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One such acronym Read more What must be done when a nonessential variable on a WPS is changed? When a nonessential variable on a Welding Read more Working with lead sheets and bars often requires precise cutting to achieve the desired shapes and sizes. However, cutting lead Read more ,the free encyclopedia that anyone can edit.117,937 active editors 7,000,929 articles in EnglishThe English-language Wikipedia thanks its contributors for creating more than seven million articles! Learn how you can take part in the encyclopedia's continued improvement.Andrea Navagero (14831529) was a Venetian diplomat and writer. He entered the Great Council of Venice at the age of twenty, five years younger than was normal at the time. He edited manuscripts at the Aldine Press, garnering a reputation as a scholar and a highly skilled writer. In 1515, he was appointed the official historian of the Republic of Venice as well as the caretaker of a library containing the collection of the scholar Bessarion. Navagero was named the Venetian ambassador to Spain in 1523 and navigated the volatile diplomatic climate caused by the conflict between CharlesV of Spain and FrancisI of France. By the time Navagero arrived back in Venice in 1528, he had grown disillusioned with politics and wished to return to editing manuscripts and cultivating his prized gardens. Much to his dismay, he was appointed ambassador to France in January 1529. After traveling to meet with FrancisI, he fell ill and died that May. (Fullarticle...)Recently featured: Nosy KombaMcDonnell Douglas Phantom in UK serviceTransportation during the 2024 Summer Olympics and ParalympicsArchiveBy emailMore featured articlesAboutEngraving of the Great Pyramid of Giza... that the 1572 Eight Wonders of the World (engraving pictured) is the source of the modern list of classical Seven Wonders of the World?... that Hedwig Tam gained 20 pounds to play a postpartum mother in Montages of a Modern Motherhood?... that the Alfonsine Ordinances punished Jews and Muslims with enslavement if they disguised their identity with the intention of "sinning with Christian women"?... that even though he had never seen a field hockey game, Willy Miranda became a high school coach and went on to win over 450 games across a 42-year tenure?... that a false viral rumour claimed 42 people committed suicide after their homoerotic fan art was included in the film Crazy About One Direction?... that an Arizona TV station put a satellite dish in a vacant swimming pool?... that 42 years after Jilly Cooper's How to Stay Married was first published, she described it as "terribly politically incorrect"?... that wrestler Kurt Howell won all 108 of his matches in high school?... that the second-place candidate in the 2018 Taipei mayoral election lost by just 0.23%, demanded a recount, and ended up losing by even more?ArchiveStart a new articleNominate an articlenosato DaikiKenyan writer and activist Ngg wa Thiong'o dies at the age of 87.In sumo, nosato Daiki (pictured) is promoted to yokozuna.In association football, Liverpool win the Premier League title.In motor racing, lex Palou wins the Indianapolis 500.Ongoing: Gaza warM23 campaignRussian invasion of UkrainetimelineSudanese civil wartimelineRecent deaths: Phil RobertsonMary K. GaillardPeter DavidAlan YentobGerry ConnollySebastio SalgadoNominate an articleMay 29: Feast day of Saint PaulVI (Catholicism)Headline in the New York Times1233 MongolJin War: The Mongols entered and began looting Kaifeng, the capital of the Jin dynasty of China, after a 13-month siege.1416 A squadron of the Venetian navy captured many Ottoman ships at the Battle of Gallipoli, confirming Venetian naval superiority in the Aegean Sea for the next few decades.1913 During the premiere of the ballet Le Sacre du printemps by Igor Stravinsky at the Thtre des Champs-lyses in Paris, the avant-garde nature of the music and choreography caused a near-riot in the audience (report pictured).1999 Charlotte Perrelli, representing Sweden, won the Eurovision Song Contest, the first edition not to feature an orchestra or live accompaniment.2011 Residents of Portland, Oregon, held a rally called Hands Across Hawthorne in response to an attack against a gay couple holding hands while crossing the Hawthorne Bridge.Benedetto Pistrucci (b.1783)G.K. Chesterton (b.1874)Hubert Opperman (b.1904)Uro Drenovi (d.1944)More anniversaries: May 28May 29May 30ArchiveBy emailList of days of the yearAboutThe Australian white ibis (Threskiornis molucca) is a wading bird of the ibis family, Threskiornithidae. It is widespread across much of Australia, and has a predominantly white plumage with a bare, black head, long downcurved bill, and black legs. While it is closely related to the African sacred ibis, the Australian white ibis is a native Australian bird. Due to its increasing presence in the urban environment and its habit of rummaging in garbage, the species has acquired a variety of colloquial names such as "tip turkey" and "bin chicken". This Australian white ibis was photographed at the Royal Botanic Garden, Sydney.Photograph credit: Charles J. SharpRecently featured: Hell Gate BridgeAnemonoides blandaBluespotted ribbontail rayArchiveMore featured picturesCommunity portal The central hub for editors, with resources, links, tasks, and announcements.Village pump Forum for discussions about Wikipedia itself, including policies and technical issues.Site news Sources of news about Wikipedia and the broader Wikimedia movement.Teahouse Ask basic questions about using or editing Wikipedia.Help desk Ask questions about using or editing Wikipedia.Reference desk Ask research questions about encyclopedic topics.Content portals A unique way to navigate the encyclopedia.Wikipedia is written by volunteer editors and hosted by the Wikimedia Foundation, a non-profit organization that also hosts a range of other volunteer projects: CommonsFree media repository MediaWikiWiki software development Meta-WikiWikimedia project coordination WikibooksFree textbooks and manuals WikidataFree knowledge base WikinewsFree-content news WikiquoteCollection of quotations WikisourceFree-content library WikispeciesDirectory of species WikiversityFree learning tools WikivoyageFree travel guide WiktionaryDictionary and thesaurusThis Wikipedia is written in English. Many other Wikipedias are available; some of the largest are listed below. 1,000,000+ articles DeutschEspaolFranaisItalianoNederlandsPolskiPortugusSvenskaTing Vit 250,000+ articles Bahasa IndonesiaBahasa MelayuBn-lm-gCataletinaDanskEestiEsperantoEuskaraMagyarNorsk bokmlRomnSimple EnglishSloveninaSrpskiSrpskohrvatskiSuomiTrkeOzbekcha 50,000+ articles AsturianuAzrbaycancaBosanskiFryskGaeilgeGalegoHrvatskiKurdLatvieuLietuviNorsk nynorskShqipSlovenina Retrieved from " 2Calendar yearYearsMillennium2ndmillenniumCenturies12thcentury13thcentury 14thcenturyDecades1210s1220s1230s 1240s1250sYears1230123112321233 123412351236vte1233 by topicLeadersPolitical entitiesState leadersReligious leadersBirth and death categoriesBirths DeathsEstablishments and disestablishments categoriesEstablishments DisestablishmentsArt and literature1233 in poetryvte1233 in various calendarsGregorian calendar1233MCCXXXIIIAb urbe condita1986Armenian calendar682 Assyrian calendar5983Balinese saka calendar11541155Bengali calendar639640Berber calendar2183English Regnal year17Hen.318Hen.3Buddhist calendar1777Burmese calendar595Byzantine calendar67416742Chinese calendar (WaterDragon)3930 or 3723to (WaterSnake)3931 or 3724Coptic calendar949950Discordian calendar2399Ethiopian calendar12251226Hebrew calendar49934994Hindu calendars-Vikram Samvat12891290- Shaka Samvat11541155- Kali Yuga43334334Holocene calendar11233Igbo calendar233234Iranian calendar611612Islamic calendar630631Japanese calendarJei 2 / Tenpuku 1()Javanese calendar11421143Julian calendar1233MCCXXXIIIKorean calendar3566Minguo calendar679 before ROC679Nanakshahi calendar235Thai solar calendar17751776Tibetan calendar(male Water-Dragon)1359 or 978 or 206to(female Water-Snake)1360 or 979 or 207 Henry I of Cyprus receives a messageYear 1233 (MCCXXXIII) was a common year starting on Saturday of the Julian calendar.War of the Lombards: Lombard forces at Kyrenia surrender to John of Beirut, after a 10-month siege. The defenders, with their personal belongings, are allowed to retire to Tyre. Captured prisoners are exchanged for those held by Richard Filangieri, commander of the Lombards, at Tyre. Cyprus is wholly restored under the rule of the 16-year-old King Henry I ("the Fat"). His vassals are rewarded, and loans that they have made are repaid.