelt, and other workers like him, who helped make the automaker successful.



Roosevelt Ford was among the thousands of young African-American men lured north to Detroit in the 1920s by Henry Ford's \$5-a-day paycheck and his promise of a future in the factories and foundries of Ford.

### **A Family Tradition**

For Roosevelt Ford and his family, it was only the beginning. Four sons, seven grandchildren and two great-grandsons followed in his footsteps at Ford. They are electricians, engineers and administrators; hourly workers at the Rouge assembly complex; and white-collar employees in the Ford corporate headquarters. They are the "other Ford family" and are as dedicated and loyal to the company as Henry's own great-grandson, Ford Chairman Bill Ford.

"My name is Ford, I worked at Ford, and I drive a Ford," said Roosevelt's son, Carl, who retired in 1997 after 48 years with the automaker.

"I am part of a tradition," said DuJuan Ford, 28, a production worker at the Ford Rouge Center's Stamping facility. "My great-grandfather started it. It's the family business."

Roosevelt Ford was one of 13 children, a teen-ager growing up in the depressed, Deep South of the 1920s. Insects had badly damaged the cotton fields, and good-paying jobs were scarce. Roosevelt's ticket to a new life was a freight train heading to Detroit and a place in line with many other African-Americans trying to get a job at Henry Ford's first auto assembly plant.

"No American manufacturing company offered a wage anything like Ford," said Warren Whatley, professor of economics at the University of Michigan. "For a black to get \$5 a day was phenomenal." Roosevelt was hired at the Rouge in 1924, landing a job as a millwright in the steel foundry.

What Roosevelt Ford had, he wanted for his children. "Ford pays a good wage," he told his sons. "I want all my boys to work at Ford." Four of his sons -- Roosevelt Jr., Alvin, Carl and Herbert -- would follow him to Ford.

### **Appendix #24a**



Roosevelt Jr. the eldest, was a toolmaker in the Dearborn Engine Plant at the Ford Rouge Center. He was so skilled, that he built a working, 3-inch-long, V-8 engine as a hobby. Alvin and Herbert were among the first African-Americans ever enrolled in the Henry Ford Trade School and later served apprenticeships to enter the skilled trades. Alvin became an electrician and then a supervisor. Herbert started in production and then worked as a metal model maker at Ford's engineering center. Carl was the first African-American electrician at the engineering center.

"No question, Ford has been the best manufacturing company for the black man," Carl said. "The others are now on par, but they were far, far behind."

### **Family Loyalty**

Roosevelt Ford died in 1983 never knowing how far his family would go at Ford. His granddaughter, Maria Ford-Conliffe, said, "My grandfather would be so proud. He'd be proud that my father and his brothers and my cousins and my brother and nephews have worked so hard to get ahead."

Kevin Ford Jr. says, "The 'other Ford family' is still loyal and enthusiastic about the future and the products Ford is bringing out."

### **Equal Opportunity**

"What Henry Ford did had enormous consequences," said Elliott Hall, a lawyer with the Detroit firm Dykema Gossett and the first African-American vice president at Ford. "What he did raised the standard of living of every African-American in the early part of this century."

In a sense, the Rouge was the cradle of equal opportunity in the auto industry. At the groundbreaking for the new, redesigned Ford Rouge Center's Dearborn Truck Plant, the honor of driving the first construction piling into the ground didn't go to Chairman Bill Ford or some other corporate executive. Instead, the man pulling the levers on the crane was Carl Ford.

"That was quite a thrill," Carl said. "Of all the big guys and VIPs, I had the opportunity to drive the piling."

But the honor, he said, really goes to his father. "He was so proud of the fact that he worked at Ford. He wanted all of us to be at Ford."



## **Appendix #24b**

## From Doing Nails to Building Ford Trucks

Sally Smith used to spend her days polishing women's nails with colors like "I'm-Not-A-Waitress-Red," "Tutti Frutti," and "Chick Flick Cherry." Manicures. Pedicures. Acrylic Tips. All the while she chatted with customer about their lives, jobs, family troubles, deaths and divorces. But after a dozen years of it, Smith realized she needed a change. Her husband, a 25-year autoworker, convinced her to apply at Ford Motor Co.

Think of it: A woman who had spent years worrying about breaking those 3-inch nails working on an assembly line. But after a few stints doing other jobs – a waitress, working at craft store and at a pet store, Smith says she decided to give it a try

Today, this Southfield mom of two is building some of those glitzy SUVs that were on display at the North American International Auto Show in Detroit. She works the night shift at Ford's Michigan Truck Plant in Wayne, installing door-locking mechanisms on Navigators and Explorers. She spends 48 seconds on each of the 540 trucks slowly rolling past her, one after another, for 10 hours. If there's a problem, she can activate a yellow light for help so the team leader can make sure every car is completed.

While life on the line is hard on a woman's nails, this UAW Local 900 worker says she's never been happier. "For the first six months, I didn't like it," she says. "I cried. I whined. I couldn't believe I had ever done this." Her hands, unused to the repetitive physical labor, throbbed in pain. "Everyone hurts at first, even the guys," she said.

She was assigned to the trim area or "nursery" as workers call it, to learn. Now, she's more used to the physical labor at the plant, which she says is like an amazing self-sufficient city.

The guys on the line call her "Red" because of her curly red hair. Smith says there are quite a few female autoworkers. According to Ford Motor Company nearly 20 percent of its UAW-represented hourly employees are women. They come from all over, drawn by good wages and benefits, just like her. For a 58-hour week, she will make about \$1,000, she says. Because she is now a single mom, money is important. She has two kids, a 15-year-old daughter and a 10-year-old son. Smith just bought a black 2003 Ford Taurus and is buying a new home later this year.

"We've got a few ministers, the guy who works across from me, his wife just had twins," she says. "You can be working next to millionaires and not know it, depending on how they've invested their money."

Some days go fast. Some days go slow. "It's repetitive," she says. "I think a lot about how I'm going to decorate my new house or where my children are and what they're doing," she says. "We'll tell jokes." Smith, who used to spend eight hours listening to women, says this job is very different.

Smith, just elected recording secretary for the education committee for Local 900, says her friends thought she was crazy, but she's built a good life. Ford is tough, but fair – "You are there to do a job and that job is to make vehicles."

She hopes to take the skilled trades test, and she likes doing union work. Meanwhile, her son is impressed. "We'll be out driving and my son will say, 'Hey Mom, that's a new Navigator, you probably worked on that,'" Smith says.

"I kind of wear [my job] as a badge of honor. I was at Home Depot the other day and had to lift something heavy... and this guy came up and offered to help. I said, 'Oh thank you, but I can do it, I build trucks for a living.'"

## Appendix #28