### Fibre Source
- **1750**: Cotton and Linen rags are exclusively used for papermaking.

### Technology
- **1764**: Bleaching by using lime, sun bleaching, stale urine or sour wine.
- **1774**: Deinking with bentonite is discovered by Justus Claproth in Germany allowing easier paper recycling.
- **1790**: Rag fermentation in stock preparation dies out.
- **1795**: Hydraulic press is invented by Joseph Bramah in England.
- **1798**: A papermaking machine is patented by Nicholas Robert in France.
- **1800**: Quality recycled paper is produced by Mathias Koop.
- **1801**: Mathias Koop patents a deinking and paper recycling process in the UK.
- **1800**: Possible date for the improved laid mould to prevent pulp build up around chain lines. Start of modern laid paper.
- **1803**: The cylinder mould machine is invented by John Dickinson.
- **1807**: The 'Shaker' mechanism for papermaking machines is patented by Louis Robert.

### Mechanical Pulp
- **1750**: Bleaching by using lime, sun bleaching, stale urine or sour wine.
- **1774**: Chlorine is discovered by Karl Scheele.
- **1789**: Sodium hypochlorite is produced and popularized by Claude Berthollet.
- **1788**: James Watt discovers the bleaching properties of sodium hypochlorite in Scotland.
- **1792**: Bleaching paper and textiles with chlorine is patented by George & Clement Taylor.
- **1799**: Charles Tennant invents bleaching powder, calcium hypochlorite, in Glasgow, Scotland.
- **1804**: Calcium hypochlorite started to be used as a bleach in the USA.
- **1807**: Sodium hydroxide is discovered by Humphrey Davy.
- **1818**: Louis Thenard discovers Hydrogen Peroxide.

### Soda Pulp
- **1750**: Bleaching by using lime, sun bleaching, stale urine or sour wine.
- **1772**: Jacob Christian Schaffer proposed using plant fibre directly to make paper.
- **1790**: Rag fermentation in stock preparation dies out.
- **1800**: Quality recycled paper is produced by Mathias Koop.
- **1801**: Mathias Koop patents a deinking and paper recycling process in the UK.
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### Sulphite Pulp
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### Sizing
- **1750**: Sizing was external. (Tub sizing), using gelatine often mixed with alum to help prevent it from going off.
- **1756**: James Whatman produces the first wove paper in Europe for John Baskerville.
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### Fillers, Coating, Optical Brighteners
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- **1817**: Two ply papers and a single steam heated drying cylinder are researched by John Dickinson.
1823: Gypsum, calcium sulphate, is used as a filler in paper.

1824: Board-making patent by John Dickinson

1825: A dandy roll to produce a laid paper is patented by John and Christopher Phillips

1826: Technique for sewing watermarks into a covered roll is patented by Thomas Barrett

1829: First Fourdrinier machine built in the USA at New York.

1830: About half of England's paper is produced by papermaking machines.

1836: The vacuum box is added to the Fourdrinier machine by James Watt.

1838: Cellulose is first isolated and its chemical formula determined by Anselme Payen.

1839: Esparto grass is experimented with by Miles Berry, but with no success.

1839: Technique for fixing letters to a dandy roll is patented by William Joynson.

1841: Groundwood paper is made in Halifax, Nova Scotia, Canada.

1845: Friedrich Keller produces paper from softwood pulp, the Boston Weekly Journal is printed using a twin wire machine.

1846: Improved "Hosmer" dandy roll is patented by Robert Barson.

1847: Papermaking process is introduced in the USA by Joseph Burgess and Charles Watt.

1849: Shade tonal watermarks are invented by John Jones in the USA.

1851: Soda Pulping process is developed by Hugh Burgess and Charles Watt.

1856: Bagasse may have been used by Henry Howe in Baltimore.

1856-1869: Soda pulp process used in Lyndon Mill, Gloucester, UK.

1860: Esparto paper production increases, especially in book paper.

1863: First groundwood pulp production in the USA.

1866: The last commercial hand made paper mill closes in the USA.

1868: Papermakers alum, Al_2(SO_4)_3, is first used.

1870s: Steam pre-treatment of mechanical pulp is developed.

1872: A Heinrich Voelter designed and Voith build grinder is installed at American Tappan Mill, Curtisville, Massachusetts, USA.

1873: Word Fair in Vienna, the latest Voith grinder is exhibited, with a power of 500hp.

1874: The Sulphite pulp process is developed by Benjamin Tilghman.

1876: Papermakers alum, Al_2(SO_4)_3, is first used.

1879: Internal alum resin sizing is introduced in the USA by Joseph Koht.

1880: Esparto use in newspaper ceases.