[1]August 20 Oath of Bereg: King Andrew II of Hungary vows to the Holy See that he will not employ Jews and Muslims to administer royal revenues, which causes diplomatic complaints and ecclesiastical censures.[2]Winter Reconquista: King Ferdinand III of Castile ("the Saint") conquers the cities of Trujillo and beda. The Castilian army besieges the city of Peniscola. Ferdinand forces Ibn Hud, ruler of the Taifa of Zaragoza, to sign a truce.[3]August Richard Marshal, 3rd Earl of Pembroke, signs an alliance with Llywelyn the Great, to join forces to revolt against King Henry III. Richard is faced by demands from royal bailiffs in September where the garrison of Usk Castle is forced to surrender.November Henry III's army camped at Grosmont Castle is attacked in the night, by a force of Welsh and English rebels. Several of Henry's supporters are captured, and the castle is returned to Hubert de Burgh, one of the rebels.May 29 MongolJin War: The Mongol army led by gedei Khan captures Kaifeng, capital of the Jin dynasty ('Great Jin'), after the 13-month Siege of Kaifeng (1232). The Mongols plunder the city, while Emperor Aizong of Jin flees for the town of Caizhou. Meanwhile, gedei departs and leaves the final conquest to his favoured general, Subutai.December Siege of Caizhou: The Mongols under gedei Khan besiege Caizhou and ally themselves with the Chinese Song dynasty to eliminate the Jin Dynasty.Gendt receives its city rights from Otto II ("the Lame"), count of Guelders (modern Netherlands).Pope Gregory IX establishes the Papal Inquisition, to regularize the persecution of heresy.June/July Ibn Manzur, Arab lexicographer and writer (d. 1312)August 15 Philip Benizi de Damiani, Italian religious leader (d. 1285)October Al-Nawawi, Syrian scholar, jurist and writer (d. 1277)Adelaide of Burgundy, duchess of Brabant (d. 1273)Choe Ui, Korean military leader and dictator (d. 1258)Ibn al-Quff, Ayyubid physician and surgeon (d. 1286)Sancho of Castile, archbishop of Toledo (d. 1261)January 6 Matilda of Chester, Countess of Huntingdon (or Maud), English noblewoman (b. 1171)January 18 Yang (or Gongsheng), Chinese empress (b. 1162)February 12 Ermengarde de Beaumont, queen of ScotlandMarch 1 Thomas I (or Tommaso), count of Savoy (b. 1178)May Simon of Joinville, French nobleman and knight (b. 1175)June Yolanda de Courtenay, queen consort of HungaryJuly 8 Konoe Motomichi, Japanese nobleman (b. 1160)July 26 Wilbrand of Oldenburg, prince-bishop of UtrechtJuly 27 Ferdinand (or Ferrand), count of Flanders (b. 1188)July 29 Savari de Maulon, French nobleman (b. 1181)July 30 Konrad von Marburg, German priest (b. 1180)October 8 Ugo Canefri, Italian health worker (b. 1148)October 22 Fujiwara no Shunshi, Japanese empress consort (b. 1209)November 22 Helena, duchess of Brunswick-LneburgNovember 27 Shi Miyuan, Chinese politician (b. 1164)Ibn al-Athir, Seljuk historian and biographer (b. 1160)Bertran de Born lo Filhs, French troubadour (b. 1179)Bohemond IV ("the One-Eyed"), prince of Antioch (b. 1175)Gkbri ("Blue-Wolf"), Ayyubid general and ruler (b. 1154)Guilln Prez de Guzmn, Spanish nobleman (b. 1180)John Apokaukos, Byzantine bishop and theologianMathilde of Angoulme, French noblewoman (b. 1181)Sayf al-Din al-Amidi, Ayyubid scholar and jurist (b. 1156)William Comyn, Scoto-Norman nobleman (b. 1163)^ Steven Runciman (1952). A History of The Crusades. Vol III: The Kingdom of Acre, pp. 169170. ISBN978-0-241-29877-0.^ Berend, Nora (2001). At the Gate of Christendom: Jews, Muslims and "Pagans" in Medieval Hungary, c. 1000-c.1300. Cambridge University Press. p.158. ISBN978-0-521-02720-5.^ Lourie, Elena (2004). Jews, Muslims, and Christians in and around the Crown of Aragon: essays in honour of Professor Elena Lourie. Brill. p.270. ISBN90-04-12951-0.[permanent dead link]Retrieved from " 3One hundred years, from 1101 to 1200See also: Renaissance of the 12th centuryMillennia2ndmillenniumCenturies11thcentury12thcentury13thcenturyTimelines11thcentury12thcentury13thcenturyState leaders11thcentury12thcentury13thcenturyDecades1100s1110s1120s1130s1140s1150s1160s1170s1180s1190sCategories:Births Deaths Establishments DisestablishmentsvteEastern Hemisphere at the beginning of the 12th centuryThe 12th century is the period from 1101 to 1200 in accordance with the Julian calendar. In the history of European culture, this period is considered part of the High Middle Ages and overlaps with what is often called the "'Golden Age' of the Cistercians". The Golden Age of Islam experienced significant development, particularly in Islamic Spain.In Song dynasty China, an invasion by Jurchens caused a political schism of north and south. The Khmer Empire of Cambodia flourished during this century, while the Fatimids of Egypt were overtaken by the Ayyubid dynasty. Following the expansions of the Ghaznavids and Ghurid Empire, the Muslim conquests in the Indian subcontinent took place at the end of the century.The Ghurid Empire converted to Islam from Buddhism.1101: In July, the Treaty of Alton is signed between Henry I of England and his older brother Robert, Duke of Normandy in which Robert agrees to recognize Henry as king of England in exchange for a yearly stipend and other concessions. The agreement temporarily ends a crisis in the succession of the Anglo-Norman kings.11011103: David the Builder takes over Kakheti and Hereti (now parts of Georgia).1102: King Coloman unites Hungary and Croatia under the Hungarian Crown.1102: Muslims conquer Seoro de Valencia.11031104: A church council is convened by King David the Builder in Urbnisi to reorganize the Georgian Orthodox Church.1104: In the Battle of Ertsukhi, King David the Builder defeats an army of Seljuks.1104: King Jayawarsa of Kadiri (on Java) ascends to the throne.[citation needed]1106: Battle of Tinchebray.11071111: Sigurd I of Norway becomes the first Norwegian king to embark on a crusade to the Holy Land. He fights in Lisbon and on various Mediterranean isles and helps the King of Jerusalem to take Sidon from the Muslims.1108: By the Treaty of Devol, signed in September, Bohemond I of Antioch has to submit to the Byzantine Empire, becoming the vassal of Alexius I.1109: On June 10, Bertrand of Toulouse captures the County of Tripoli (northern Lebanon/western Syria).1109: In the Battle of Nako, Boleslaus III Wrymouth defeats the Pomeranians and re-establishes Polish access to the sea.1109: On August 24, in the Battle of Hundsfeld, Boleslaus III Wrymouth defeats Emperor Henry V of Germany and stops German expansion eastward.1111: On April 14, during Henry V's first expedition to Rome, he is crowned Holy Roman Emperor.1113: Paramavishnulok is crowned as King Suryavarman II in Cambodia. He expands the Khmer Empire and builds Angkor Wat during the first half of the century. He establishes diplomatic relations with China.1115: The Georgian army occupies Rustavi in the war with the Muslims.1115: In Java, King Kamesvara of Kadiri ascends to the throne. Janggala ceases to exist and comes under Kadiri domination, highly possible under royal marriage. During his reign, Mpu Dharmaja writes Kakawin Smaradahana, a eulogy for the king which become the inspiration for the Panji cycle tales, which spread across Southeast Asia.