Harley-Davidson Technical & Historical Report (1903-2003)

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Chapter 1. Harley-Davidson Technical & Historical Report

This report summarizes the technical and historical development of the Harley-Davidson Motor Company. The text contains the most crucial information for a BA thesis titles “ Harley-Davidson – history and its role in the society".

Chapter 2. Founding and Early Years (1903–1906)

Founding and Early Years (1903–1906

The Harley-Davidson Motor Company began in **Milwaukee in 1903**. The founders were brothers **Walter, Arthur, and William Davidson** and their friend **William Harley**.

- **First Motorcycle:** A one-cylinder machine developed in a 10 by 15 foot wooden shed.
- **Engine (Early):** One-cylinder gasoline engine with a displacement of **400 cc** (approximately 24.4 cu. in.), producing **three horsepower**.
- **Starting Method:** Started by **pedaling or pushing** the vehicle.
- **Production (First Year):** Only **three motorcycles** were made in the first year.
- **Factory Expansion:** In **1906**, a new 28 by 80 foot factory was built on Chestnut St., later renamed Juneau Avenue.

Table 1. Key Technical Innovations (1907–1936)

Year	Innovation/Model	Description/Engine Specification
1907	Engine Upgrade	Displacement increased to **35 cu. in.**; produced **four horsepower**.
1907	Suspension	**Front shock absorbers** introduced, known as "**Springer**".
1907	Incorporation	H-D Motor Company was **incorporated on September 17th**.
1909	**V-twin Engine**	Adopted Gottlieb Daimler's two-cylinder engine construction. The enduring icon was born with **two cylinders in a 45 degrees configuration**.
1911	"7D" Model	Modernized two-cylinder engine, correcting defects of the earlier "5D" model.
1912	Engine Upgrade	Displacement increased to **50 cu. in.**; produced **6.5 horsepower**.
1912	Drivetrain	**Clutch** was placed in the rear hub.
1914	Drivetrain	**Two-speed rear hub** was introduced.
1915	Drivetrain	**Three-speed gearboxes** appeared.

Table 1. Key Technical Innovations (1907–1936) (continued)

Year	Innovation/Model	Description/Engine Specification
1915	Starting Method	**"Kick starter"** introduced, replacing pedaling.
1916	**Eight-valve racer**	Introduced and used until 1928, instrumental in winning national championships.
1921	JD model engine	Introduced a **74 cubic inch** engine. Used pistons made of light metals (like aluminium).
1925	Appearance	The identifiable **teardrop gas tank** shape appeared.
1928	JD series	First **two cam engine** available; top speed **85-100 mph**.
1928	Safety	**Front brakes** were made available on all H-D motorcycles.
1929	D model engine	**45 cubic inch V-twin** engine (later nicknamed "**flathead**") introduced. Variations available until 1972.
1932	Servi-car	**Three-wheeled motorcycle** driven by a 45 cubic inch engine, used commercially and by police/postal services.
1936	**EL model**	Introduced 1340 cc engine.
1936	**"Knucklehead"**	**61 cubic inch overhead valve engine** launched (named for rocker boxes).

Production and Military Engagement (World Wars)

- **World War I (WWI):** America joined in 1917, leading to an immediate increase in machine requisition. Roughly one-third of all H-D motorcycles produced were sold to the U.S. Army within a few months.
    - **Training:** The **Quartermasters School** was opened in July 1917 to train military mechanics on H-D motorcycles.
    - **Usage:** By the end of WWI in 1918, almost half of all H-D motorcycles were sold for U.S. Military use; an estimated **20,000 motorcycles** were used by the Army, mostly Harley-Davidson.
- **World War II (WWII):** Civilian production was almost entirely suspended in favor of military production after December 1941.
    - **WLA/WLC Models:** The small 45cubic inch **WL models** were commonly produced as **WLA** (Army) and **WLC** (Canadian Army).
    - **Unique Design:** In 1942, the **XA 750** was produced, featuring **horizontally opposed cylinders and shaft drive** for desert use. Only 1011 XA's were built before the contract was cancelled.
    - **Production Volume:** During the war, the factory worked on three shifts, producing **750 machines each week**. By 1945, almost **90,000 WLA models** were produced.

Chapter 3. Post-War to Modern Times (1947–2003)

Table 2. Post-War to Modern Times (1947–2003)

Year	Innovation/Model	Description/Engine Specification
1948	**"Panhead"**	New features added to 61 and 72 overhead valve engines, including **aluminium heads and hydraulic valve lifters**. Plated rocker covers shaped like pancakes gave the nickname.
1949	Hydra Glide	Introduced **hydraulic front forks**.
1952	K model	Introduced with an **integrated engine and transmission** to compete with smaller, sportier motorcycles.
1953	Indian Ceases	Hendee Manufacturing (Indian) went out of business; H-D became the **sole U.S. motorcycle manufacturer for 46 years**.
1957	**Sportster**	Premiered as a **55 cubic inch overhead valve engine**; became known as the first of "**Superbikes**".
1958	Duo Glide	Introduced the **first rear brakes and hydraulic rear suspension**.
1965	Electra Glide	Replaced the Duo Glide; the first usable H-D motorcycle with an **electric start**. The three-wheeled Servi-car received electric start a year earlier in 1964.
1966	**"Shovelhead"**	First engines introduced on Electra Glide models, replacing the "Panhead".
1971	FX 1200 Super Glide	Designed by Willy G. Davidson; united a sporty front end with the frame and power train of the FL series. Birth of the **cruiser** class.
1977	FX Low Rider	Regarded as the **first serial chopper**.

Table 2. Post-War to Modern Times (1947–2003) (continued)

Year	Innovation/Model	Description/Engine Specification
1980	FLT	Debuted with a **vibration-dampening rubber isolated drive train**. **Kevlar belt replaced the chain** as the final drive.
1984	**Evolution Engine**	The **1340 cc V-twin** (also called "**Blockhead**") was unveiled, the result of seven years of development.
1984	**Softail**	Debut of the design, which "**hid**" the motorcycle's shock absorbers.
1988	Springer Softail	The "**Springer**" front end returned.
1990	**"Fat Boy"**	Introduced and became a modern legend of motorcycle design (named for dual gas tanks).
1996	Ultra Classic	First model to include **sequential port electronic fuel injection**.
1999	Twin Cam 88	All '99 models big twins received the new **Twin Cam 88** engine A counter-balanced version (Twin Cam 88B) followed in 2000 for Softail and Dyna Glide models.
2001	VRSCA **V-Rod**	Inspired by the VR-1000 racer, H-D's first motorcycle to combine **fuel injection and liquid cooling**. Cylinders in a **60 degrees configuration**; delivered **115 horsepower**.