History of Engineering Drawing

Free eBook

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Excerpt: This free 11-page eBook contains a history and timeline of the pioneers and shapers of engineering drawing and graphics.

History of Engineering Drawing

It may be right to say that engineering drawing evolved out of drawing which is believed to be as old as humanity itself. Mankind's ability to draw helped him to develop the first written language—ancient writing—which did not use words as we use them today.

Animal and human shapes during prehistoric times were expressed via drawings and paintings (a.k.a. pictograms) and carvings (a.k.a. petroglyphs). A pictogram is a graphic character or symbol used in picture writing to represent an idea or a word; a petroglyph, on the other hand, is any carving or drawing that is made on a rock.

It may be important to note that although pictograms and petroglyphs are not engineering drawings, they are still forms of graphic communication that to a great extent served the same purpose as modern-day engineering drawings do.

In the distant past, the meanings of different ideas were often expressed through drawings—somewhat pictures—or "picture" languages; for instance, the drawings done by primitive people

survive to this day and can still be seen carved on the ancient walls of caves and rocks; they were used for communication in societies that were predominantly hunting animals and gathering food back in the day.

Evidence and records prove that as far back as 12,000 B.C., drawings were engraved on ancient caves and walls—evidence of the mentality and experiences of humans during prehistoric times when stone/ flint was used to carve "picture messages" on granite rocks.

As humanity was becoming more civilized, drawing continued to advance into the engineering drawing form which helped in the planning and construction stages of bridges, structures, roads, and cities.

The individuals and eras that pioneered and shaped engineering drawing

Most pioneers of engineering drawings were inventors and artists. Each of them deserves a place in the history or annals of engineering drawing because of their immense wisdom, talent, vision, innovative ideas, and input in engineering drawing which

is widely applied in many fields: transport, manufacturing, agriculture, mining, etc.

The fourteenth and fifteenth centuries witnessed the earliest forms of engineering drawings which were graphic representations of buildings and machines. In their much simple form, they were actually pictorial sketches that had enough details and descriptions to help knowledgeable or experienced workers fabricate and build objects or products from start to finish.

Leonardo da Vinci

Some of the earliest engineering drawings were created by Leonardo da Vinci who is well known for being a mapmaker, having designed the glider and crossbow, and painting *The Last Supper* and *Mona Lisa* in 1498 and 1507, respectively.

Leonardo used his self-taught mapmaking skills to create a map of the town plan of Imola, Italy, in 1502; he was appointed as the chief military engineer and architect because of his talent for mapmaking. It can be argued that his mapmaking work was more artistic than engineering drawing, but this still doesn't

erase the fact that it (i.e., his mapmaking work) would always be mentioned in the history of engineering drawing.

During Leonardo's days, drawings were not expressed in the form of the types of engineering drawings widely used today, as they were somewhat pictorial and usually didn't have dimensions.

Leon Battista Alberti

Leon Battista Alberti was the spot-on person who proposed that drawings should use multiple views rather than the pictorial drawings that were popular at the time. He wrote various topics spanning over different subjects, including engineering, architecture, philosophy of beauty, and town planning. His insights on the importance of integrating more geometry into drawings were reflected in his 1435 and 1436 writings.

René Descartes

Mathematician and philosopher René Descartes invented the popular Cartesian coordinate system, constituted or composed analytic geometry, and was behind the development of descriptive geometry which exerted a great influence on the use of multiview 2D drawings around the early half of the seventeenth century. As

we all know, the Cartesian coordinate system is the foundation for establishing important points that are widely used today in computer-aided design and graphics (CADD).

Gaspard Monge

Gaspard Monge also made great strides on his own personal research in the development of descriptive geometry during the late part of the eighteenth century, about a hundred years after René Descartes' passing in 1650. In addition to employing his self-taught methods and self-designed instruments to create a large plan of a town, he also introduced the idea of inclining two planes of projection at 90° or right angles to each other.

Through the late 1800s and early 1900s

Most of the designs used during the 1800s were hand sketches of objects or products that were meant to be built later, and manufacturers created products or parts from hand drawings or sketches that were made on blackboards. Workers produced wooden types of models from which real patterns or objects were constructed. This practice was widely used in some companies, and it even continued well into the twentieth century. Henry Ford

is one example of such companies; his blackboards were very famous back then.

Coleman Sellers

Coleman Sellers used blackboards to create life-size drawings of parts for manufacturing fire engines. Coleman's son, George Sellers, was once involved in the production of satisfactory sketches or drawings: George would lie on his own belly and use his arms as radius for curves of products, while his father (Coleman Sellers) would stand over him and alter the position of his arms, and would only stop when he was satisfied with a particular radius or arm posture.

The Industrial Revolution age

The beneficial Industrial Revolution between the eighteenth and nineteenth centuries brought major changes in many fields. But at a point, practitioners started sensing the need for interchangeability in manufactured products.

Interchangeability was gradually developed and used in manufacturing during the eighteenth century, and it enabled new products to be easily assembled and existing products to be

easily repaired, thus generally minimizing the amount of time required to assemble and repair products.

But, prior to the times of interchageability—i.e., prior to the Industrial Revolution age—it wasn't necessary to produce or use accurate drawings; the engineering drawings of The Industrial Revolution age—regarded as "early engineering drawings"—were usually artworks and mostly created with ink.

During that era, drafters would draw using a pencil, triangles, French (irregular) curves, T-square, scales, and drawing equipment such as divider and compass. As years rolled by during The Industrial Revolution, other devices and templates were invented, and these empowered drafters to create consistent quality lettering, even though most master drafters preferred to go the old/previous way of creating high-quality freehand lettering.

The arrival of drafting machine ushered in a lot of advancements in drafting, and it replaced the protractor, triangles, T-square, and scales which were commonly used to create drawings. Drafters in architecture used a device known as parallel bar to

draw horizontal lines, while triangles were used on the parallel bar to construct vertical and angled or inclined lines.

In the decades after World War II, suppliers of drafting equipment innovated various materials to step up the productiveness of the general drafting process. As interchangeability was gaining the upper hand and engineering drawings were evolving, drafters sensed that it would be important to duplicate and preserve original drawings.

Te blueprint process was developed to easily reproduce and distribute drawings to builders, engineers, architects, and manufacturers. As the reproduction of drawing continued to evolve, the diazo process replaced the blueprint process.

The CADD age

CADD (computer-aided design and drafting) ran riot during the 1980s and 1990s when it rapidly went from an emerging technology to one that was taken very seriously, owing to its many-sided advantages. The creators of CADD software had succeeded in designing it with features that endeared it to the practitioners of engineering drawings.

However, many drafters who had become accustomed to manual drafting found it challenging to create drawings via computer. But soon in the 1980s, some schools started using CADD to teach drafting alongside traditional manual drafting programs; this motivated traditional manual drafters to learn and develop their CADD knowledge and skills.

On the other hand, those in the industry were also taking CADD seriously, and by the 1990s, many companies and schools completely transitioned to CADD and replaced their manual drafting tables with CADD workstations. As it stands today, CADD is used for almost all types of engineering design and drafting.