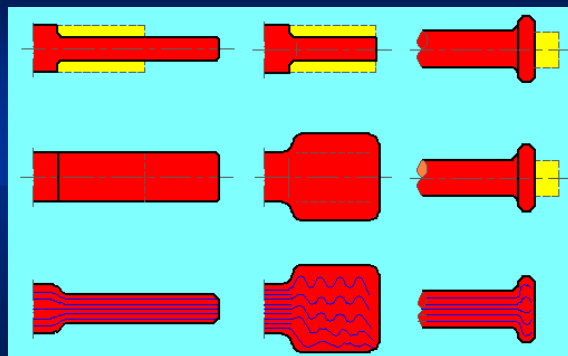


Kovanje

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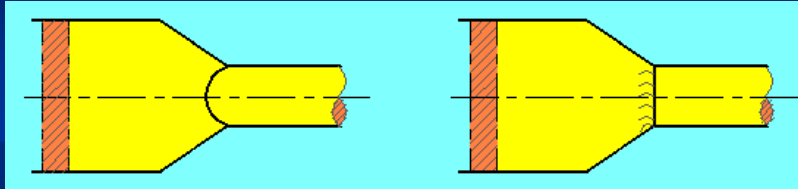
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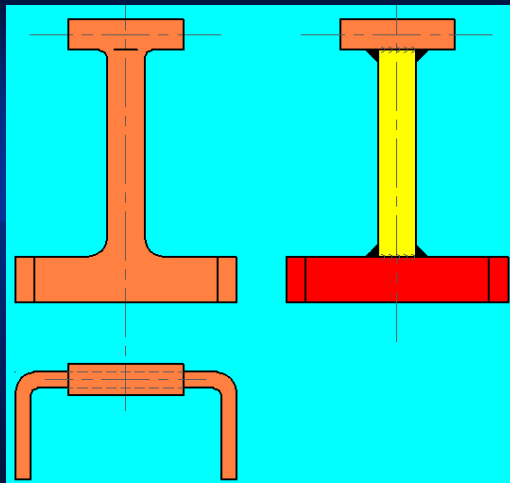
Osnovni postupci pri slobodnom kovanju

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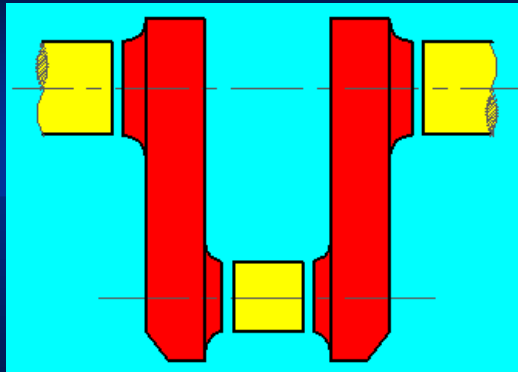
TEHNOLOGIČNO OBLIKOVANJE



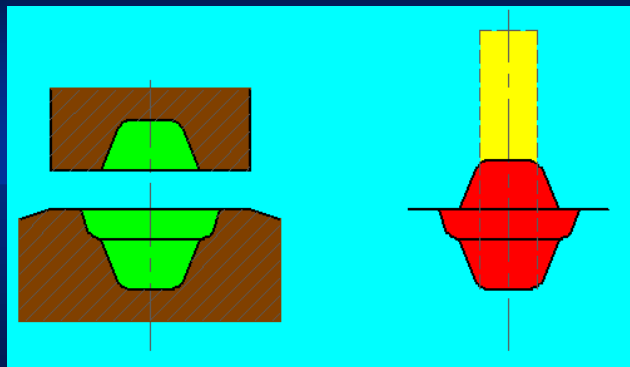
Zavari umjesto kovanja



Zavarivanje je često jeftinije od kovanja

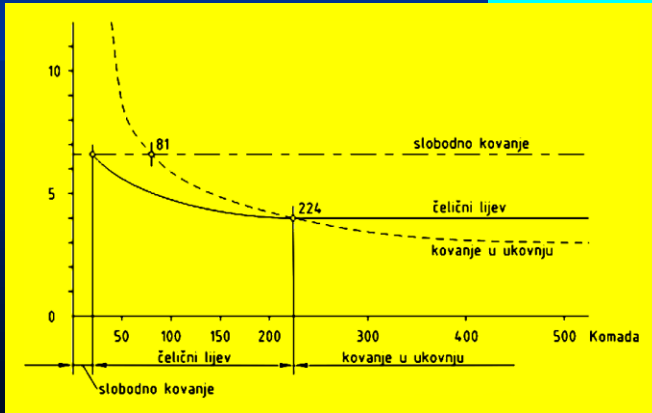
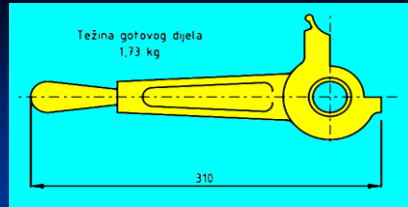