[1]1116: The Byzantine army defeats the Turks at Philomelion.1116: Death of doa Jimena Daz, governor of Valencia from 1099 to 1102.c. 1119: The Knights Templar are founded to protect Christian pilgrims in Jerusalem.A Black and White Photo of the 12th century Cuenca Cathedral (built from 1182 to 1270) in Cuenca, Spain1120: On January 16, the Council of Nablus, a council of ecclesiastic and secular lords in the crusader Kingdom of Jerusalem, establishes the first written laws for the kingdom.1120: On November 25, William Adelin, the only legitimate son of King Henry I of England, drowns in the White Ship Disaster, leading to a succession crisis which will bring down the Norman monarchy of England.1121: On August 12, in the Battle of Didgori, the greatest military victory in Georgian history, King David the Builder with 45,000 Georgians, 15,000 Kipchak auxiliaries, 500 Alan mercenaries and 100 French Crusaders defeats a much larger Seljuk-led Muslim coalition army.1121: On December 25, St. Norbert and 29 companions make their solemn vows in Premontre, France, establishing the Premonstratensian Order.1122: The Battle of Beroia (Modern-day Stara Zagora, Bulgaria) results in the disappearance of the Pechenegs Turkish tribe as an independent force.1122: On September 23, the Concordat of Worms (Pactum Calixtinum) is drawn up between Emperor Henry V and Pope Calixtus II bringing an end to the first phase of the power struggle between the papacy and the Holy Roman Empire.1122: King David the Builder captures Tbilisi and declares it the capital city of Georgia, ending 400 years of Arab rule.1123: The Jurchen dynasty of China forces Koryo (now Korea) to recognize their suzerainty.1124: In April or May, David I is crowned King of the Scots.1125: On June 11, in the Battle of Azaz, the Crusader states, led by King Baldwin II of Jerusalem, defeat the Seljuk Turks.1125: In November, the Jurchens of the Jin dynasty declare war on the Song dynasty, beginning the JinSong wars.1125: Lothair of Supplinburg, duke of Saxony, is elected Holy Roman Emperor instead of the nearest heir, Frederick of Swabia, beginning the great struggle between Guelphs and Ghibellines.1127: The Northern Song dynasty loses power over northern China to the Jin dynasty.1128: On June 24, the Kingdom of Portugal gains independence from the Kingdom of Len at the Battle of So Mamede; (recognised by Len in 1143).The temple complex of Angkor Wat, built during the reign of Suryavarman II in Cambodia of the Khmer Era.11301180: 50-year drought in what is now the American Southwest.11301138: Papal schism, Pope Innocent II vs. Antipope Anacletus II.1130: On March 26, Sigurd I of Norway dies. A golden era of 95 years comes to an end for Norway as civil wars between the members of Harald Fairhair's family line rage for the remainder of the century.1130: On Christmas Day, Roger II is crowned King of Sicily, the royal title being bestowed on him by Antipope Anacletus II.1132: The Southern Song dynasty establishes China's first permanent standing navy, although China had a long naval history prior. The main admiral's office is at the port of Dinghai.11321183: the Chinese navy increases from a mere 3,000 to 52,000 marine soldiers stationed in 20 different squadrons. During this time, hundreds of treadmill-operated paddle wheel craft are assembled for the navy to fight the Jin dynasty in the north.1135: King Jayabaya of Kadiri ascends to the throne.[2]11351154: The Anarchy takes place, during a period of civil war in England.1136: Suger begins rebuilding the abbey church at St Denis north of Paris, which is regarded as the first major Gothic building.1137: On July 22, the future King Louis VII of France marries Eleanor, the Duchess of Aquitaine.1138: On October 11, the 1138 Aleppo earthquake devastates much of northern Syria.1139: in April, the Second Lateran Council ends the papal schism.1139: On July 5, in the Treaty of Mignano, Pope Innocent II confirms Roger II as King of Sicily, Duke of Apulia, and Prince of Capua and invests him with his titles.1139: On July 25, the Portuguese defeat the Almoravids led by Ali ibn Yusuf in the Battle of Ourique; Prince Afonso Henriques is acclaimed King of Portugal by his soldiers.Averroes in a 14th-century painting by Andrea di Bonaiuto11401150: Collapse of the Ancestral Puebloan culture at Chaco Canyon (modern-day New Mexico).1141: The Treaty of Shaoxing ends the conflict between the Jin dynasty and Southern Song dynasty, legally establishing the boundaries of the two countries and forcing the Song dynasty to renounce all claims to its former territories north of the Huai River. The treaty reduces the Southern Song into a quasi-tributary state of the Jurchen Jin dynasty.1143: Manuel I Komnenos is crowned as Byzantine emperor after the death of John II Komnenos.1143: Afonso Henriques is proclaimed King of Portugal by the cortes.1143: The Treaty of Zamora recognizes Portuguese independence from the Kingdom of Len. Portugal also recognizes the suzerainty of the pope.1144: On December 24, Edessa falls to the Atabeg Zengi.11451148: The Second Crusade is launched in response to the fall of the County of Edessa.1147: On October 25, the four-month-long Siege of Lisbon successfully brings the city under definitive Portuguese control, expelling the Moorish overlords.1147: A new Berber dynasty, the Almohads, led by Emir Abd al-Mu'min, takes North Africa from the Almoravides and soon invades the Iberian Peninsula. The Almohads began as a religious movement to rid Islam of impurities.1147: The Wendish Crusade against the Polabian Slavs (or "Wends") in what is now northern and eastern Germany.1150: Ramon Berenguer IV, Count of Barcelona marries Petronilla, the Queen of Aragon.1151: The Treaty of Tudiln is signed by Alfonso VII of Len and Raymond Berengar IV, Count of Barcelona, recognizing the Aragonese conquests south of the Jcar and the right to expand in and annex the Kingdom of Murcia.1153: The Treaty of Wallingford, ends the civil war between Empress Matilda and her cousin King Stephen of England fought over the English crown. Stephen acknowledges Matilda's son Henry of Anjou as heir.1153: The First Treaty of Constance is signed between Emperor Frederick I and Pope Eugene III, by the terms of which, the emperor is to prevent any action by Manuel I Comnenus to reestablish the Byzantine Empire on Italian soil and to assist the pope against his enemies in revolt in Rome.1154: the Moroccan-born Muslim geographer Muhammad al-Idrisi publishes his Geography.1154: On December 27, Henry II is crowned King of England at Westminster Abbey.1155: Pope Adrian IV grants overlordship of Ireland to Henry II of England in the bull Laudabiliter.1156: On June 18, the Treaty of Benevento is entered into by Pope Adrian IV and the Norman Kingdom of Sicily. After years of turbulent relations, the popes finally settles down to peace with the Hauteville kings. The kingship of William I is recognized over all Sicily, Apulia, Calabria, Campania, and Capua. The tribute to the pope of 600 schifati agreed upon by Roger II in 1139 at Mignano is affirmed and another 400 shift is added for the new lands.1158: The Treaty of Sahagn ends the war between Castile and Len.The Liuhe Pagoda of Hangzhou, China, 11651161: the Song dynasty Chinese navy, employing gunpowder bombs launched from trebuchets, defeats the enormous Jin dynasty navy in the East China Sea in the Battle of Tangdao and on the Yangtze River in the Battle of Caishi.1161: Kilij Arslan II, Sultan of Rum, makes peace with the Byzantine Empire, recognizing the emperor's primacy.1161: In the siege of Ani, troops from the Kingdom of Georgia take control over the city, only to have it sold for the second time to the Shaddadids, a Kurdish dynasty.1162: Genghis Khan, the founder of the Mongol Empire, is born as Temjin in present-day Mongolia.1163: The Norwegian Law of Succession takes effect.11651182: Tensions and disputes between the Pagan Empire and the Kingdom of Polonnaruwa causes the Sinhalese under Parakramabahu the Great to raid Burma.1168: King Valdemar I of Denmark conquers Arkona on the Island of Rgen, the strongest pagan fortress and temple in northern Europe.1169: Political disputes within the Pandya Empire sparks the decade-long Pandyan Civil War.1169: On May 1, the Norman invasion of Ireland begins. Richard fitzGilbert de Clare ('Strongbow') allies with the exiled Irish chief, Dermot MacMurrough, to help him recover his kingdom of Leinster.The defense of the Carroccio during the battle of Legnano (1176) by Amos Cassioli (18321891)1170: The Treaty of Sahagn is signed by Alfonso VIII of Castile and Alfonso II of Aragon. Based on the terms of the accord, Alfonso VIII agrees to provide Alfonso II with three