



Mechanics and Machines, Lecture 8

Connections:

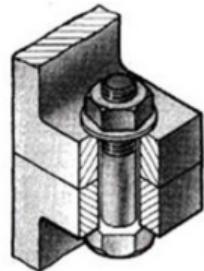
Detachable (Threaded, Keyed, Pin, Split pin)

Permanent (Riveting, Welding, Soldering, Glue)

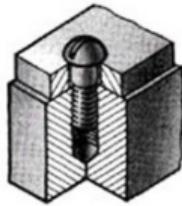


Connections

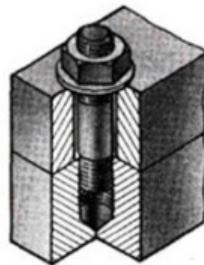
Classification



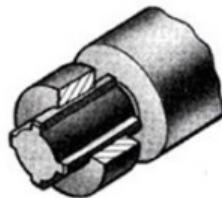
боловое



винтовое



шпилечное



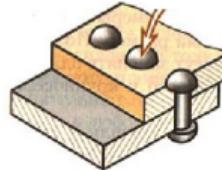
шлифтовое



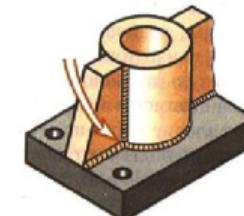
шпоночное



штифтовое



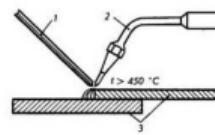
клепаное



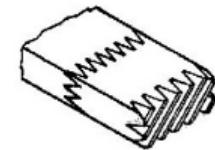
сварное



шивное



паяное



клеевое

Detachable (Разъемные)

Permanent (Неразъемные)



Keyed (шпоночное) and Spline (шлифцевое)

They attach gears, pulleys, and cams on shafts to obtain machinery. In general, we call the assembly sections of these parts shafts hubs.

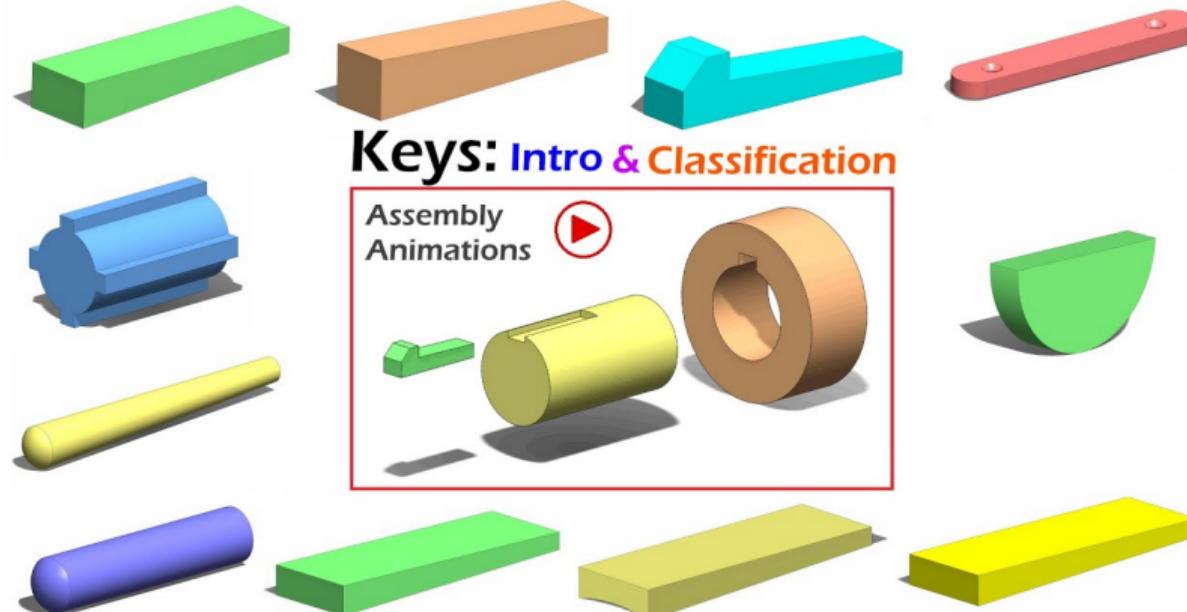
So, we use keys in the attachment of these elements to shafts.