Elektrotoporno zavareno vratilo manjih dimenzija



Sabijanje pri kovanju u ukovnju

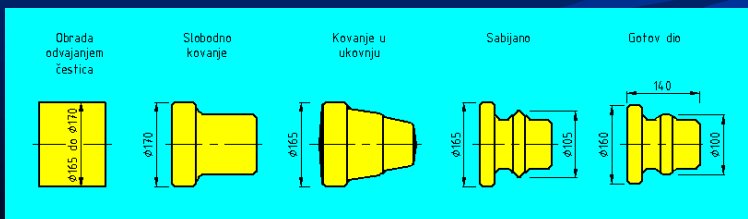
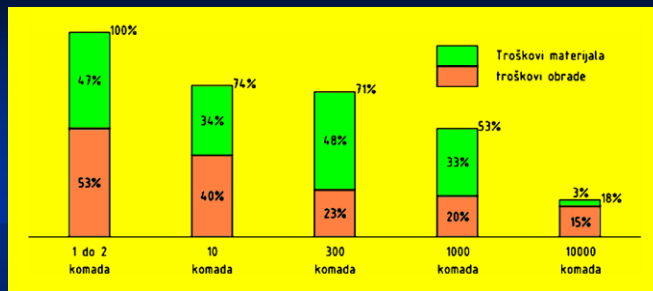
Granica ekonomičnosti kovanja ručice u ukovnju



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TEHNOLOGIČNO OBLIKOVANJE

Učestalost troškova materijala, težine materijala i troškova obrade pri izradi zupčanog prigona u postocima

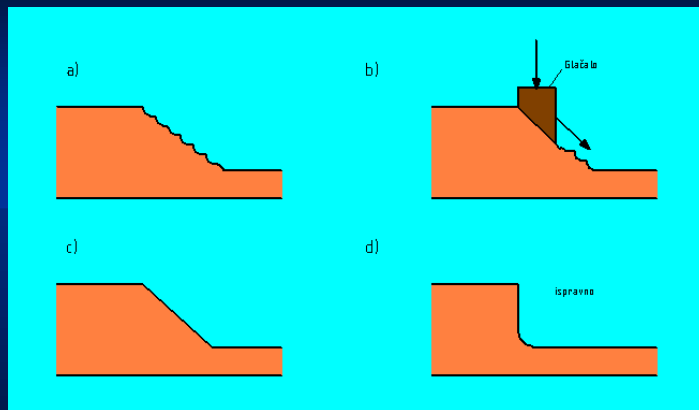
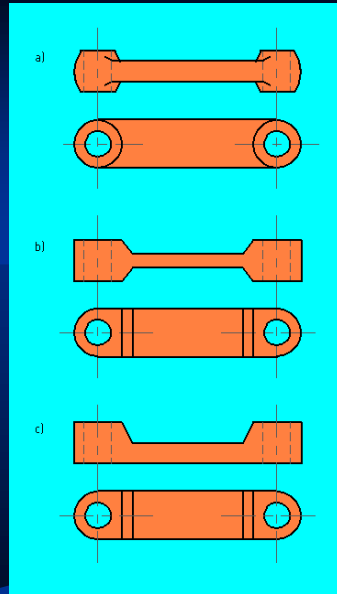


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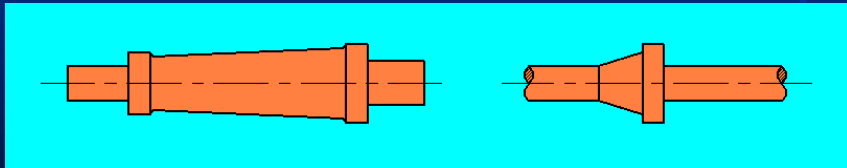
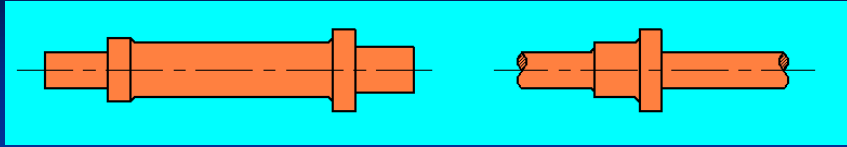
TEHNOLOGIČNO OBLIKOVANJE

