

Activities/ Resources for Outcomes

Outcome #1

Supply & Demand: How Markets Work

The two basic terms used most often by economists are *supply* and *demand*. The amount of something that is available (the *supply*) and the amount of something that people want (the *demand*) make up a working market. The market is the way in which an economic activity is organized between buyers and sellers through their behavior and interaction with one another. Buyers, as a group, determine the overall demand for a particular product at various prices while sellers, as a group, determine the supply of a particular product at various prices.

The interaction of buyers and sellers in the market helps to determine the market price, thereby allocating scarce goods and services efficiently. The price is taken into account when deciding how much of something to consume, and also how much to produce. The relationship between price and quantity demanded is so universal that it is called the *law of demand*. This law states that with all else equal, when the price of goods rise, the quantity demanded falls - and when the price falls, the quantity demanded rises. The *supply curve* provides the opposite information: the higher the price, the higher the quantity supplied - and the lower the price, the lower the quantity supplied.

A key function of the market is to find the equilibrium price when supply and demand are in balance. At this price, the goods supplied are equal to what is being demanded thereby bringing about the most efficient allocation of the goods. An efficient allocation of goods in a market is one in which no one can be made better off unless someone else is made worse off.

There are influences other than price, however, that can play a role in keeping the market from being truly efficient and at equilibrium.

Variables that Influence Buyers (Demand)

- Price
- Income
- Prices of related goods
- Tastes
- Expectations
- Number of Buyers

Variables that Influence Sellers (Supply)

- Price
- Input prices
- Technology
- Expectations
- Number of Sellers

On the demand side, income can play a significant role. As income rises, people will buy more of some goods or even begin to purchase higher quality or more expensive goods. The price of related goods can also alter demand. For example, if the price of one cereal increases, demand will likely switch to a similar cereal, which would be considered *substitute* goods. If the goods are considered to be *complimentary*-- or are typically used together--a decrease in the price of one of the goods will increase the demand for another. Examples of complimentary goods are cars and gasoline, where the price of gasoline depends partly on the number of cars. Personal tastes and expectations of the future also influence individual demands as does the number of buyers. An increase in buyers vying for a specific number of goods will increase the demand and likely increase the overall purchase price.

On the supply side, both expectations and the number of sellers can influence the number of goods produced. In addition, the cost of producing the goods--or the input prices--and the level of technology used to turn the inputs into goods greatly influence the final price and quantity supplied.

Although most economic analyses focus on finding the market equilibrium, there exist a number of other market forms. When it comes to the utilization of natural resources or other environmental quality amenities, it is often difficult to find the equilibrium through mere market pricing since they are not true market goods. Efficiency would require maximizing current costs and benefits of using or extracting natural resources while taking into consideration future costs and benefits, including the intrinsic and existence value of the resources. When the market fails to allocate the resources efficiently, market failure can occur. An example of this is the creation of externalities which often occurs when clear property rights are absent, as with air and some water resources. Attempts to promote efficiency and bring the market back into equilibrium can be through market options, like economic incentives and disincentives, or the establishment of property rights, or through government intervention.

Updated by Dawn Anderson

Recommended Resources

Price Theory, Lecture 2: Supply and Demand

Glen Whitman, an Associate Professor of Economics at California State University, Northridge, compiled information on his website based on his lecture notes. He includes principles of supply and demand, constructing the market, and various types of competition.

Supply and Demand

An excellent summary on the topic by Wikipedia, the free encyclopedia.

Introduction to Economic Models of Natural Resource Utilization

Richard Kazmierczak, Jr., an Associate Professor at Louisiana State University compiled this information based on his class in Natural Resource Economics.

FOR THE CLASSROOM

EconEdLink: To Market To Market

This lesson has students become consumers and producers by taking turns buying and selling things in a classroom-created market. Students establish prices for items and observe what happens during the sale of those items. [Grades K-5]

Fill'er Up Please: A Lesson in Supply and Demand

This EconEdLink activity provides students with an opportunity to learn about gas prices and how prices in general affect both consumer demand and producer supply. [Grades 6-8]

Learner.org: Workshop 2 - Why Markets Work

This workshop includes a market simulation and exercise, "A Classroom Market for Crude Oil" (beginning on page 32) to illustrate key concepts of the market. Special emphasis is given to the interplay of supply and demand: how they can affect prices, and how prices can work as incentives for consumers and producers. [Grades 9-12]

References:

Economics basics: Demand and Supply from Investopedia.com

Mankiw, N. Gregory, *Principles of Economics*. Mason, OH: South-Western College Publishing, 2003.

The Concise Encyclopedia of Economics from the Library of Economics and Liberty.