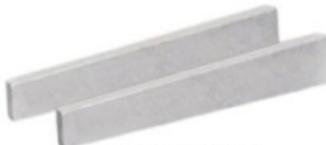
Types of keys

Video





Types of keys





Keys and splines (rus)

Video

ШПОНОЧНЫЕ И ШЛИЦЕВЫЕ СОЕДИНЕНИЯ



Эти соединения служат для окружной фиксации деталей на валах и осях и передачи вращающего момента.



Keyed

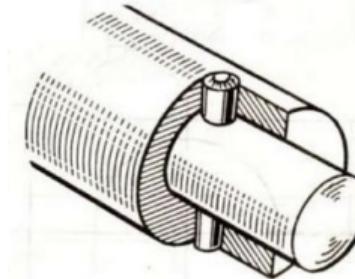
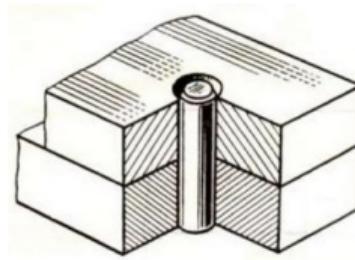
Reference material

- Shaft Keys and Keyways; Design, Explanation Applications



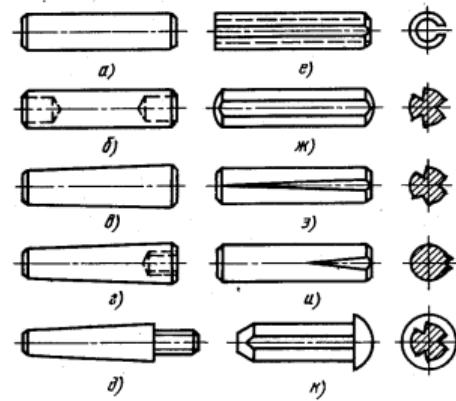
Pin (Штифтовое)

It is a fastening element in the form of a cylindrical or tapered rod designed for a fixed connection. The pin is inserted tightly into the hole that runs through both parts, preventing their mutual displacement.





Types of pin connections

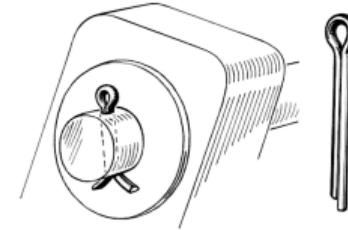




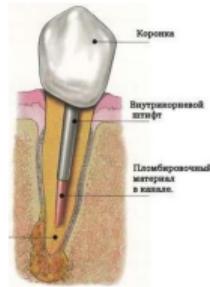
Pin connection Applications



Common usage



Splint pin (шплинтовое)



Stomatology



Dowel (шкант)



Pin types

Video





Split Pin (шплинтовое)

Video

ШПЛИНТОВОЕ КРЕПЛЕНИЕ:



о-шплинты
круглогубцы

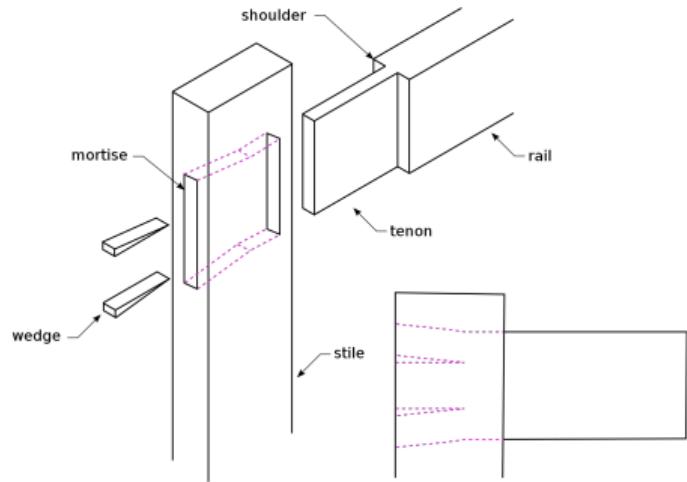




Tongue & groove (Шпунт), Mortise & tenon (Шиповое)