Oblikovanje slobodno kovane ručice

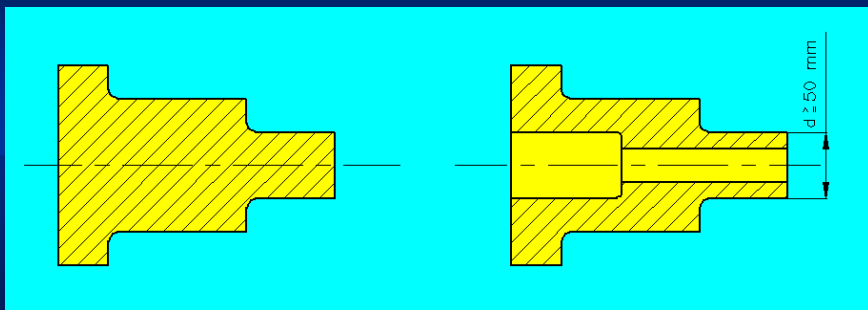
- a) kovački nepogodan oblik
- b) kovački pogodniji oblik
- c) mogućnost pojeftinjenja izrade



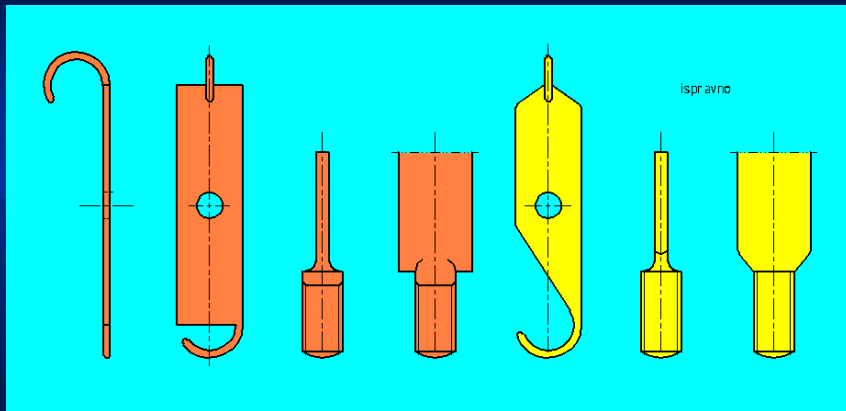
Izbjegavanje strmih prijelaza



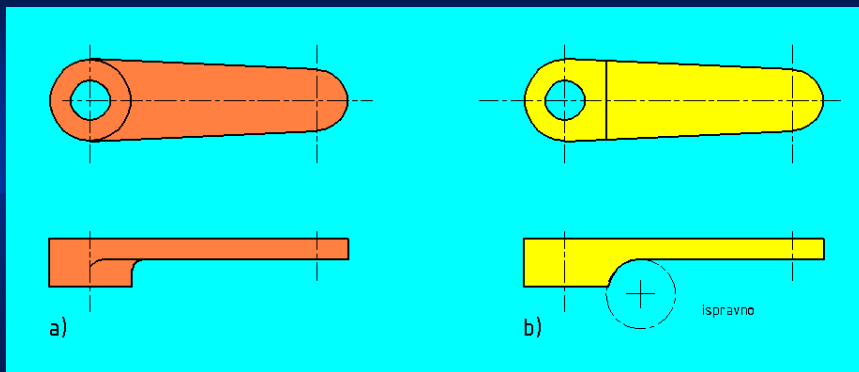
Izbjegavanje stožastih prijelaza



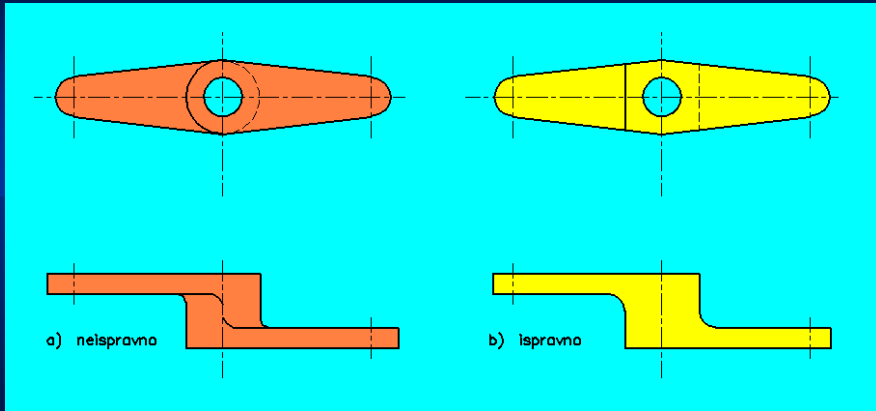
Teški otkivci moraju biti šuplji



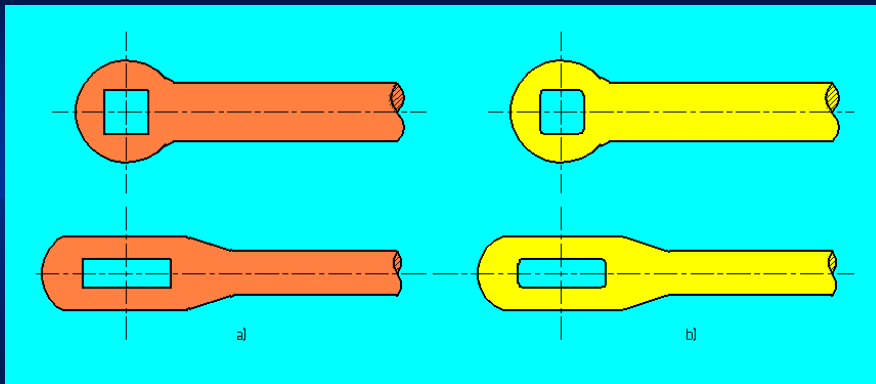
Oštre prijelaze presjeka treba izbjegavati



