



Sveučilište u Zagrebu Građevinski fakultet
Zavod za organizaciju, tehnologiju i menadžment

Tehnologija građenja niskogradnja

11. predavanje

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Sadržaj

- ❑ Sustavi skela i oplata u mostogradnji
- ❑ Skele i oplate za upornjake i stupišta mostova
- ❑ Skele i oplate rasponskih konstrukcija AB mostova
- ❑ Oplate rasponskih konstrukcija mostova – izvedba bez skela
- ❑ Skele i oplate pomostja
- ❑ Izrada AB nosača montažnih mostova
- ❑ Montažna gradnja mostova - podizanje nosača
- ❑ Montažna gradnja mostova - navlačenje nosača
- ❑ Montažna gradnja mostova - sastavljanje nosača

Sustavi skela i oplata u mostogradnji

Vrste mostova

Djelatnost mostogradnje (gradnje masivnih mostova) promišlja se po različitim pristupima ovisno o vrsti mosta u smislu:

- ❑ namjene:
 - prometni: cestovni, željeznički, pješački;
 - industrijski: mostovi naftovoda, plinovoda, vodovoda, mostovi koji nose transportne trake...
- ❑ gradiva: drveni, kameni, betonski, metalni, spregnuti ...
- ❑ prostornog položaja: premošćenje rijeke, mora, (suhe) doline, druge prometnice,...
- ❑ osnovne (ukupne, prostorne, nosive) konstrukcije :
 - gredni mostovi
 - prostogredni mostovi od montažnih (prednapetih) nosača različitog poprečnog presjeka (puni T, sandučasti...)
 - kontinuirani različitog poprečnog presjeka: pločasti do sandučasti
 - lučni mostovi
 - ovješeni i viseći mostovi
 - ...

Masivni betonski mostovi

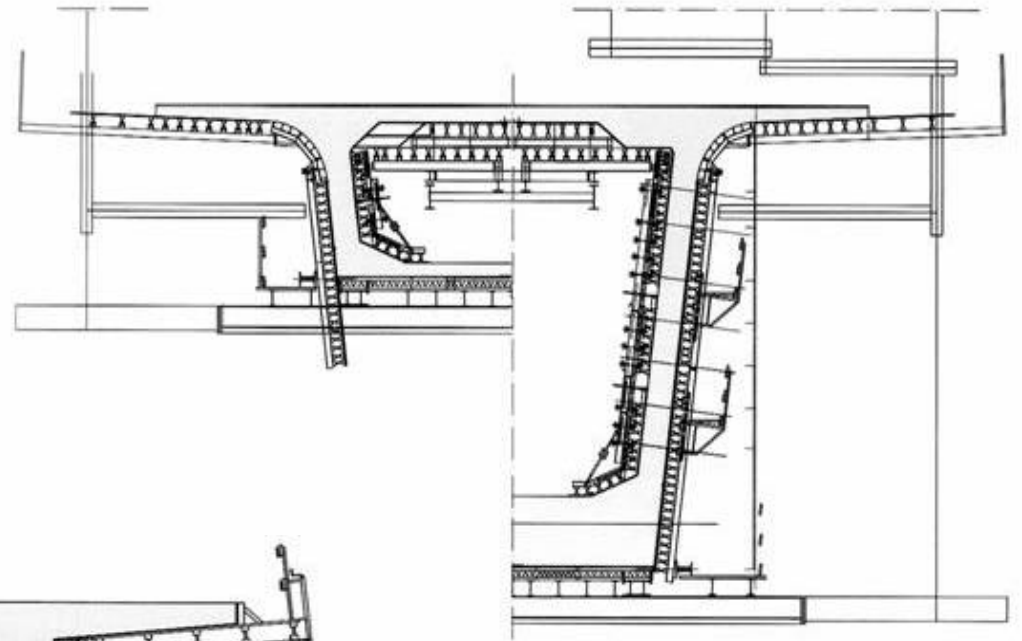
❑ složene nadzemne prostorne konstrukcije

❑ obuhvaćaju slijedeće osnovne dijelove:

1. temelji
 - piloti temelja
2. upornjaci
3. stupovi (stupišta)
 - naglavnice stupišta
4. rasponska konstrukcija (konstrukcija premošćenja između stupova ili piona)
 - masivni pločasti mostovi raspona do oko 10 m
 - gredni mostovi s pločom raspona do oko 30 m
 - sandučasti mostovi raspona do oko 200 m
5. pomostje (namjenski dijelovi mosta: kolnik, hodnik, ...).
6. oprema mosta (odvodnja, ograde, rasvjeta)