Tongue and groove (Шпунт)



Mortise and tenon (Шиповое)

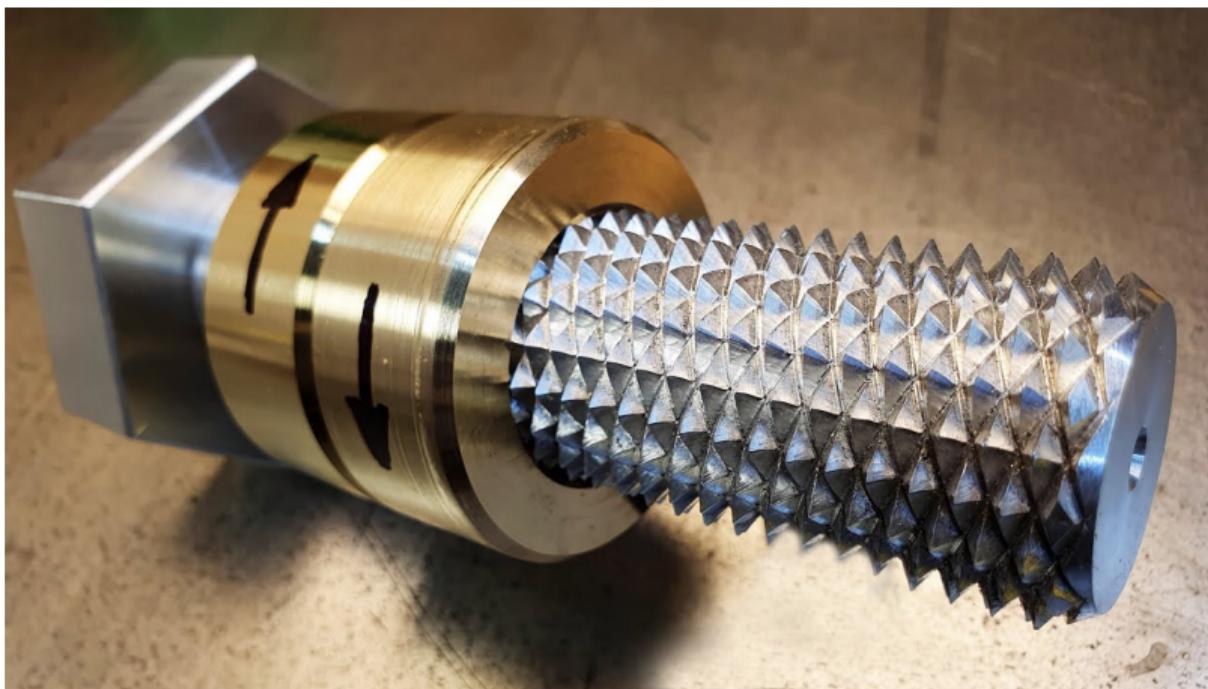


Threaded



Magic 2 sided screw

Video





Threaded

Reference material

- Threaded connection (video, rus)



Glued



Threadlocker (Фиксатор Резьбы)