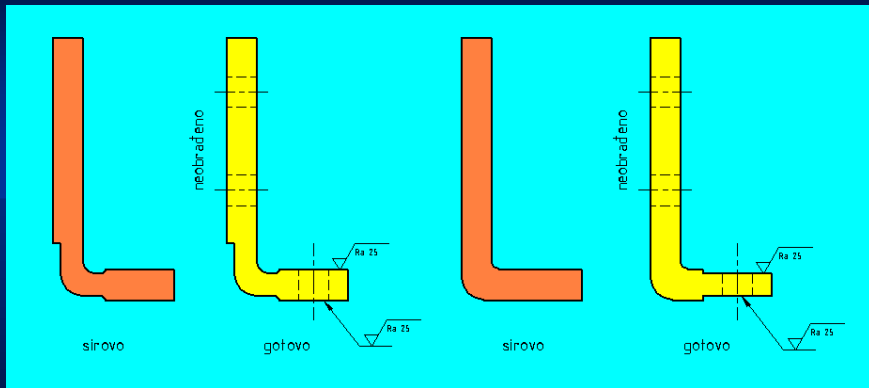
Okrugla oka na jednokratnoj ručici valja izbjegavati



Okrugla oka na dvokrakoj ručici potrebno je izbjegavati



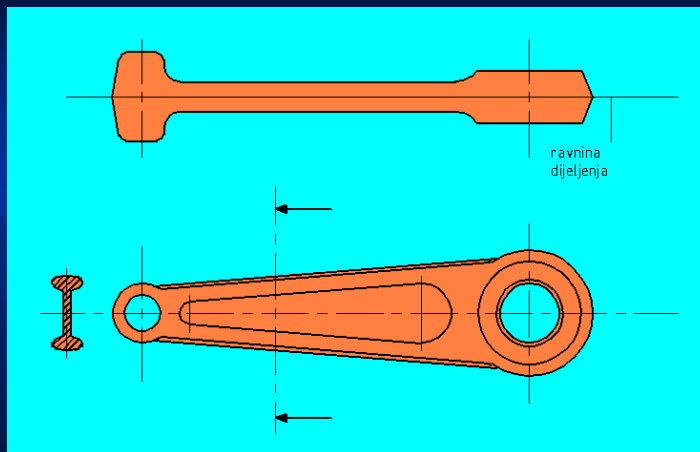
Oštre kutove na četverokutnim rupama i prorezima valja izbjegavati



Kovanje kutnika iz tanjeg materijala sabijanjem i iz debljeg i stanjivanjem pomoću obrade

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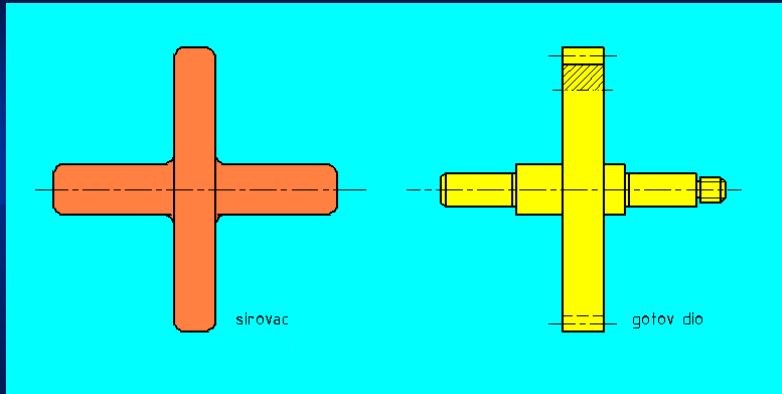
TEHNOLOGIČNO OBLIKOVANJE