<http://www.enviroliteracy.org/article.php/1310.html>

Outcome #2

How the Japanese disaster influences the supply chain and manufacturing efforts

Because of the devastating effects of the earthquake and tsunami, Japan's suppliers of technology-based devices such as semiconductors, LED and LCD screens, batteries and various electronics components, along with suppliers of automobile parts and manufacturing, have been disrupted. This disruption may potentially drive prices up.

The Japanese disasters that have caused these companies to temporarily cease production have disrupted the supply chain and impacted manufacturing on a world-wide scale. Retail outlets and manufacturers who received their components from Japan are now consuming their excess inventories of these products.

Since many of the raw materials and components for these products are sourced from Japan, manufacturers of items such as smartphones and Apple's Ipad 2 will definitely be delayed,. Retailers will continue to sell what is on hand but may have a hard time restocking these products. With a procurement deficiency looming, certain items may also increase in price as Japanese suppliers scramble to recoup their losses and regain their margins to pre-earthquake and pre-tsunami levels.

If this is the case, these manufacturers will experience the supply chain multiplier effect. The end result is an increase in prices. Moreover, prices will increase due to supply and demand. If certain products are delayed in manufacturing once current retail and warehouse stocks have been depleted, there will not be enough supply to fulfill demand. If demand is higher than supply, simple economics says prices will also increase.

Several questions arise. Since Japan is the third largest economy in the world, will it also consume more oil to catch up to what was lost during the times of shutdown? And, will it increase its usage to ramp up to pre-disaster levels? Also, how long might Japan take to regain their competitive edge?

Furthermore, because some fruits and vegetables have now been banned for export, Japan will be forced to import those fruits and vegetables that they have previously grown, possibly leading to a larger deficit. A larger deficit could mean higher corporate and personal taxes, thereby driving up retail prices on computers, memory, smartphones, electronics and automobiles, just to name a few of the main consumer items that may be affected.

Some significant Japanese companies that have been impacted are:

- Toyota Motor Company
- Nissan Motor Company
- Canon

- Fujitsu
- Hitachi
- Panasonic
- Sony
- Toshiba

These companies are world players who influence everything from electronics to automobile production.

Hopefully, the Japanese will be able to cope with the disruptions to their supply chain and manufacturing capabilities caused by the earthquake and tsunami. As previously noted, these disruptions may lead to increased prices for most consumer goods due to lack of products being available.

Adapted from:

<http://www.eval-source.com/blog/2011/04/01/japanese-disasters-influences-supply-chain-manufacturing-efforts/>

Outcome #4

Industrial Revolution Inventions Timeline – 1712-1942

- 1712 – Thomas Newcomen patents the atmospheric steam engine
- 1733 – John Kay invents the flying shuttle
- 1745 – E.G. von Kleist invents the leyden jar, the first electrical capacitor
- 1752 – Benjamin Franklin invents the lightning rod
- 1764 – James Hargreaves invents the spinning jenny
- 1768 – Richard Arkwright patents the spinning frame
- 1769 – James Watt invents an improved steam engine
- 1774 – Georges Louis Lesage patents the electric telegraph
- 1775 – Jacques Perrier invents a steamship
- 1776 – David Bushnell invents a submarine
- 1779 – Samuel Crompton invents the spinning mule
- 1780 – Gervinus invents the circular saw
- 1783 – Benjamin Hanks patents the self-winding clock; Henry Cort invents the steel roller for steel production
- 1784 – Andrew Meikle invents the threshing machine
- 1785 – Edmund Cartwright invents the power loom
- 1786 – John Fitch invents a steamboat
- 1790 – The United States issues its first patent to William Pollard of Philadelphia for a machine that roves and spins cotton
- 1791 – John Barber invents the gas turbine; early bicycles are invented in Scotland
- 1794 – Eli Whitney patents the cotton gin; Philip Vaughan invents ball bearings

- 1797 – Henry Maudslay invents the first metal or precision lathe
- 1799 – Louis Robert invents the Fourdrinier Machine for sheet paper making
- 1800 – J.M. Jacquard invents the Jacquard Loom; Count Alessandro Volta invents the battery
- 1804 – Richard Trevithick develops the first steam-powered locomotive
- 1809 – Humphry Davy invents the first electric light-- the first arc lamp
- 1814 – George Stephenson designs the first steam locomotive; Joseph Nicéphore Niépce is the first person to take a photograph
- 1825 – William Sturgeon invents the electromagnet
- 1829 – W.A. Burt invents a typewriter
- 1830 – Barthelemy Thimonnier invents a sewing machine
- 1831 – Cyrus McCormick invents the first commercially successful reaper; Michael Faraday invents a electric dynamo
- 1834 – Henry Blair patents a corn planter; he is the second black person to receive a U.S. patent. Jacob Perkins invents an early refrigerator type device: an ether ice machine
- 1835 – Charles Babbage invents a mechanical calculator
- 1836 – Francis Pettit Smith and John Ericcson co-invent the propeller; Samuel Colt patents the first revolver
- 1837 – Samuel Morse invents the telegraph
- 1839 - Charles Goodyear invents rubber vulcanization; Louis Daguerre and J.N. Niepce co-invent Daguerrotype photography; Sir William Robert Grove conceives of the first hydrogen fuel cell
- 1843 – Alexander Bain invents the facsimile
- 1845 – Elias Howe invents a sewing machine; Robert William Thomson patents the first vulcanized rubber pneumatic tire
- 1850 – Joel Houghton is granted the first patent for a dishwasher
- 1851 – Isaac Singer invents a sewing machine