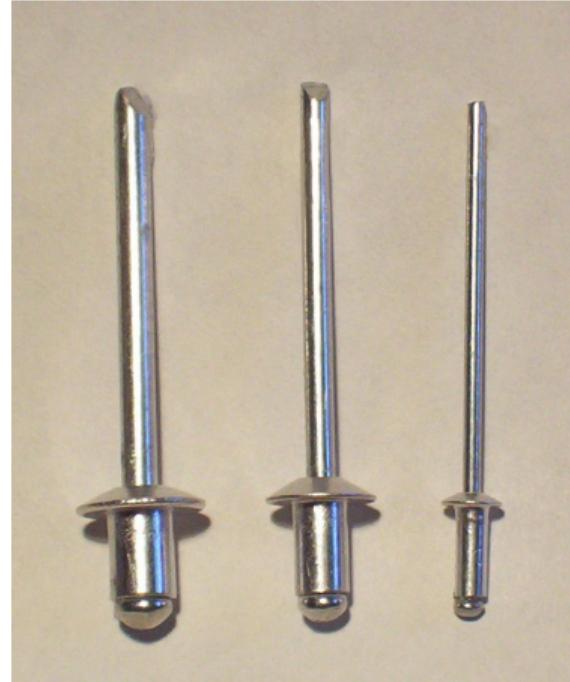




Riveting (Заклепочное)

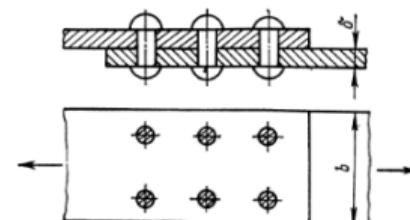
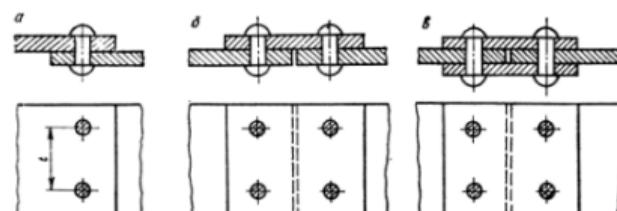
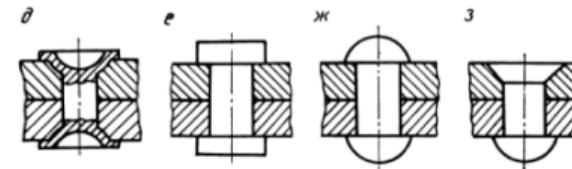
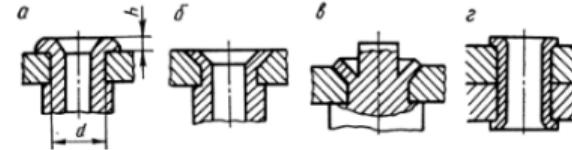
The riveted joint is a permanent joint cause rivet is a permanent mechanical fastener. A rivet is a cylindrical shaft with a head on one end and the opposite end known as a tail.

Rivets are generally made of mild steel, but at times they are also made of brass, copper, and aluminum, etc. Used in structures, bridges, sheet metal operations, ships, and many industries.