hostages, to be used as tribute payments owed by Ibn Mardan of Valencia and Murcia.1170: On December 29, Thomas Becket is murdered in Canterbury Cathedral.1171: Saladin deposes the last Fatimid Caliph Al-'id and establishes the Ayyubid dynasty.1171: On November 11, Henry II of England lands in Ireland to assert his claim as Lord of Ireland.1172: The Pandyan city of Madurai is sacked by the Sinhalese army due to an attempt to drive off the rival throne claimant, Kulasekara Pandyan.1173: Sinhalese king Parakramabahu the Great gains a decisive victory by invading the Chola Empire as an ally of the Pandyas in the Pandyan Civil War.1174: On July 12, William I of Scotland is captured by the English in the Battle of Alnwick. He accepts the feudal overlordship of the English crown and pays ceremonial allegiance at York.1175: Hnen Shnin (Genk) founds the Jdo sh (Pure Land) sect of Buddhism.1175: The Treaty of Windsor is signed by King Henry II of England and the High King of Ireland, Ruaidr Ua Conchobair.1176: On May 29, Frederick Barbarossa's forces are defeated in the Battle of Legnano by the Lombard League which results in the emperor's acknowledgment of the pope's sovereignty over the Papal States and Alexander acknowledging the emperor's overlordship of the imperial Church.1176: On September 17, The Battle of Myriokephalon (Myriocephalum; Turkish: Miryakefalon Sava) is fought between the Byzantine Empire and the Seljuk Turks in Phrygia. It is a serious reversal for the Byzantine forces and will be the final, unsuccessful, effort by the Byzantines to recover the interior of Anatolia from the Seljuk Turks.1177: The Treaty or Peace of Venice is signed by the papacy and its allies, and Frederick I, Holy Roman Emperor. The Norman Kingdom of Sicily also participates in negotiations and the treaty thereby determines the political course of all of Italy for the next several years.1178: Chinese writer Zhou Qufei, a Guangzhou customs officer, writes of an island far west in the Indian Ocean (possibly Madagascar), from where people with skin "as black as lacquer" and with frizzy hair were captured and purchased as slaves by Arab merchants.1179: The Treaty of Cazola (Cazorla) is signed by Alfonso II of Aragon and Alfonso VIII of Castile, dividing Andalusia into separate zones of conquest for the two kingdoms, so that the work of the Reconquista would not be stymied by internecine feuding.1180: The Portuguese Navy defeats a Muslim fleet off the coast of Cape Espichel.11801185: the Genpei War in Japan.1181: Parakramabahu the Great conducts a large-scale raid on Burma, after a ship transporting a Sinhalese princess to the Khmer Empire is attacked by Burmese naval fleets.1182: Religious reformations of Theravada Buddhism in Pagan Burma under the patronage of Narapatisithu are continued with the end of the Polonnaruwa-Pagan War.1182: Revolt of the people of Constantinople against the Latins, whom they massacre, proclaiming Andronicus I Comnenus as co-emperor.1183: On January 25, the final Peace of Constance between Frederick Barbarossa, the pope and the Lombard towns is signed, confirming the Peace of Venice of 1177.1183: On September 24, Andronicus I Comnenus has his nephew Alexius II Comnenus strangled.1184: On March 24, Queen Tamar, King of Georgia, accedes to the throne as sole ruler after reigning with her father, George III, for six years.1184: Diet of Pentecost organised by Emperor Frederick I in Mainz.1185: The Uprising of Asen and Peter against the Byzantine Empire leads to the restoration of the Bulgarian Empire.1185: Andronicus I Comnenus is deposed and, on September 12, executed as a result of the Norman massacre of the Greeks of Thessalonika.1185: The cathedral school (Katedralskolan) in Lund, Sweden, is founded. The school is the oldest in northern Europe and one of the oldest in all of Europe.1185: Beginning in this year the Kamakura shogunate deprives the emperor of Japan of political power.1186: On January 27, the future Holy Roman Emperor Henry VI marries Constance of Sicily, the heiress to the Sicilian throne.1187: On July 4, in the Battle of Hattin, Saladin defeats the king of Jerusalem.1187: In August, the Swedish royal and commercial center Sigtuna is attacked by raiders from Karelia, Couronia, and/or Estonia.[3]1188: The Riah were introduced into the Habt and south of Tetouan by the Almohad caliph, Abu Yusuf Yaqub al-Mansur, and Jochem and Acem were introduced in Tamesna.[4]1189: On September 3, Richard I is crowned King of England at Westminster.1189: On November 11, William II of Sicily dies and is succeeded by his illegitimate cousin Tancred, Count of Lecce instead of Constance.11891192: The Third Crusade is an attempt by European leaders to wrest the Holy Land from Saladin.Richard I of England, or Richard the Lionheart.1190: On June 10, Emperor Frederick Barbarossa drowns in the River Salef, leaving the Crusader army under the command of the rivals Philip II of France and Richard I of England, which ultimately leads to the dissolution of the army.1191: Holy Roman Emperor Henry VI attacked the Kingdom of Sicily from May to August but fails and withdrawn, with Empress Constance captured (released 1192).1191: On September 7, Saladin is defeated by Richard I of England at the Battle of Arsuf.1192: In April, Isabella I begins her reign as Christian Queen of the Kingdom of Jerusalem1192: In the Battle of Jaffa, King Richard the Lionheart defeats Saladin.1192: In June, the Treaty of Ramla is signed by Saladin and Richard Lionheart. Under the terms of the agreement, Jerusalem will remain under Muslim control. However, the city will be open to Christian pilgrims. The Latin Kingdom is reduced to a coastal strip that extends from Tyre to Jaffa.1192: Minamoto no Yoritomo is appointed Sei-i Taishgun, "barbarian-subduing great general", shgun for short, the first military dictator to bear this title.1192: Sultan Shahbuddin Muhammad Ghori establishes the first Muslim empire in India for 14 years (11921206) by defeating Prithviraj Chauhan.1193: Nalanda, the great Indian Buddhist educational centre, is destroyed.1194: Emperor Henry VI conquers the Kingdom of Sicily.1195: On June 16, the struggle of Shamqori. Georgian forces annihilate the army of Abu Baqar.1198: The brethren of the Crusader hospital in Acre are raised to a military order of knights, the Teutonic Knights, formally known as the Order of the Knights of the Hospital of St. Mary of the Teutons in Jerusalem.1199: Pope Innocent III writes to Kaloyan, inviting him to unite the Bulgarian Church with the Roman Catholic Church.1200: Construction begins on the Grand Village of the Natchez near Natchez, Mississippi. This ceremonial center for the Natchez people is occupied and built until the early 17th century.[5]Eastern Hemisphere at the end of the 12th centuryChina is under the Northern Song dynasty. Early in the century, Zhang Zeduan paints Along the River During the Qingming Festival. It will later end up in the Palace Museum, Beijing.In southeast Asia, there is conflict between the Khmer Empire and the Champa. Angkor Wat is built under the Hindu king Suryavarman II. By the end of the century, the Buddhist Jayavarman VII becomes the ruler.Japan is in its Heian period. The Chj-jinbutsu-giga is made and attributed to Toba Sj. It ends up at the Kzan-ji, Kyoto.In Oceania, the Tui Tonga Empire expands to a much greater area.Europe undergoes the Renaissance of the 12th century. The blast furnace for the smelting of cast iron is imported from China, appearing around Lapphyttan, Sweden, as early as 1150.Alexander Neckam is the first European to document the mariner's compass, first documented by Shen Kuo during the previous century.Christian humanism becomes a self-conscious philosophical tendency in Europe. Christianity is also introduced to Estonia, Finland, and Karelia. The first medieval universities are founded. Pierre Abelard teaches.Middle English begins to develop, and literacy begins to spread outside the Church throughout Europe.[6] In addition, churchmen are increasingly willing to take on secular roles. By the end of the century, at least a third of England's bishops also act as royal judges in secular matters.