- 1852 – Henri Giffard builds an airship powered by the first aircraft engine – an unsuccessful design
- 1853 – George Cayley invents a manned glider
- 1854 – John Tyndall demonstrates the principles of fiber optics
- 1855 – Isaac Singer patents the sewing machine motor
- 1858 – Hamilton Smith patents the rotary washing machine; Jean Lenoir invents an internal combustion engine
- 1862 – Richard Gatling patents the machine gun; Alexander Parkes invents the first man-made plastic
- 1866 – Alfred Nobel invents dynamite; Robert Whitehead invents a torpedo
- 1867 – Christopher Scholes invents the first practical and modern typewriter
- 1868 – Robert Mushet invents tungsten steel; J P Knight invents traffic lights
- 1873 – Joseph Glidden invents barbed wire
- 1874 – C. Goodyear, Jr. invents the shoe welt stitcher
- 1876 – Alexander Graham Bell patents the telephone; Nicolaus August Otto invents the first practical four-stroke internal combustion engine; Melville Bissell patents the carpet sweeper
- 1877 – Thomas Edison invents the cylinder phonograph or tin foil phonograph; Eadweard Muybridge invents the first moving pictures
- 1881 – Alexander Graham Bell invents the first crude metal detector; David Houston patents the roll film for cameras; Edward Leveaux patents the automatic player piano
- 1884 - George Eastman patents paper-strip photographic film; James Ritty invents the first working, mechanical cash register; Charles Parson patents the steam turbine
- 1885 – Harim Maxim invents the machine gun; Karl Benz invents the first practical automobile to be powered by an internal-combustion engine; Gottlieb Daimler invents the first gas-engined motorcycle
- 1886 – Josephine Cochrane invents the dishwasher; Gottlieb Daimler builds the world's first four-wheeled motor vehicle

- 1888 – John Boyd Dunlop patents a commercially successful pneumatic tire; Nikola Tesla invents the AC motor and transformer
- 1891 – Jesse W. Reno invents the escalator
- 1892 – Rudolf Diesel invents the diesel-fueled internal combustion engine
- 1895 – Lumiere Brothers invent a portable motion-picture camera, film processing unit and projector called the Cinematographe. Using their Cinematographe, they are the first to present a projected motion picture to an audience of more than one person
- 1898 – Edwin Prescott patents the roller coaster; Rudolf Diesel receives patent #608,845 for an “internal combustion engine,” the Diesel engine
- 1899 – John Thurman patents the motor-driven vacuum cleaner
- 1900 – The zeppelin is invented by Count Ferdinand von Zeppelin
- 1901 – The first radio receiver successfully receives a radio transmission
- 1902 – Willis Carrier invents the air conditioner
- 1903 – Bottle-making machinery is invented by Michael J. Owens; the Wright Brothers invent the first gas-motored and manned airplane; William Coolidge invents ductile tungsten used in light bulbs
- 1904 – Benjamin Holt invents a tractor; John A Fleming invents a vacuum diode or Fleming valve
- 1906 – Lewis Nixon invents the first sonar-like device; Lee DeForest invents electronic amplifying tube (triode)
- 1907 – Leo Baekeland invents the first synthetic plastic, called “Bakelite”; Color photography is invented by Auguste and Louis Lumiere; The very first piloted helicopter is invented by Paul Cornu.
- 1908 – Cellophane is invented by Jacques E. Brandenberger; the first Model T is sold
- 1910 – Thomas Edison demonstrates the first talking motion picture; Georges Claude displays the first neon lamp to the public on December 11, 1910, in Paris
- 1912 – Motorized movie cameras are invented and replace hand-cranked cameras
- 1915 – Eugene Sullivan and William Taylor co-invent Pyrex in New York City