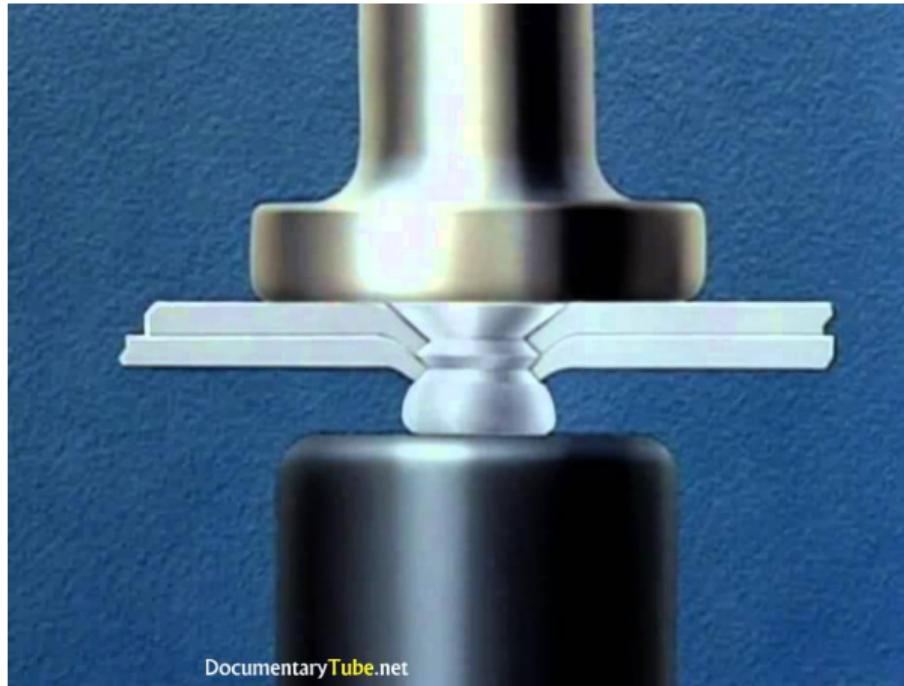
Riveting in general





Rivets in aircrafting

Video



DocumentaryTube.net



Rivets in leather industry





Riveting rus

Video



Неразъемные соединения



постройка Титаника





How to remove rivets

Video





Riveting Rofl

Video





Riveting

Reference material

- Types of rivets



Welding

Welding is a fabrication process that joins materials, usually metals or thermoplastics, by using high heat to **melt the parts together** and allowing them to cool, causing fusion.





Difference between welding and soldering (rus)