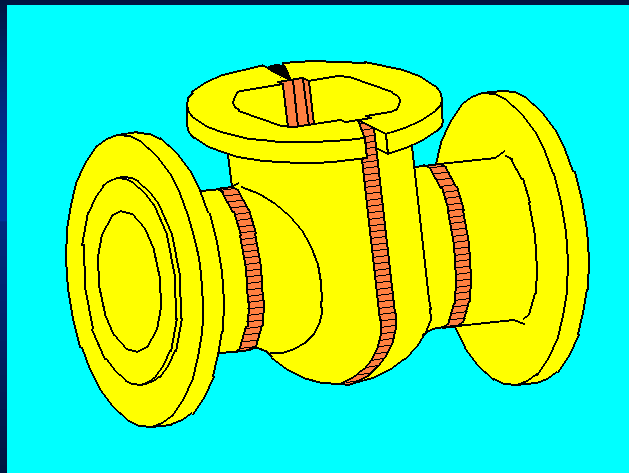
Ojnica motora kovana u ukovnju

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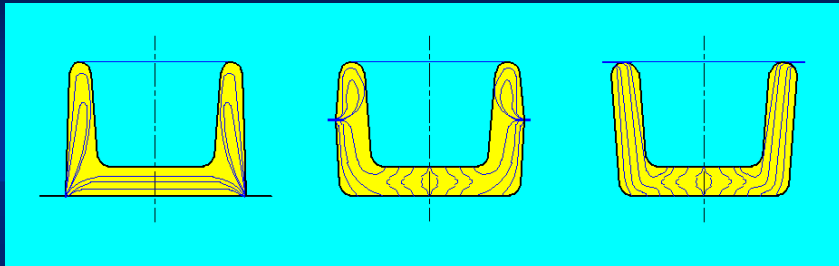
TEHNOLOGIČNO OBLIKOVANJE



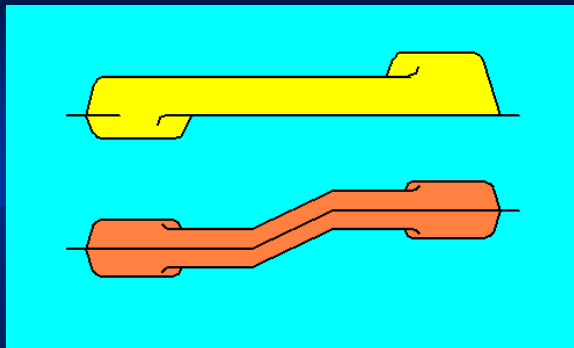
Zupčanik s vratilom kovan u ukovnju



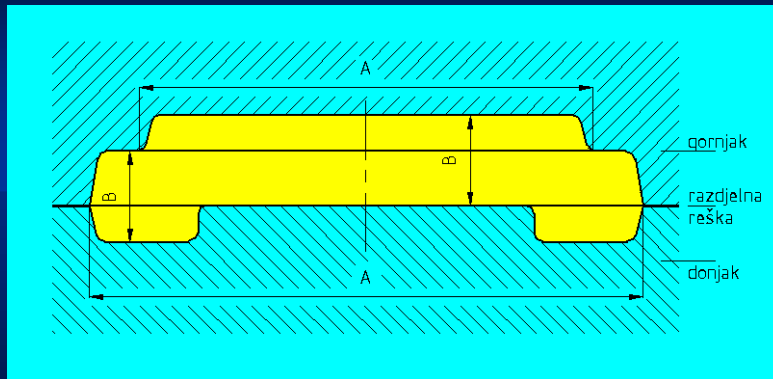
Otkovak kovan u ukovnju i dijelovima i zavaren