- 1916 – Radio tuners are invented that receive different stations; Stainless steel invented by Henry Brearly
- 1921 – Artificial life begins — the first robot is built
- 1927 – Philo Taylor Farnsworth invents a complete electronic TV system
- 1928 – Jacob Schick patents the electric shaver
- 1930 – Wallace Carothers and DuPont Labs invent neoprene; the “differential analyzer”, or analog computer, is invented by Vannevar Bush at MIT in Boston
- 1931 – Germans Max Knott and Ernst Ruska co-invent the electron microscope
- 1932 – Karl Jansky invents the radio telescope
- 1934 – Joseph Begun invents the first tape recorder for broadcasting – first magnetic recording
- 1935 – Wallace Carothers and DuPont Labs invent nylon (polymer 6.6.); Robert Watson-Watt patents radar
- 1936 – Bell Labs invents the voice recognition machine
- 1937 – Chester F. Carlson invents the photocopier; the first jet engine is built
- 1938 – Roy J. Plunkett invents tetrafluoroethylene polymers, or Teflon
- 1939 – Igor Sikorsky invents the first successful helicopter
- 1941 – Konrad Zuse’s Z3 is the first computer controlled by software; Enrico Fermi invents the neutronic reactor
- 1942 – John Atanasoff and Clifford Berry build the first electronic digital computer

Adapted from Beginning of the Information Age...
Source: <http://inventors.about.com/od/timelines/tp/timeline.htm>

Outcome #5

Child Labor in U.S. History



Breaker Boys

Hughestown Borough Pa. Coal Co.

Pittston, Pa.

Photo: Lewis Hine

Forms of child labor, including indentured servitude and child slavery, have existed throughout American history. As industrialization moved workers from farms and home workshops into urban areas and factory work, children were often preferred, because factory owners viewed them as more manageable, cheaper, and less likely to strike. Growing opposition to child labor in the North caused many factories to move to the South. By 1900, states varied considerably in whether they had child labor standards and in their content and degree of enforcement. By then, American children worked in large numbers in mines, glass factories, textiles, agriculture, canneries, home industries, and as newsboys, messengers, bootblacks, and peddlers.



Spinning Room

Cornell Mill

Fall River, Mass.

Photo: Lewis Hine

In the early decades of the twentieth century, the numbers of child laborers in the U.S. peaked. Child labor began to decline as the labor and reform movements grew and labor standards in general began improving, increasing the political power of working people and other social reformers to demand legislation regulating child labor. Union organizing and child labor reform were often intertwined, and common initiatives were conducted by organizations led by working women and middle class consumers, such as state Consumers' Leagues and Working Women's Societies. These organizations generated the National Consumers' League in 1899 and the National Child Labor

Committee in 1904, which shared goals of challenging child labor, including through anti-sweatshop campaigns and labeling programs. The National Child Labor Committee's work to end child labor was combined with efforts to provide free, compulsory education for all children, and culminated in the passage of the Fair Labor Standards Act in 1938, which set federal standards for child labor.

Child Labor Reform and the U.S. Labor Movement

1832 New England unions condemn child labor

The New England Association of Farmers, Mechanics and Other Workingmen resolve that "Children should not be allowed to labor in the factories from morning till night, without any time for healthy recreation and mental culture," for it "endangers their . . . well-being and health"



Women's Trade Union League of New York

1836 Early trade unions propose state minimum age laws

Union members at the National Trades' Union Convention make the first formal, public proposal recommending that states establish minimum ages for factory work

1836 First state child labor law

Massachusetts requires children under 15 working in factories to attend school at least 3 months/year

1842 States begin limiting children's work days

Massachusetts limits children's work days to 10 hours; other states soon pass similar laws—but most of these laws are not consistently enforced

1876 Labor movement urges minimum age law

Working Men's Party proposes banning the employment of children under the age of 14

1881 Newly formed AFL supports state minimum age laws

The first national convention of the American Federation of Labor passes a resolution calling on states to ban children under 14 from all gainful employment

1883 New York unions win state reform

Led by Samuel Gompers, the New York labor movement successfully sponsors legislation prohibiting cigar making in tenements, where thousands of young children work in the trade

1892 Democrats adopt union recommendations

Democratic Party adopts platform plank based on union recommendations to ban factory employment for children under 15



National Child Labor Committee

1904 National Child Labor Committee forms

Aggressive national campaign for federal child labor law reform begins

1916 New federal law sanctions state violators

First federal child labor law prohibits movement of goods across state lines if minimum age laws are violated (law in effect only until 1918, when it's declared unconstitutional, then revised, passed, and declared unconstitutional again)

1924 First attempt to gain federal regulation fails

Congress passes a constitutional amendment giving the federal government authority to regulate child labor, but too few states ratify it and it never takes effect

1936 Federal purchasing law passes

Walsh-Healey Act states U.S. government will not purchase goods made by underage children

1937 Second attempt to gain federal regulation fails

Second attempt to ratify constitutional amendment giving federal government authority to regulate child labor falls just short of getting necessary votes

1937 New federal law sanctions growers

Sugar Act makes sugar beet growers ineligible for benefit payments if they violate state minimum age and hours of work standards

1938 Federal regulation of child labor achieved in Fair Labor Standards Act

For the first time, minimum ages of employment and hours of work for children are regulated by federal law

http://www.continuetolearn.uiowa.edu/laborctr/child_labor/about/us_history.html

Outcome #7

Organized labor unions and politics

Organized labor unions often take part in assisting political campaigns during presidential campaign years. Often they do not favor strictly one political party but rather a pro-worker candidate who they think will best favor a political stance that promotes workers' rights and the role of the labor union in working America. Often, this stance causes the unions in the US to move together and organize in a movement called the Change to Win coalition, which was active throughout the country during the recent 2008 presidential campaign. How do labor unions help politics?