[7]The Ars antiqua period in the history of the medieval music of Western Europe begins.The earliest recorded miracle play is performed in Dunstable, England.Gothic architecture and trouvre music begin in France.During the middle of the century, the Cappella Palatina is built in Palermo, Sicily, and the Madrid Skylitzes manuscript illustrates the Synopsis of Histories by John Skylitzes.Fire and plague insurance first become available in Iceland, and the first documented outbreaks of influenza there happens.The medieval state of Serbia is formed by Stefan Nemanja and then continued by the Nemanji dynasty.By the end of the century, both the Capetian dynasty and the House of Anjou are relying primarily on mercenaries in their militaries. Paid soldiers are available year-round, unlike knights who expected certain periods off to maintain their manor lifestyles.[8]In India, Hoysala architecture reaches its peak.In the Middle East, the icon of Theotokos of Vladimir is painted probably in Constantinople. Everything but the faces will later be retouched, and the icon will go to the Tretyakov Gallery of Moscow.The Georgian poet Shota Rustaveli composes his epic poem The Knight in the Panther's Skin.Shahab al-Din Suhrawardi founds his "school of illumination".In North Africa, the kasbah of Marrakesh is built, including the city gate Bab Agnaou and the Koutoubia mosque.In sub-Saharan Africa, Kente cloth is first woven.In France, the first piedfort coins were minted.The city of Tula burns down, marking the end of the Toltec EmpireIn West Africa the Ife Empire is established.See also: Timeline of historic inventions 12th century1104: The Venice Arsenal of Venice, Italy, is founded. It employed some 16,000 people for the mass production of sailing ships in large assembly lines, hundreds of years before the Industrial Revolution.1106: Finished building of Gelati.1107: The Chinese engineer Wu Deren combines the mechanical compass vehicle of the south-pointing chariot with the distance-measuring odometer device.1111: The Chinese Donglin Academy is founded.1165: The Liuhe Pagoda of Hangzhou, China, is built.1170: The Roman Catholic notion of Purgatory is defined.[9]1185: First record of windmills.Wikimedia Commons has media related to 12th century.^ Soekmono, R, Drs., Pengantar Sejarah Kebudayaan Indonesia 2, 2nd ed. Penerbit Kanisius, Yogyakarta, 1973, 5th reprint edition in 1988 p.57^ Britannica, T. Editors of Encyclopaedia (1998, July 20). Kairi. Encyclopedia Britannica.^ Enn Tarvel (2007). Sigtuna hukkumine. Archived 2017-10-11 at the Wayback Machine Haridus, 2007 (7-8), p 3841^ Notice sur les Arabes hilaliens. Ismal Hamet. p.248.^ Francine Weiss and Mark R. Barnes (May 3, 1989). "National Register of Historic Places Registration: Grand Village of the Natchez Site / Fatherland Plantation Site (22-Ad-501)" (pdf). National Park Service. and Accompanying 3 photos, from 1989.(680KB)^ Warren 1961, p.129.^ Warren 1961, p.159.^ Warren 1961, p.60-61.^ Le Goff, Jacques (1986). The Birth of Purgatory. Chicago: University of Chicago Press. ISBN0226470822.Warren, Wilfred Lewis (1961). King John. University of California Press. p.362. ISBN9780520036437. {{cite book}}: ISBN / Date incompatibility (help)Retrieved from " 4The following pages link to 12th century External tools(link counttransclusion countsorted list) See help page for transcluding these entriesShowing 50 items.View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Antisemitism in Christianity (links | edit)Catharism (links | edit)List of decades, centuries, and millennia (links | edit)Dialect (links | edit)House of Habsburg (links | edit)House of Hohenzollern (links | edit)History of Mali (links | edit)Maimonides (links | edit)Passport (links | edit)Sumba (links | edit)Taoism (links | edit)Weregild (links | edit)Zanzibar (links | edit)20th century (links | edit)1040 (links | edit)15th century (links | edit)16th century (links | edit)17th century (links | edit)18th century (links | edit)14th century (links | edit)1st century (links | edit)13th century (links | edit)4th century (links | edit)11th century (links | edit)1282 (links | edit)7th century (links | edit)10th century (links | edit)9th century (links | edit)8th century (links | edit)6th century (links | edit)5th century (links | edit)3rd century (links | edit)2nd century (links | edit)4th century BC (links | edit)1st century BC (links | edit)2nd century BC (links | edit)3rd century BC (links | edit)5th century BC (links | edit)6th century BC (links | edit)21st century BC (links | edit)11th century BC (links | edit)1000s (decade) (links | edit)1040s (links | edit)1299 (links | edit)1154 (links | edit)1163 (links | edit)1160s (links | edit)1141 (links | edit)1135 (links | edit)1204 (links | edit)View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Retrieved from " WhatLinksHere/12th_century"Submerged arc welding (SAW) is a process in which the joining of metals is produced by heating with an arc or arcs between a bare metal electrode or electrodes and the work.The arc is shielded by a blanket of granular fusible material on the work.Filler metal is obtained from the electrode or from a supplementary welding rod.The SAW equipment components required for submerged arc welding are shown by figure 10-59.Equipment consists of a welding machine or power source, the wire feeder and control system, the welding torch for automatic welding or the welding gun and cable assembly for semiautomatic welding, the flux hopper and feeding mechanism, usually a flux recovery system, and a travel mechanism for automatic welding.The power source for submerged arc welding must be rated for a 100 percent duty cycle, since the submerged arc welding operations are continuous and the length of time for making a weld may exceed 10 minutes.If a 60 percent duty cycle power source is used, it must be derated according to the duty cycle curve for 100 percent operation.When constant current is used, either ac or dc, the voltage sensing electrode wire feeder system must be used.When constant voltage is used, the simpler fixed speed wire feeder system is used. The CV system is only used with direct current.Both generator and transformer-rectifier power sources are used, but the rectifier machines are more popular.Welding machines for submerged arc welding range in size from 300 amperes to 1500 amperes.They may be connected in parallel to provide extra power for high-current applications.Direct current power is used for semiautomatic applications, but alternating current power is used primarily with the machine or the automatic method.Multiple electrode systems require specialized types of circuits, especially when ac is employed.For semiautomatic application, a welding gun and cable assembly are used to carry the electrode and current and to provide the flux at the arc.A small flux hopper is attached to the end of the cable assembly.The electrode wire is fed through the bottom of this flux hopper through a current pickup tip to the arc.The flux is fed from the hopper to the welding area by means of gravity.The amount of flux fed depends on how high the gun is held above the work.The hopper gun may include a start switch to initiate the weld or it may utilize a hot electrode so that when the electrode is touched to the work, feeding will begin automatically.For automatic welding, the torch is attached to the wire feed motor and includes current pickup tips for transmitting the welding current to the electrode wire.The flux hopper is normally attached to the torch, and may have magnetically operated valves which can be opened or closed by the control system.Other pieces of equipment sometimes used may include a travel carriage, which can be a simple tractor or a complex moving specialized fixture. A flux recovery unit is normally provided to collect the unused submerged arc flux and return it to the supply hopper.Submerged arc welding system can become quite complex by incorporating additional devices such as seam followers, weavers, and work rovers. Figure 10-59. Block diagram of SAW (submerged arc welding) Equipment. The major advantages of the SAW or submerged arc welding process are:high quality metal weld.extremely high speed and