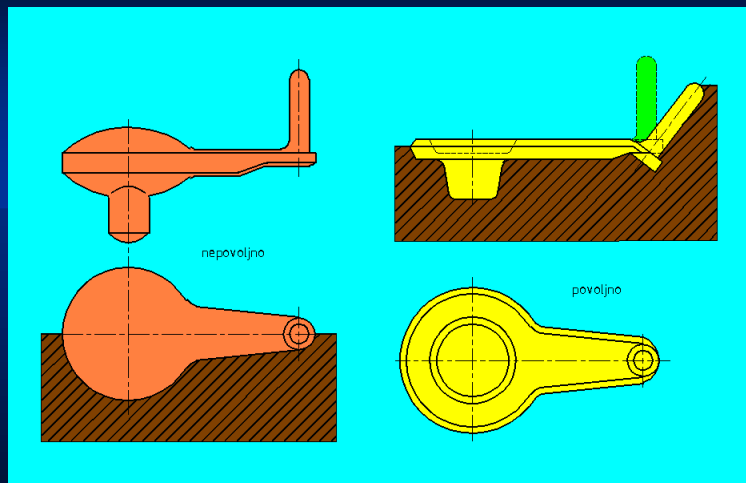
Mogući tok strukturnih linija



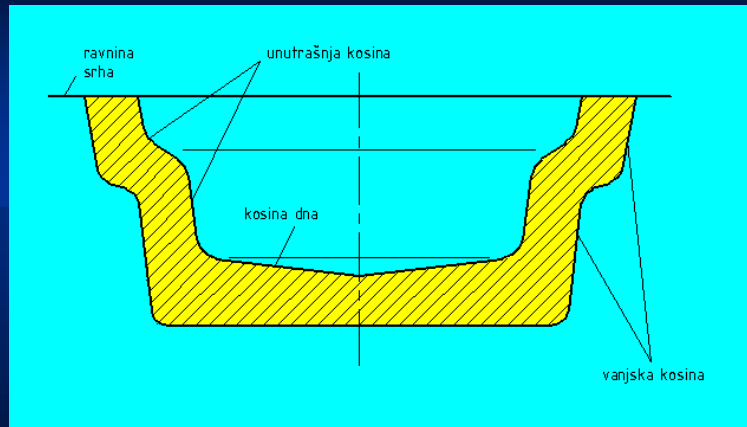
Razdjelna reška mora ležati u jednoj ravnini



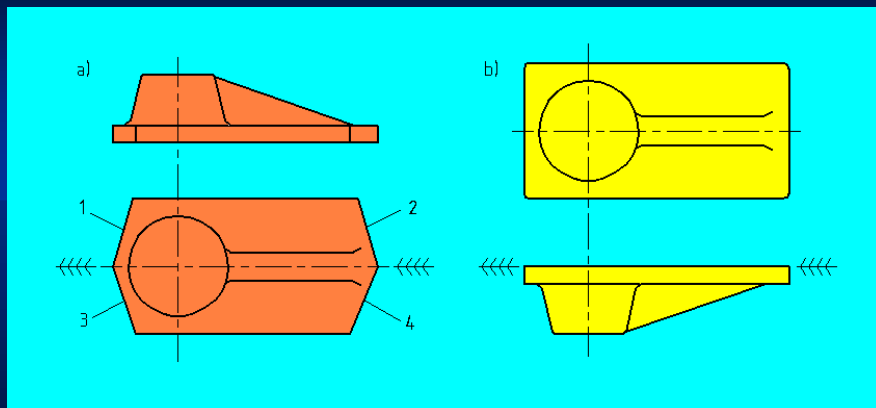
- A) mjere i oblik određene jednom polovicom alata (točne mjere i oblik)
- B) mjere određene objema polovicama alata



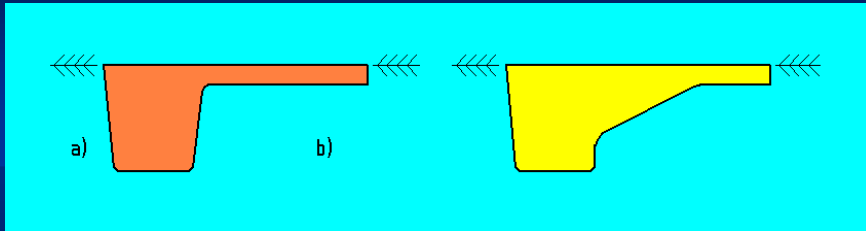
Naknadno savijanje nakon kovanja u ukovnju



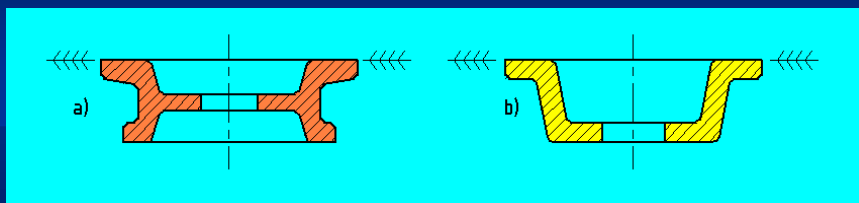
Kosine na dnu otkovka olakšavaju tečenje



Položaj razdjelne reške

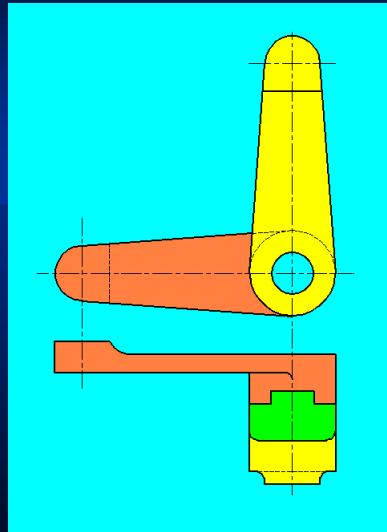


Valja izbjegavati nagle prijelaze presjeka



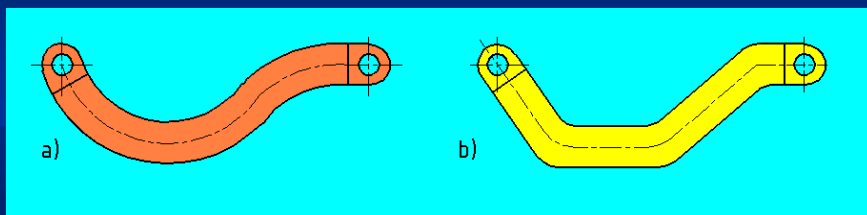
Otkovke s podrezom potrebno je izbjegavati