Labor unions often donate a large amount of time and money to support the candidates they have chosen. They will often use some of their own employees as a small independent group to help join the candidate's campaign and send them out on assignment to help campaign with other volunteers.

These people are getting paid their regular wages, but instead of their regular job duties they are calling people, knocking on doors, and distributing campaign literature. They might even help out at rallies and recruit other volunteers.

In addition to putting people in motion, they stage rallies of their own in addition to the campaign to make people aware of campaign issues and they also circulate literature to their own employees, either through the mail, via email, or through worksite visits. Unions create their own small, mobilized army of voices in support of the candidates they think will best help them and working America.

While it is not easy to get involved in one of these paid campaign jobs, if you are already a member of a labor union it is something to keep in mind when the next election year comes around. Some unions are more forceful and do more work than others, but all have some degree of involvement in the political arena. Each union typically has a political director who selects the people that are taken out on assignment for this kind of work. Contacting either the political director or the union president and letting them know that you are interested in helping is a great start towards getting involved.

There often is a short list of people they have considered to be excellent, vocal workers who could be assets to the campaign. Letting them know you are interested may not get you on that list for the entire project, but may for at least some of it. They often have a limited number of positions available and they select them early.

<http://www.cvtips.com/career-choice/organized-labor-unions-and-politics.html>

Outcome #9

Occupational Safety and Health Administration

http://en.wikipedia.org/wiki/Occupational_Safety_and_Health_Administration

The United States **Occupational Safety and Health Administration (OSHA)** is an agency of the United States Department of Labor. It was created by Congress of the United States under the Occupational Safety and Health Act, signed by President Richard M. Nixon, on December 30, 1970. Its mission is to prevent work-related injuries, illnesses, and occupational fatality by issuing and enforcing standards for workplace safety and health. The agency is headed by a Deputy Assistant Secretary of Labor.

The OSH Act which created OSHA also created the National Institute for Occupational Safety and Health (NIOSH) as a research agency focusing on occupational health and safety. NIOSH is not a part of the U.S. Department of Labor.

OSHA federal regulations cover most private sector workplaces. The OSH Act permits states to develop approved plans as long as they cover public sector employees and they provide protection equivalent to that provided under Federal OSHA regulations. In return, a portion of the cost of the approved state program is paid by the federal government. Twenty-two states and territories operate plans covering both the public and private sectors and five — Connecticut, Illinois, New Jersey, New York and the US Virgin Islands — operate public employee only plans. In those five states, private sector employment remains under Federal OSHA jurisdiction.

In 2000, the United States Postal Act made the U.S. Postal Service the only quasi-governmental entity to fall under the purview of OSHA jurisdiction.

History

OSHA was widely criticized after its inception for confusing, burdensome regulations. A good deal of the early conflict came about because of inconsistent enforcement during OSHA's early years. In addition, businesses were expected to retrofit safety devices on existing equipment and to implement other hazard controls, which often led to considerable expense. Other requirements like mandated training, communication, and extensive documentation were seen as even more burdensome and expensive.

With time, manufacturers of industrial equipment began to include OSHA-compliant safety features on new machinery. Enforcement has become more consistent across jurisdictions, and some of the more outdated or irrelevant rules have been repealed or are not enforced.

University of Cincinnati toxicologist Eula Bingham was appointed as the agency's administrator during the Carter administration. Under Bingham, OSHA began to concentrate more on health hazards like toxic chemicals. Bingham also launched the "New Directions" program, OSHA's first worker training grant program.

The Reagan and Bush administrations saw efforts to weaken OSHA enforcement and rulemaking through Reagan's "deregulation" campaign. However, several of OSHA's most important rules were issued at the same time, including hazard communication (workers' right to know about chemical exposures) and blood-borne pathogens (regulations to protect workers against illnesses such as hepatitis and AIDS). The Reagan administration also launched OSHA's Voluntary Protection Program (VPP). VPP was OSHA's first foray into voluntary programs and partnerships with industry: management, labor, and OSHA establish cooperative relationships at workplaces that have implemented a comprehensive safety and health management system. Approval into VPP is OSHA's official recognition of the outstanding efforts of employers and employees who have achieved exemplary occupational safety and health.^[1]

In 2000, OSHA issued an ergonomics standard after ten years of study and debate with business associations such as the Chamber of Commerce and National Association of Manufacturers, who were unconvinced that additional regulation was needed. Ergonomic injuries such as carpal tunnel syndrome account for one third of all serious injuries suffered by American workers. In March 2001, the Republican-controlled Congress voted to repeal the standard and the repeal was one of the first major pieces of legislation signed by President George W. Bush. Since the repeal of the ergonomics standard, OSHA has issued three ergonomics guidelines, and only a small handful of ergonomic citations under the Act's "general duty" clause.