deposition ratesmooth, uniform finished weld with no spatter.little or no smoke.no arc flash, thus minimal need for protective clothing.high utilization of electrode wire.easy automation for high-operator factor.normally, no involvement of manipulative skills.SAW welding process to build long steel piles to support ocean platform.Major Uses of SAWThe submerged arc process is widely used in heavy steel plate fabrication work. This includes the welding of:structural shapesthe longitudinal seam of larger diameter pipethe manufacture of machine components for all types of heavy industry,the manufacture of vessels and tanks for pressure and storage useIt is widely used in the shipbuilding industry for splicing and fabricating sub-assemblies, and by many other industries where steels are used in medium to heavy thicknesses.It is also used for surfacing and buildup work, maintenance, and repair.In SAW welding the flux and wire are separate. Both impact the properties of the weld, requiring the selection of the optimal combination by the engineer for each project.Process LimitationsA major limitation of SAW (submerged arc welding) is its limitation of welding positions. The other limitation is that it is primarily used only to weld mild and low-alloy high-strength steels.The high-heat input and slow-cooling cycle can be a problem when welding quenched and tempered steels. The heat input limitation of the steel in question must be strictly adhered to when using submerged arc welding.This may require the making of multipass welds where a single pass weld would be acceptable in mild steel. In some cases, the economic advantages may be reduced to the point where flux-cored arc welding or some other process should be considered.In semiautomatic submerged arc welding, the inability to see the arc and puddle can be a disadvantage in reaching the root of a groove weld and properly filling or sizing.Demonstration of Saw Welding Process.Principles of OperationProcessThe submerged arc welding process is shown by figure 10-60. It utilizes the heat of an arc between a continuously fed electrode and the work.Figure 10-60: Process Diagram for SAW (submerged arc welding)The heat of the arc melts the surface of the base metal and the end of the electrode. The metal melted off the electrode is transferred through the arc to the workpiece, where it becomes the deposited weld metal.Shielding is obtained from a blanket of granular flux, which is laid directly over the weld area. The flux close to the arc melts and intermixes with the molten weld metal, helping to purify and fortify it.The flux forms a glass-like slag that is lighter in weight than the deposited weld metal and floats on the surface as a protective cover.The weld is submerged under this layer of flux and slag, hence the name submerged arc welding. The flux and slag normally cover the arc so that it is not visible.The unmelted portion of the flux can be reused. The electrode is fed into the arc automatically from a coil. The arc is maintained automatically.Travel can be manual or by machine. The arc is initiated by a fuse type start or by a reversing or retrack system.Normal Method of Application and Position CapabilitiesThe most popular method of SAW application is the machine method, where the operator monitors the welding operation.Second in popularity is the automatic method, where welding is a pushbutton operation. The process can be applied semiautomatically; however, this method of application is not too popular.The process cannot be applied manually because it is impossible for a welder to control an arc that is not visible. The submerged arc welding process is a limited-position welding process.The welding positions are limited because the large pool of molten metal and the slag are very fluid and will tend to run out of the joint. Welding can be done in the flat position and in the horizontal fillet position with ease.Under special controlled procedures, it is possible to weld in the horizontal position, sometimes called 3 oclock welding.This requires special devices to hold the flux up so that the molten slag and weld metal cannot run away. The process cannot be used in the vertical or overhead position.Metals Weldable and Thickness RangeSubmerged arc welding is used to weld low- and medium-carbon steels, low-alloy high-strength steels, quenched and tempered steels, and many stainless steels.Experimentally, it has been used to weld certain copper alloys, nickel alloys, and even uranium.Metal thicknesses from 1/16 to 1/2 in. (1.6 to 12.7 mm) can be welded with no edge preparation. With edge preparation, welds can be made with a single pass on material from 1/4 to 1 in. (6.4 to 25.4 mm).When the multipass technique is used, the maximum thickness is practically unlimited. This information is summarized in table 10-22. Horizontal fillet welds can be made up to 3/8 in. (9.5 mm) in a single pass and in the flat position, fillet welds can be made up to 1 in. (25 mm) size.Joint DesignAlthough the submerged arc welding process can utilize the same joint design details as the shielded metal arc welding process, different joint details are suggested for maximum utilization and efficiency of submerged arc welding. For groove welds, the square groove design can be used up to 5/8 in. (16 mm) thickness.Beyond this thickness, bevels are required. Open roots are used but backing bars are necessary since the molten metal will run through the joint.When welding thicker metal, if a sufficiently large root face is used, the backing bar may be eliminated. However, to assure full penetration when welding from one side, backing bars are recommended. Where both sides are accessible, a backing weld can be made which will fuse into the original weld to provide full penetration.Welding Circuit and CurrentThe SAW or submerged arc welding process uses either direct or alternating current for welding power. Direct current is used for most applications that use a single arc. Both direct current electrode positive (DCEP) and electrode negative (DCEN) are used.The constant voltage type of direct current power is more popular for submerged arc welding with 1/8 in. (3.2 mm) and smaller diameter electrode wires.The constant current power system is normally used for welding with 5/3 2 in. (4 mm) and larger-diameter electrode wires. The control circuit for CC power is more complex since it attempts to duplicate the actions of the welder to retain a specific arc length. The wire feed system must sense the voltage across the arc and feed the electrode wire into the arc to maintain this voltage. As conditions change, the wire feed must slow down or speed up to maintain the prefixed voltage across the arc. This adds complexity to the control system. The system cannot react instantaneously. Arc starting is more complicated with the constant current system since it requires the use of a reversing system to strike the arc, retract, and then maintain the preset arc voltage.For SAW ac welding, the constant current power is always used. When multiple electrode wire systems are used with both ac and dc arcs, the constant current power system is utilized. The constant voltage system, however, can be applied when two wires are fed into the arc supplied by a single power source. Welding current for submerged arc welding can vary from as low as 50 amperes to as high as 2000 amperes. Most submerged arc welding is done in the range of 200 to 1200 amperes.Deposition Rates and Weld QualityThe deposition rates of the submerged arc welding process are higher than any other arc welding process. Deposition rates for single electrodes are shown by figure 10-62. There are at least four related factors that control the deposition rate of submerged arc welding: polarity, long stickout, additives in the flux, and additional electrodes. The deposition rate is the highest for direct current electrode negative (DCEN). The deposition rate for alternating current is between DCEP and DCEN. The polarity of maximum heat is the negative pole.The deposition rate with any welding current can be increased by extending the stickout. This is the distance from the point where current is introduced into the electrode