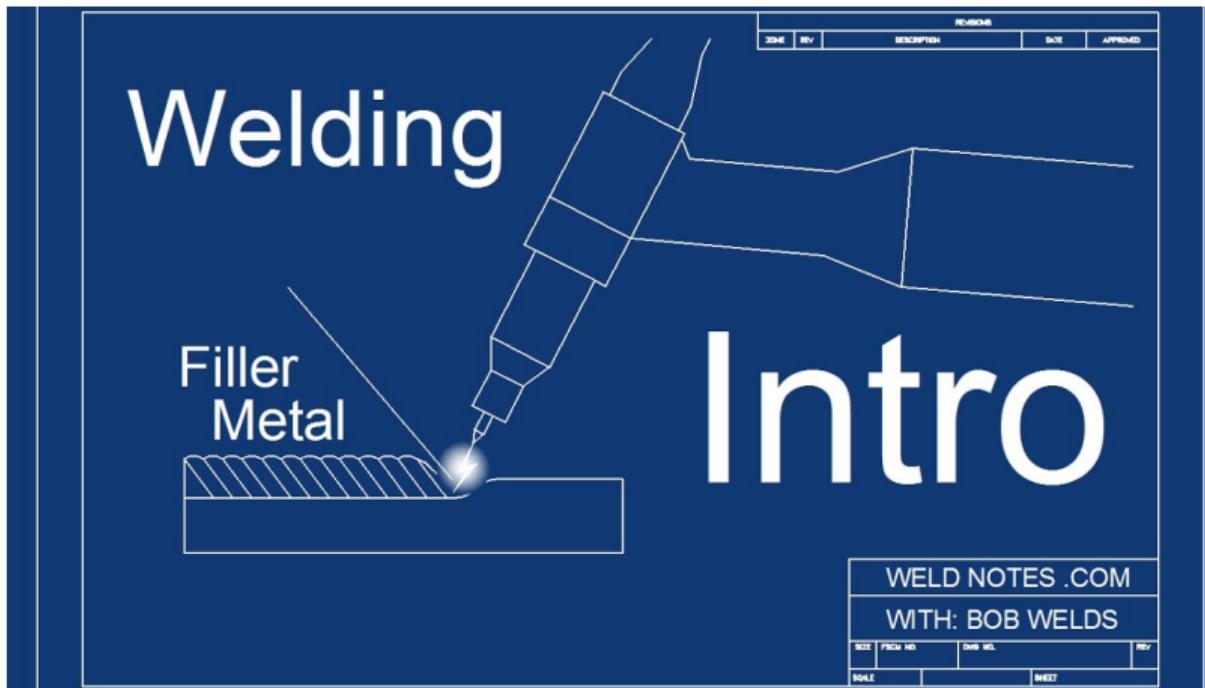
Video





Introduction to welding process

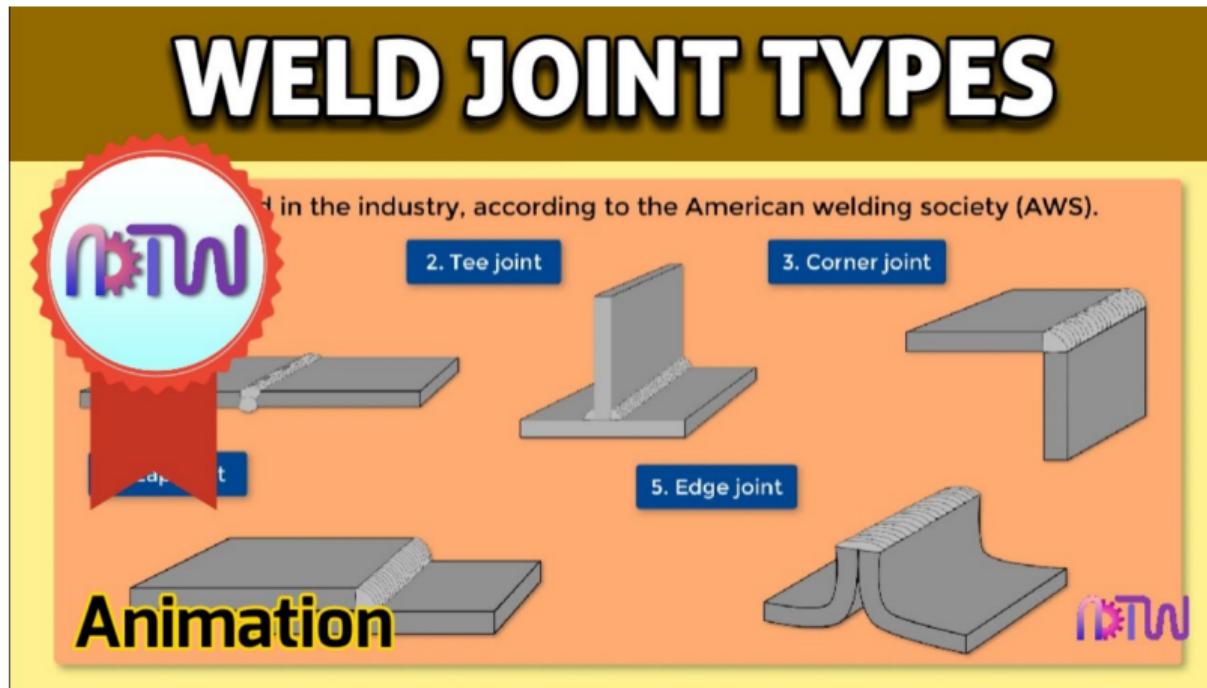
Video





Weld joint types

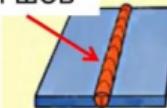
Video





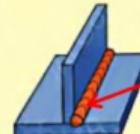
ВИДЫ СОЕДИНЕНИЙ И ШВОВ

стыковой шов



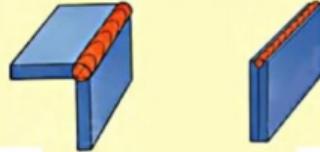
стыковое

угловой шов



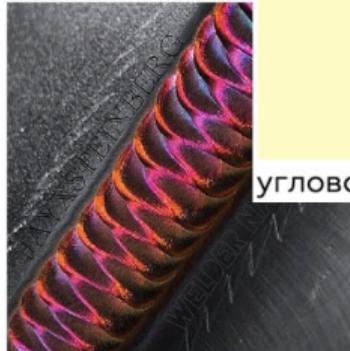
тавровое

нахлесточное



угловое

торцовое





Classical Welding techniques

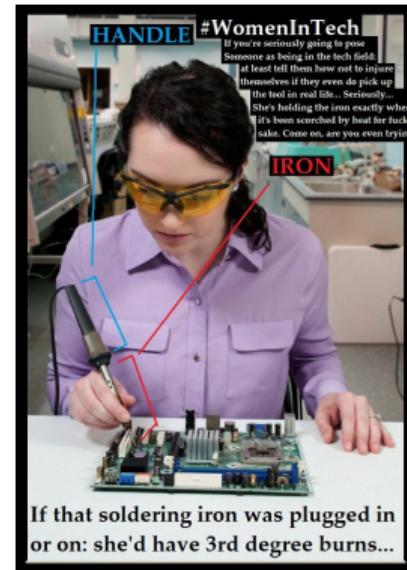
Reference material

- Stick (Ручная дуговая) (SMAW)
- MIG (С помощью Инертного газа) (GMAW)
- TIG (Аргонодуговая)
- Flux Cored Arc (Порошковым флюсом)
- Another explanation of all 4 types



Soldering & Brazing

It is a process in which two or more items are joined by melting and putting a filler metal (solder) into the joint, the filler metal having a lower melting point than the adjoining metal.