The Bush administration largely replaced the process of issuing mandatory regulations with voluntary guidelines and put additional resources into other, previously existing voluntary programs, as well as new "Alliance" program.¹ In 2004, the General Accounting Office issued a report recommending that the Agency collect more data from participants in order to better ascertain the benefits of the program. A GAO report released in 1992 concluded that employers participating in the program benefited from significant cost reductions in workers' compensation premiums while improving labor productivity. The number of inspections conducted by OSHA improved during the Bush Administration compared to the Clinton years.

It is sometimes believed that the Agency promotes "voluntary compliance." In fact, all employers are required by law to comply with all final published rules promulgated under the Occupational Safety and Health Act of 1970.

In June 2009 David Michaels was nominated by President Obama and later confirmed by the senate as the head of OSHA.

Controversy

Much of the debate about OSHA regulations and enforcement policies revolves around the cost of regulations and enforcement, versus the actual benefit in reduced worker injury, illness and death. A 1995 study of several OSHA standards by the Office of Technology Assessment (OTA)^[2] found that regulated industries as well as OSHA typically overestimate the expected cost of proposed OSHA standards.

OSHA has come under considerable criticism for the ineffectiveness of its penalties, particularly its criminal penalties. OSHA is only able to pursue a criminal penalty when a willful violation of an OSHA standard results in the death of a worker.^[2] The maximum penalty is a misdemeanor with a maximum of 6-months in jail.^[2] In response to the criticism, OSHA, in conjunction with the Department of Justice, has pursued several high-profile criminal prosecutions for violations under the Act, and has announced a joint enforcement initiative between OSHA and the United States Environmental Protection Agency (EPA) which has the ability to issue much higher fines than OSHA. Meanwhile, Congressional Democrats, labor unions and community safety and health advocates are attempting to revise the OSH Act to make it a felony with much higher penalties to commit a willful violation that results in the death of a worker. Some local prosecutors are charging company executives with manslaughter and other felonies when criminal negligence leads to the death of a worker

During its more than 30 years of existence, OSHA has secured only 12 criminal convictions.^[3]

OSHA has been accused of being more devoted to the numbers of inspections than to actual safety. Industry associations and unions have resorted to court action to force OSHA to promulgate new standards such as the Hexavalent Chromium standard. OSHA has also been criticized for taking decades to develop new regulations. Speaking about OSHA on the specific issue of combustible dust explosions:^[4]

"[Carolyn] Merritt was appointed to the Chemical Safety Board by President Bush. Asked what her experience has been with regard to safety regulations in the Bush administration, Merritt says, 'The basic disappointment has been this attitude of no new regulation. They don't want industry to be pestered. In some instances, industry has to be pestered in order to comply.' "

Regulatory impact

Here are some of the changes in industrial safety regulation brought about by OSHA:

1. **Guards on all moving parts** - By 1970, there were guards to prevent inadvertent contact with most moving parts that were accessible in the normal course of operation. With OSHA, use of guards was expanded to cover essentially all parts where contact is possible.

2. **Permissible exposure limits (PEL)** - Maximum concentrations of chemicals stipulated by regulation for chemicals and dusts. They cover around 600 chemicals. Most are based on standards issued by other organizations in 1968 or before.
3. **Personal protective equipment (PPE)** - broader use of respirators, gloves, coveralls, and other protective equipment when handling hazardous chemicals; goggles, face shields, ear protection in typical industrial environments.
4. **Lockout/tagout** - In the 1980s, requirements for locking out energy sources (securing them in an "off" condition) when performing repairs or maintenance.
5. **Confined space** - In the 1990s, specific requirements for air sampling and use of a "buddy system" when working inside tanks, manholes, pits, bins, and similar enclosed areas.
6. **Hazard Communication** (HazCom ^[5]) - Also known as the "Right to Know" standard, was issued as 29CFR1910.1200 on November 25, 1983 (48 FR 53280), requires developing and communicating information on the hazards of chemical products used in the workplace.
7. **Process Safety Management (PSM ^[6])** - Issued in 1992 as 29CFR1910.119 in an attempt to reduce large scale industrial accidents. Although enforcement of the standard has been spotty, its principles have long been widely accepted by the petrochemical industry.
8. **Bloodborne Pathogens (BBP ^[7])**- In 1990, OSHA issued a standard designed to prevent health care (and other) workers from being exposed to bloodborne pathogens such as hepatitis B and HIV.
9. **Excavations and Trenches** - OSHA regulations^[8] specify that trenches and excavations wherein workers are working 5 feet or more down must be provided with safeguards in addition to proper sloping and storage of excavated material in order to prevent collapses/cave-ins.^[9]
10. **Exposure to asbestos** - OSHA has established requirements in 29 CFR 1910.1001 for occupational exposure to asbestos. These requirements apply to most workplaces - most notably excepted is construction work. "Construction work" means work for construction, alteration and/or repair including painting and decorating. Occupational exposure requirements for asbestos in construction work can be found in 29 CFR 1926.1101.