to the arc. When using long stickout the amount of penetration is reduced. The deposition rates can be increased by metal additives in the submerged arc flux. Additional electrodes can be used to increase the overall deposition rate.The quality of the weld metal deposited by the submerged arc welding process is high. The weld metal strength and ductility exceeds that of the mild steel or low-alloy base material when the correct combination of electrode wire and submerged arc flux is used. When submerged arc welds are made by machine or automatically, the human factor inherent to the manual welding processes is eliminated. The weld will be more uniform and free from inconsistencies. In general, the weld bead size per pass is much greater with submerged arc welding than with any of the other arc welding processes. The heat input is higher and cooling rates are slower. For this reason, gases are allowed more time to escape. Additionally, since the submerged arc slag is lower in density than the weld metal, it will float out to the top of the weld. Uniformity and consistency are advantages of this process when applied automatically.Several problems may occur when using the semiautomatic application method. The electrode wire may be curved when it leaves the nozzle of the welding gun. This curvature can cause the arc to be struck in a location not expected by the welder. When welding in fairly deep grooves, the curvature may cause the arc to be against one side of the weld joint rather than at the root. This will cause incomplete root fusion. Flux will be trapped at the root of the weld. Another problem with semiautomatic welding is that of completely filling the weld groove or maintaining exact size, since the weld is hidden and cannot be observed while it is being made. This requires making an extra pass. In some cases, too much weld is deposited. Variations in root opening affect the travel speed. If travel speed is uniform, the weld may be under- or overfilled in different areas. High operator skill will overcome this problem.There is another quality problem associated with extremely large single-pass weld deposits. When these large welds solidify, the impurities in the melted base metal and in the weld metal all collect at the last point to freeze, which is the centerline of the weld. If there is sufficient restraint and enough impurities are collected at this point, centerline cracking may occur. This can happen when making large single-pass flat fillet welds if the base metal plates are 45 from flat. A simple solution is to avoid placing the parts at a true 45 angle. It should be varied approximately 10 so that the root of the joint is not in line with the centerline of the fillet weld. Another solution is to make multiple passes rather than attempting to make a large weld in a single pass.Another quality problem has to do with the hardness of the deposited weld metal. Excessively hard weld deposits contribute to cracking of the weld during fabrication or during service. A maximum hardness level of 225 Brinell is recommended. The reason for the hard weld in carbon and low-alloy steels is too rapid cooling, inadequate postweld treatment, or excessive alloy pickup in the weld metal. Excessive alloy pickup is due to selecting an electrode that has too much alloy, selecting a flux that introduces too much alloy into the weld, or the use of excessively high welding voltages.In automatic and machine welding, defects may occur at the start or at the end of the weld. The best solution is to use runout tabs so that starts and stops will be on the tabs rather than on the product.Weld SchedulesThe submerged arc welding process applied by machine or fully automatically should be done in accordance with welding procedure schedules. All of the welds made by this procedure should pass qualification, tests, assuming that the correct electrode and flux have been selected. If the schedules are varied more than 10 percent, qualification tests should be performed to determine the weld quality.Welding VariablesThe welding variables for submerged arc welding are similar to the other arc welding processes, with several exceptions.In submerged arc welding, the electrode type and the flux type are usually based on the mechanical properties required by the weld. The electrode size is related to the weld joint size and the current recommended for the particular joint. This must also be considered in determining the number of passes or beads for a particular joint. Welds for the same joint dimension can be made in many or few passes, depending on the weld metal metallurgy desired. Multiple passes usually deposit higher-quality weld metal. Polarity is established initially and is based on whether maximum penetration or maximum deposition rate is required.The major variables that affect the weld involve heat input and include the welding current, arc voltage, and travel speed. Welding current is the most important. For single-pass welds, the current should be sufficient for the desired penetration without burn-through. The higher the current, the deeper the penetration. In multi-pass work, the current should be suitable to produce the size of the weld expected in each pass. The welding current should be selected based on the electrode size. The higher the welding current, the greater the melt-off rate (deposition rate).The arc voltage is varied within narrower limits than welding current. It has an influence on the bead width and shape. Higher voltages will cause the bead to be wider and flatter. Extremely high arc voltage should be avoided, since it can cause cracking. This is because an abnormal amount of flux is melted and excess deoxidizers may be transferred to the weld deposit, lowering its ductility. Higher arc voltage also increases the amount of flux consumed. The low arc voltage produces a stiffer arc that improves penetration, particularly in the bottom of deep grooves. If the voltage is too low, a very narrow bead will result. It will have a high crown and the slag will be difficult to remove.Travel speed influences both bead width and penetration. Faster travel speeds produce narrower beads that have less penetration. This can be an advantage for sheet metal welding where small beads and minimum penetration are required. If speeds are too fast, however, there is a tendency for undercut and porosity, since the weld freezes quicker. If the travel speed is too slow, the electrode stays in the weld puddle too long. This creates poor bead shape and may cause excessive spatter and flash through the layer of flux.The secondary variables include the angle of the electrode to the work, the angle of the work itself, the thickness of the flux layer, and the distance between the current pickup tip and the arc. This latter factor, called electrode stickout, has a considerable effect on the weld. Normally, the distance between the contact tip and the work is 1 to 1-1/2 in. (25 to 38 mm). If the stickout is increased beyond this amount, it will cause preheating of the electrode wire, which will greatly increase the deposition rate. As stickout increases, the penetration into the base metal decreases. This factor must be given serious consideration because in some situations the penetration is required.The depth of the flux layer must also be considered. If it is too thin, there will be too much arcing through the flux or arc flash. This also may cause porosity. If the flux depth is too heavy, the weld may be narrow and humped. Too many small particles in the flux can cause surface pitting since the gases generated in the weld may not be allowed to escape. These are sometimes called peck marks on the bead surface.Tips for Using the ProcessOne of the major applications for submerged arc welding is on circular welds where the parts are rotated under a fixed head. These welds can be made on the inside or outside diameter. Submerged arc welding produces a large molten weld puddle and molten slag which tends to run. This dictates that on outside diameters, the electrode should be positioned ahead of the extreme top, or 12 oclock position, so that the weld metal will begin to solidify before it starts the