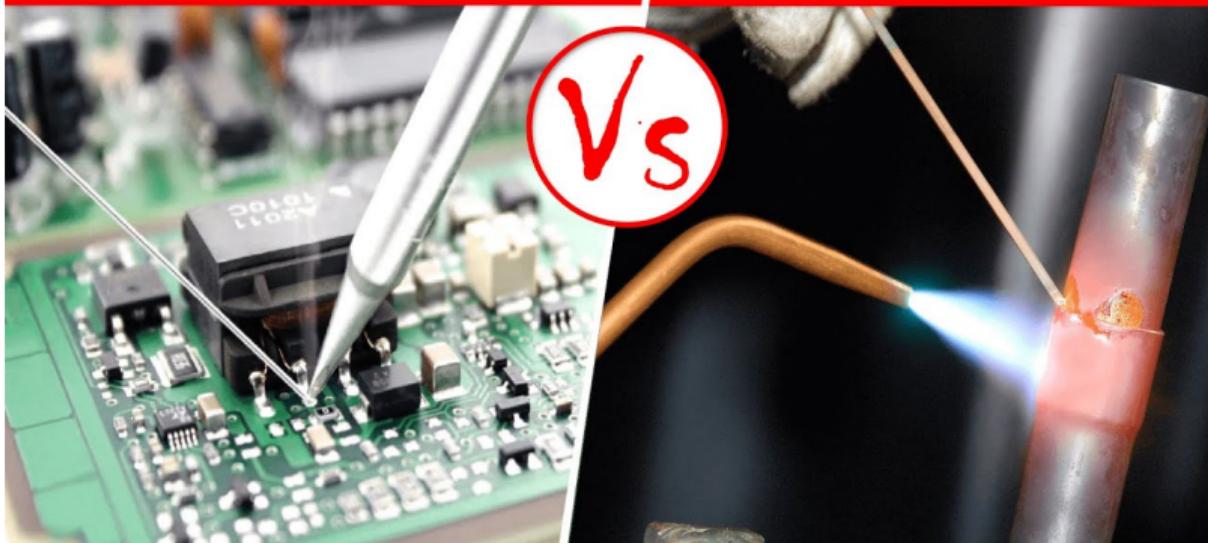




Difference between Soldering and Brazing (Пайка)

Video

Soldering/Brazing





Soldering & Brazing

Reference material

- Brazing soldering welding difference



Reference material

1. Mott R. L., Vavrek E. M., Wang J. Machine Elements in Mechanical Design, Ed. — 2011
2. Avallone E. A., Baumeister III T., Sadegh A. Marks' standard handbook for mechanical engineers. — McGraw-Hill Education, 2007.
3. Budynas R. G. et al. Shigley's mechanical engineering design. — New York : McGraw-Hill, 2011.
4. Types of connection (rus, video)
5. A lot of engineering books in english

Deserve “A” grade!

– Oleg Bulichev

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↗ @Lupasic

🚪 Room 105 (Underground robotics lab)