Pojednostavljanje postignuto
rastavljanjem otkovka
na pojedine dijelove



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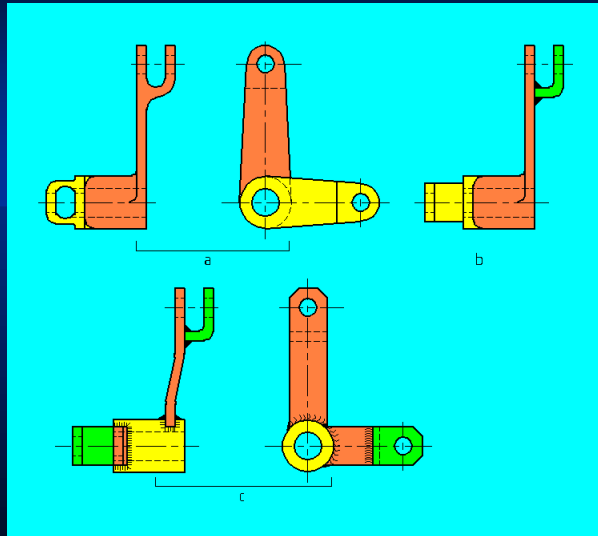
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Izbjegavati komplicirane zakrivljenosti dijelova

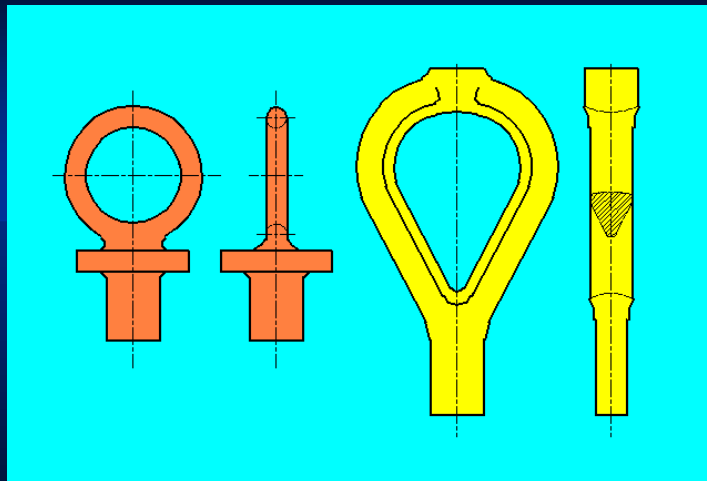
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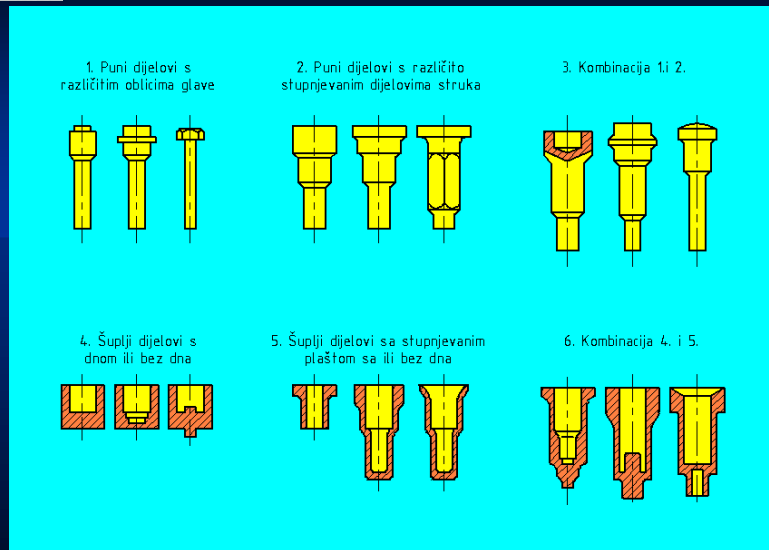
TEHNOLOGIČNO OBLIKOVANJE