downside slope. This becomes more of a problem as the diameter of the part being welded gets smaller. Improper electrode position will increase the possibility of slag entrapment or a poor weld surface. The angle of the electrode should also be changed and pointed in the direction of travel of the rotating part. When the welding is done on the inside circumference, the electrode should be angled so that it is ahead of bottom center, or the 6 oclock position.Sometimes the work being welded is sloped downhill or uphill to provide different types of weld bead contours. If the work is sloped downhill, the bead will have less penetration and will be wider. If the weld is sloped uphill, the bead will have deeper penetration and will be narrower. This is based on all other factors remaining the same.The weld will be different depending on the angle of the electrode with respect to the work when the work is level. This is the travel angle, which can be a drag or push angle. It has a definite effect on the bead contour and weld metal penetration.One side welding with complete root penetration can be obtained with submerged arc welding. When the weld joint is designed with a tight root opening and a fairly large root face, high current and electrode positive should be used. If the joint is designed with a root opening and a minimum root face, it is necessary to use a backing bar, since there is nothing to support the molten weld metal. The molten flux is very fluid and will run through narrow openings. If this happens, the weld metal will follow and the weld will burn through the joint. Backing bars are needed whenever there is a root opening and a minimum root face.Copper backing bars are useful when welding thin steel. Without backing bars, the weld would tend to melt through and the weld metal would fall away from the joint. The backing bar holds the weld metal in place until it solidifies. The copper backing bars may be water cooled to avoid the possibility of melting and copper pickup in the weld metal. For thicker materials, the backing may be submerged arc flux or other specialized type flux.Variations of the SAW ProcessThere are a large number of variations to the process that give submerged arc welding additional capabilities. Some of the more popular variations are:Two-wire systemssame power source.Two-wire systemsseparate power source.Three-wire systemsseparate power source.Strip electrode for surfacing.Iron powder additions to the flux.Long stickout welding.Electrically cold filler wire.Multi-wire SystemsThe multi-wire systems offer advantages since deposition rates and travel speeds can be improved by using more electrodes. Figure 10-68 shows the two methods of utilizing two electrodes, one with a single-power source and one with two power sources. When a single-power source is used, the same drive rolls are used for feeding both electrodes into the weld. When two power sources are used, individual wire feeders must be used to provide electrical insulation between the two electrodes. With two electrodes and separate power, it is possible to utilize different polarities on the two electrodes or to utilize alternating current on one and direct current on the other. The electrodes can be placed side by side. This is called the transverse electrode position. They can also be placed one in front of the other in the tandem electrode position.Two-wire TandemThe two-wire tandem electrode position with individual power sources is used where extreme penetration is required. The leading electrode is positive with the trailing electrode negative. The first electrode creates a digging action and the second electrode fills the weld joint. When two dc arcs are in close proximity, there is a tendency for arc interference between them. In some cases, the second electrode is connected to alternating current to avoid the interaction of the arc.Three-wire Tandem SystemThe three-wire tandem system normally uses ac power on all three electrodes connected to three-phase power systems. These systems are used for making high-speed longitudinal seams for large-diameter pipe and for fabricated beams. Extremely high currents can be used with correspondingly high travel speeds and deposition rates.The Strip Welding SystemThe strip welding system is used to overlay mild and alloy steels usually with stainless steel. A wide bead is produced that has a uniform and minimum penetration. This process variation is shown by figure 10-69. It is used for overlaying the inside of vessels to provide the corrosion resistance of stainless steel

while utilizing the strength and economy of the low-alloy steels for the wall thickness. A strip electrode feeder is required and special flux is normally used. When the width of the strip is over 2 in. (51 mm), a magnetic arc oscillating device is used to provide for even burn-off of the strip and uniform penetration.Other OptionsAnother way of increasing the deposition rate of submerged arc welding is to add iron base ingredients to the joint under the flux. The iron in this material will melt in the heat of the arc and will become part of the deposited weld metal. This increases deposition rates without decreasing weld metal properties. Metal additives can also be used for special surfacing applications. This variation can be used with single-wire or multi-wire installations.Another variation is the use of an electrically cold filler wire fed into the arc area. The cold filler rod can be solid or flux-cored to add special alloys to the weld metal. By regulating the addition of the proper material, the properties of the deposited weld metal can be improved. It is possible to utilize a flux-cored wire for the electrode, or for one of the multiple electrodes to introduce special alloys into the weld metal deposit. Each of these variations requires special engineering to ensure that the proper material is added to provide the desired deposit properties.Typical ApplicationsThe submerged arc welding process is widely used in the manufacture of most heavy steel products. These include pressure vessels, boilers, tanks, nuclear reactors, chemical vessels, etc. Another use is in the fabrication of trusses and beams. It is used for welding flanges to the web. The heavy equipment industry is a major user of submerged arc welding.Materials UsedTwo materials are used in submerged arc welding: the welding flux and the consumable electrode wire.Submerged arc welding flux shields the arc and the molten weld metal from the harmful effects of atmospheric oxygen and nitrogen. The flux contains deoxidizers and scavengers which help to remove impurities from the molten weld metal. Flux also provides a means of introducing alloys into the weld metal. As this molten flux cools to a glassy slag, it forms a covering that protects the surface of the weld. The unmelted portion of the flux does not change its form and its properties are not affected, so it can be recovered and reused. The flux that does melt and forms the slag covering must be removed from the weld bead. This is easily done after the weld has cooled. In many cases, the slag will actually peel without requiring special effort for removal. In groove welds, the solidified slag may have to be removed by a welders chipping hammer.Fluxes are designed for specific applications and for specific types of weld deposits. Submerged arc fluxes come in different particle sizes. Many fluxes are not marked for size of particles because the size is designed and produced for the intended application.There is no specification for submerged arc fluxes in use in North America. A method of classifying fluxes, however, is by means of the deposited weld metal produced by various combinations of electrodes and proprietary submerged arc fluxes. This is covered by the American Welding Society Standard. Bare carbon steel electrodes and fluxes for submerged arc welding. In this way, fluxes can be designated to be used with different electrodes to provide the deposited weld metal analysis that is desired.References for SAWSubmerged Arc Welding Process

Submerged welding process. Submerged arc welding pipe. Submerged arc welding stainless steel. Submerged-arc welding.