References

1. Retallick, Phillip (May 2008). "Corporate Commitment, Local Dedication Pave the Way to Success". *Occupational Health & Safety*. http://ohsonline.com/articles/2008/05/corporate-commitment-local-dedication-pave-the-way-to-success.aspx?sc_lang=en.
2. ^{a b} [1]
3. Justice Dept Drops Most Criminal OSHA Referrals
4. Pelley, Scott (2008-06-08). "Is Enough Done To Stop Explosive Dust?". *60 Minutes* (CBSnews.com). <http://www.cbsnews.com/stories/2008/06/05/60minutes/main4157170.shtml>. Retrieved 2008-06-09.
5. OSHA Hazard Communication Standard 29 CFR 1910.1200
6. OSHA Process Safety Management topic page
7. OSHA Bloodborne Pathogens and Needlestick Prevention topic page
8. OSHA Directive CPL 2.87 - Inspection Procedures for Enforcing the Excavation Standard, 29 CFR 1926]
9. OSHA Trench Safety Tips card

List of S-phrases

http://en.wikipedia.org/wiki/Safety_Codes

S-phrases are defined in Annex IV of European Union Directive 67/548/EEC: *Safety advice concerning dangerous substances and preparations*. The list was consolidated and republished in Directive 2001/59/EC, where translations into other EU languages may be found.

These safety phrases are used internationally and not just in Europe, and there is an ongoing effort towards complete international harmonization. (*Note: missing S-number combinations indicate phrases that were deleted or replaced by another phrase.*)

- (S1): Keep locked up
- (S2): Keep out of the reach of children
- S3: Keep in a cool place
- S4: Keep away from living quarters
- S5: Keep contents under ... (*appropriate liquid to be specified by the manufacturer*)
- S6: Keep under ... (*inert gas to be specified by the manufacturer*)
- S7: Keep container tightly closed
- S8: Keep container dry
- S9: Keep container in a well-ventilated place
- S10: Keep contents wet
- S11: Avoid contact with air
- S12: Do not keep the container sealed
- S13: Keep away from food, drink and animal foodstuffs
- S14: Keep away from ... (*incompatible materials to be indicated by the manufacturer*)
- S15: Keep away from heat
- S16: Keep away from sources of ignition - No smoking
- S17: Keep away from combustible material
- S18: Handle and open container with care
- S20: When using do not eat or drink
- S21: When using do not smoke
- S22: Do not breathe dust
- S23: Do not breathe gas/fumes/vapour/spray (*appropriate wording to be specified by the manufacturer*)
- S24: Avoid contact with skin
- S25: Avoid contact with eyes
- S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
- S27: Take off immediately all contaminated clothing
- S28: After contact with skin, wash immediately with plenty of ... (*to be specified by the manufacturer*)
- S29: Do not empty into drains

- S30: Never add water to this product
- S33: Take precautionary measures against static discharges
- S35: This material and its container must be disposed of in a safe way
- S36: Wear suitable protective clothing
- S37: Wear suitable gloves
- S38: In case of insufficient ventilation wear suitable respiratory equipment
- S39: Wear eye/face protection
- S40: To clean the floor and all objects contaminated by this material use ... (*to be specified by the manufacturer*)
- S41: In case of fire and/or explosion do not breathe fumes
- S42: During fumigation/spraying wear suitable respiratory equipment (*appropriate wording to be specified by the manufacturer*)
- S43: In case of fire use ... (*indicate in the space the precise type of fire-fighting equipment. If water increases the risk add - **Never use water***)
- S45: In case of accident or if you feel unwell seek medical advice immediately (show the label where possible)
- S46: If swallowed, seek medical advice immediately and show this container or label
- S47: Keep at temperature not exceeding ... °C (*to be specified by the manufacturer*)
- S48: Keep wet with ... (*appropriate material to be specified by the manufacturer*)
- S49: Keep only in the original container
- S50: Do not mix with ... (*to be specified by the manufacturer*)
- S51: Use only in well-ventilated areas
- S52: Not recommended for interior use on large surface areas
- S53: Avoid exposure - obtain special instructions before use
- S56: Dispose of this material and its container at hazardous or special waste collection point
- S57: Use appropriate containment to avoid environmental contamination
- S59: Refer to manufacturer/supplier for information on recovery/recycling
- S60: This material and its container must be disposed of as hazardous waste
- S61: Avoid release to the environment. Refer to special instructions/safety data sheet
- S62: If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label
- S63: In case of accident by inhalation: remove casualty to fresh air and keep at rest
- S64: If swallowed, rinse mouth with water (only if the person is conscious)