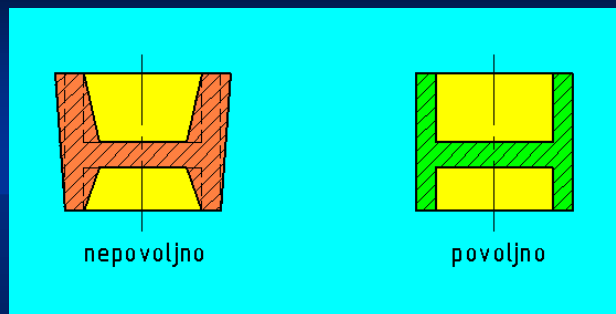
Prstenasti oblici kovani u ukovnju

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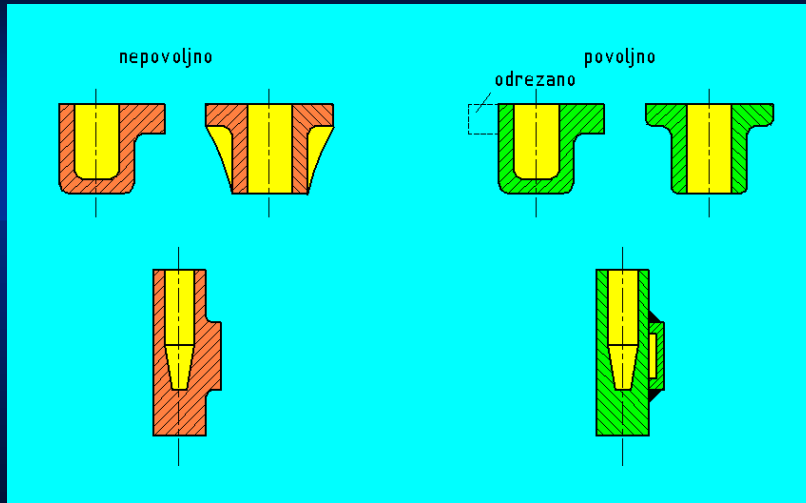
TEHNOLOGIČNO OBLIKOVANJE



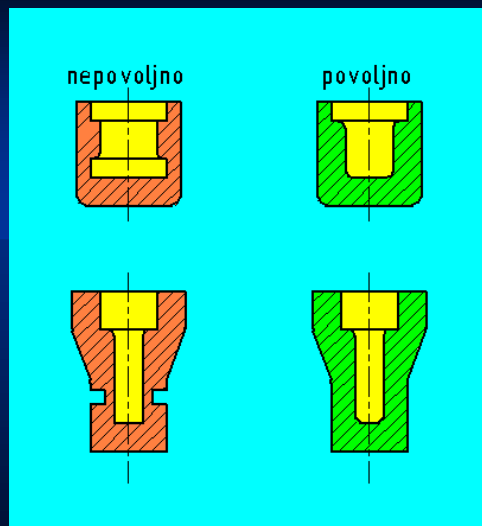
Neki važniji oblici koji se mogu proizvesti ekstrudiranjem



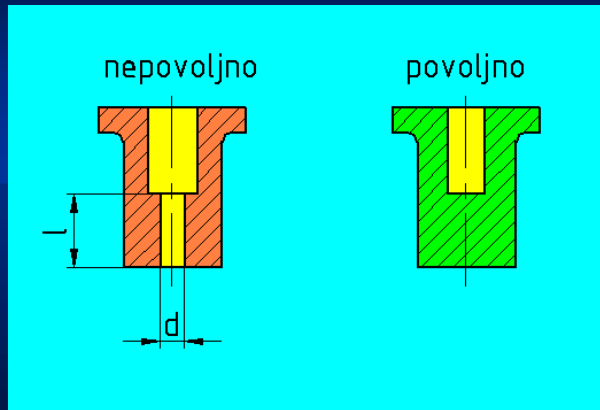
Kosine nisu potrebne



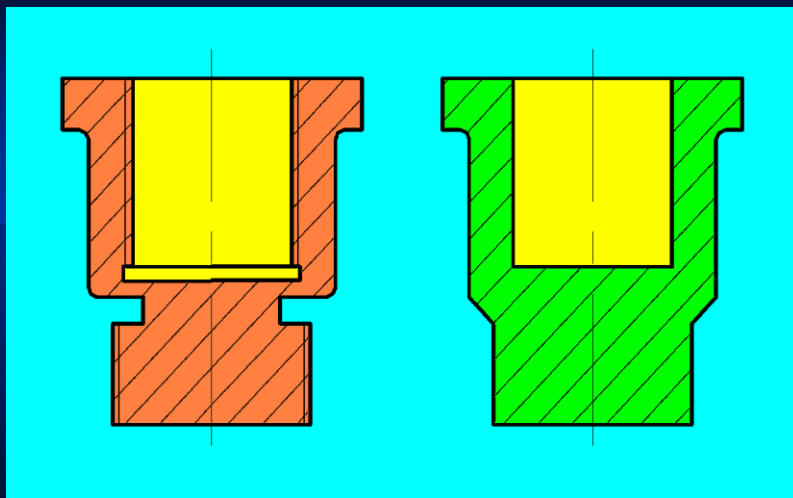
Oblikovati valja simetrično



Potrebno je oblikovati bez utora



Male rupe ne mogu se proizvesti ekstrudiranjem



Navoji se ne mogu proizvesti ekstrudiranjem