1881: Groundwood mechanical pulp is in common use in Europe.

1884: First Sulphite pulp mill opens in Sweden.

1885: First Sulphate pulp mill opens in Sweden.

1888: Sulphate pulp process is patented in US by U.S. Date.

1889: A process using a mixture of ozone and chlorine gas for bleaching is patented by Birn and Birn.

1890: First Sulphate pulp mill opens in Sweden.

1891: Sulphite pulp process is the dominant pulping process.

1894: A process using a mixture of ozone and chlorine gas for bleaching is patented by Birn and Birn.

1896: The Sulphite pulp process is developed by Benjamin Tilghman, and patented the following year.

1897: Word Fair in Venice, the latest Voith grinder is exhibited, with a power of 500hp.

1899: Esparto paper production increases, especially in book paper.

1900: The corrugated cardboard box is patented by Robert Gair in the USA.

1901: The vacuum box is added to the Fourdrinier machine in the USA.

1902: Super single-sided corrugated board making machine is invented by John Jones in the USA.
1890: Casein replaces animal glue as the most commonly used coating adhesive.
1900: Suction couch is patented by Millspaugh Ltd, UK.
1904: Modified starches introduced as a filler to be commercially used as a coating adhesive.
1908: Cellophane is invented by Jacques Brandenberger.
1912: First suction couch is introduced by Millspaugh, Ltd, USA.
1914: Aspen and Poplar are used in chemical pulp.
1916-38: Experimental work on Eucalypt wood being used for paper making.
1918: Espar is used as a replacement for Esparto due to WW1.
1921-27: L.R. Benjamin conducts research into using Eucalypt wood in Australia.
1925: Calcium carbonate starts to be used.
1930: Cotton linters started to be used in chemical pulp.
1934: Tomlinson recovery boiler invented to recover processing chemicals.
1935-40: Experimental work on hardwood being used for paper making.
1936: Experimental work on Eucalypt wood being used for paper making in Australia.
1938: Chlorine dioxide is first commercially introduced.
1946: Chlorine dioxide bleaching is introduced.
1950: Froth flotation used to deink recycled paper.
1955: Cationic starches are introduced.
1960: Synthetic forming wires developed. Polyester replaces phosphorous bronze in the wet end.
1961: Thermomechanical pulping is patented by Anglo Paper Products Research and Development.
1963: Grooved rollers in the press section are introduced.
1964: Grinding at pressure is investigated and Development patented by Anglo Paper Products Research and Development.
1966: Displacement bleaching is first investigated by Barry and Kuzman.
1968: Oxygen bleaching commercialized.
1971: Vacuum couch roller is added to the papermaking machine by George Dickinson.
1973: Continuous cooking digester developed by Arthur Richter for sulphate pulp.
1976: Synthetic forming wires developed. Polyester replaces phosphorous bronze in the wet end.
1977: Vacuum couch roller is added to the papermaking machine by George Dickinson.
1979: A continuous bleaching system of four tanks, on soda pulp in Cumberland Mill, Maine, USA.
1980: AKD sized and Kymene 557 wet strength resin is developed as permanent paper by W. Barrow for Virginia State Library.
1982: AKD sized and Kymene 557 wet strength resin is developed as permanent paper by W. Barrow for Virginia State Library.
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<thead>
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<th>Year</th>
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<td>Recycled fibre constitutes 22.5% of global fibre source</td>
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<td>1978</td>
<td>Kenaf is trialled to make newsprint at C.E. Baur, Uhio, USA</td>
<td>1980</td>
<td>Esparto no longer imported to the UK, still imported to France.</td>
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<td>1978</td>
<td>Kenaf is trialled commercially for newsprint at the International Paper mill, Mobile, USA.</td>
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<td>1986</td>
<td>Bagasse newsprint mill opens in Tamil Nadu, India</td>
<td>1981</td>
<td>Kenaf printing and writing paper is printed by Vision Papers.</td>
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<td>1992</td>
<td>Recycled fibre constitutes 33.5% of global fibre source</td>
<td>2000</td>
<td>Recycled fibre constitutes 44% of global fibre source.</td>
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<td>1970</td>
<td>First off machine blade roller is used in Canada.</td>
<td>1971</td>
<td>Organosolv pulping patented by Theodore Kleinert.</td>
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<td>1975</td>
<td>Thermomechanical pulping widely used</td>
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<td>2000</td>
<td>Shift away from elemental chlorine bleaching to TCF and ECF bleaching, in regulation and practice</td>
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<td>1980s</td>
<td>Growing environmental and health concerns about elemental and chlorine dioxide bleaching</td>
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<td>1993</td>
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