Combinations

- (S1/2): Keep locked up and out of the reach of children
- S3/7: Keep container tightly closed in a cool place
- S3/7/9: Keep container tightly closed in a cool, well-ventilated place
- S3/9/14: Keep in a cool, well-ventilated place away from ... (*incompatible materials to be indicated by the manufacturer*)

- S3/9/14/49: Keep only in the original container in a cool, well-ventilated place away from ... (*incompatible materials to be indicated by the manufacturer*)
- S3/9/49: Keep only in the original container in a cool, well-ventilated place
- S3/14: Keep in a cool place away from ... (*incompatible materials to be indicated by the manufacturer*)
- S7/8: Keep container tightly closed and dry
- S7/9: Keep container tightly closed and in a well-ventilated place
- S7/47: Keep container tightly closed and at temperature not exceeding ... °C (*to be specified by the manufacturer*)
- S8/10: Keep container wet, but keep the contents dry
- S20/21: When using do not eat, drink or smoke
- S24/25: Avoid any inhalation, contact with skin and eyes. Wear suitable protective clothing and gloves
- S27/28: After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of ... (*to be specified by the manufacturer*)
- S29/35: Do not empty into drains; dispose of this material and its container in a safe way
- S29/56: Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point
- S36/37: Wear suitable protective clothing and gloves
- S36/37/39: Wear suitable protective clothing, gloves and eye/face protection
- S36/39: Wear suitable protective clothing and eye/face protection
- S37/39: Wear suitable gloves and eye/face protection
- S47/49: Keep only in the original container at temperature not exceeding ... °C (*to be specified by the manufacturer*)

Outcome #12



What is Lean?

The core idea is to maximize **customer value** while minimizing waste. Simply, lean means creating more value for customers with fewer resources.

A lean organization understands customer value and focuses its key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste.

To accomplish this, lean thinking changes the focus of management from optimizing separate technologies, assets, and vertical departments to optimizing the flow of products and services through entire value streams that flow horizontally across technologies, assets, and departments to customers.

Eliminating waste along entire value streams, instead of at isolated points, creates processes that need less human effort, less space, less capital, and less time to make products and services at far less costs and with much fewer defects, compared with traditional business systems. Companies are able to respond to changing customer desires with high variety, high quality, low cost, and with very fast throughput times. Also, information management becomes much simpler and more accurate.

Lean for Production *and* Services

A popular misconception is that lean is suited only for manufacturing. Not true. Lean applies in every business and every process. It is not a tactic or a cost reduction program, but a way of thinking and acting for an entire organization.

Businesses in all industries and services, including healthcare and governments, are using lean principles as the way they think and do. Many organizations choose not to use the word lean, but to label what they do as their own system, such as the Toyota Production System or the Danaher Business System. Why? To drive home the point that lean is not a program or short term cost reduction program, but the way the company operates. The word **transformation or lean transformation** is often used to characterize a company moving from an old way of thinking to lean thinking. It requires a complete transformation on how a company conducts business. This takes a long-term perspective and perseverance.

The term "lean" was coined to describe Toyota's business during the late 1980s by a research team headed by Jim Womack, Ph.D., at MIT's International Motor Vehicle Program.

The characteristics of a lean organization and supply chain are described in *Lean Thinking*, by Womack and Dan Jones, founders of the Lean Enterprise Institute and the Lean Enterprise Academy (UK), respectively. While there are many very good books about lean techniques, *Lean Thinking* remains one of the best resources for understanding "what is lean" because it describes the *thought process*, the overarching key principles that must guide your actions when applying lean techniques and tools.

Purpose, Process, People

Womack and Jones recommend that managers and executives embarked on lean transformations think about three fundamental business issues that should guide the transformation of the *entire organization*:

- Purpose: What customer problems will the enterprise solve to achieve its own purpose of prospering?
- Process: How will the organization assess each major value stream to make sure each step is valuable, capable, available, adequate, flexible, and that all the steps are linked by flow, pull, and leveling?
- People: How can the organization insure that every important process has someone responsible for continually evaluating that value stream in terms of business purpose and lean process? How can everyone touching the value stream be actively engaged in operating it correctly and continually improving it?

"Just as a carpenter needs a vision of what to build in order to get the full benefit of a hammer, Lean Thinkers need a vision before picking up our lean tools," said Womack. "Thinking deeply about purpose, process, people is the key to doing this."

<http://www.lean.org/WhatsLean/>