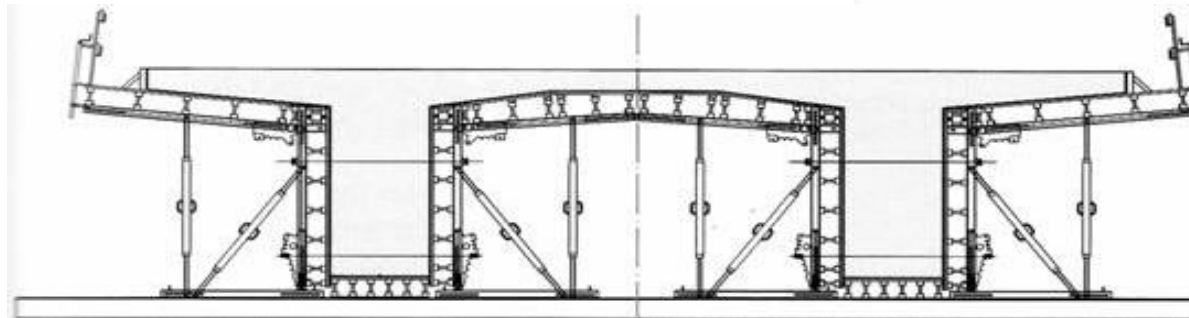
Sandučasti presjek

Raspon između oslonaca do 200 m



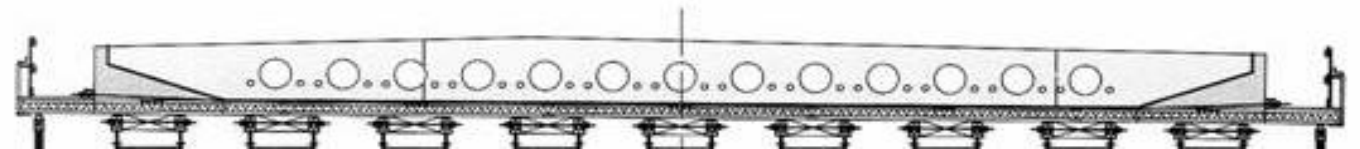
Gredni presjek

Raspon između oslonaca do 30 m



Pločasti presjek

Raspon između oslonaca do 10 m



Skele i oplate masivnih betonskih mostova

- ❑ Složene prostorne konstrukcije.
- ❑ Obuhvaćaju slijedeće osnovne sklopove i sustave :
 - oplate temelja
 - (skele) i oplate upornjaka
 - skele i oplate stupova (stupišta)
 - skele i oplate naglavnice stupišta
 - skele i oplate rasponske konstrukcije
 - skele i oplate pomostja (skele i oplate dijelova mosta izvan osnovnih dijelova rasponske konstrukcije).

Skele i oplata za upornjake i stupišta mostova

**jednostavna
panel-oplata
temelja**

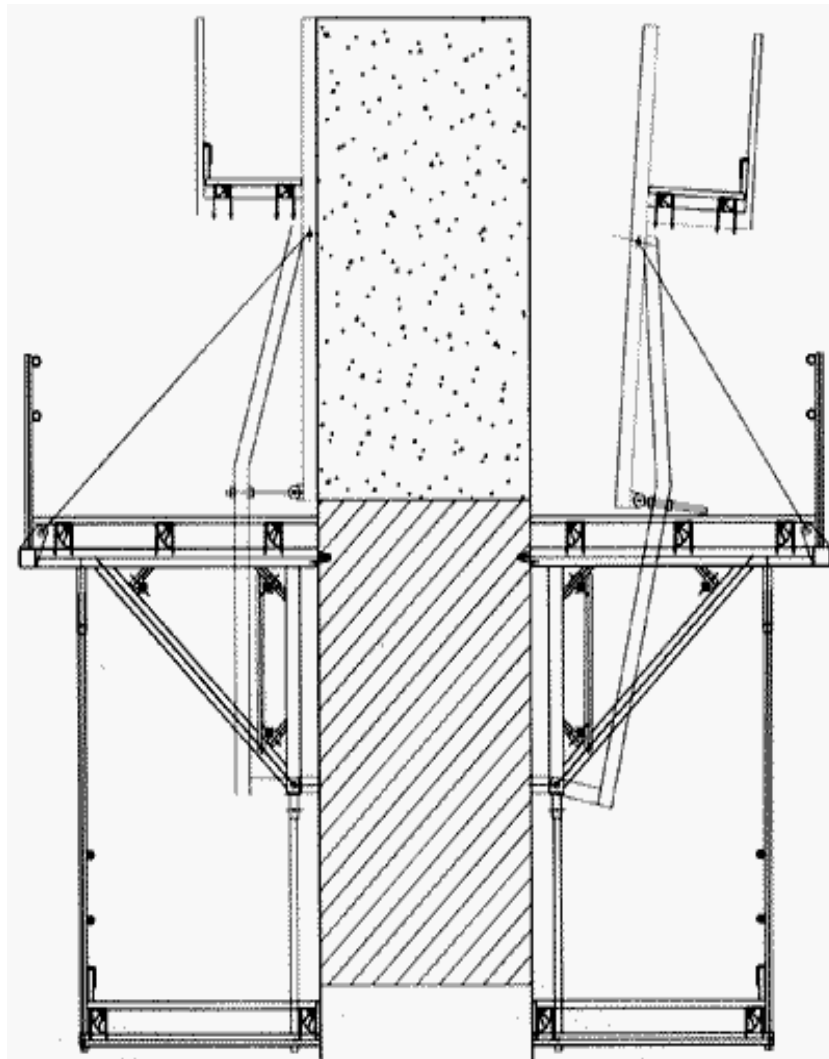


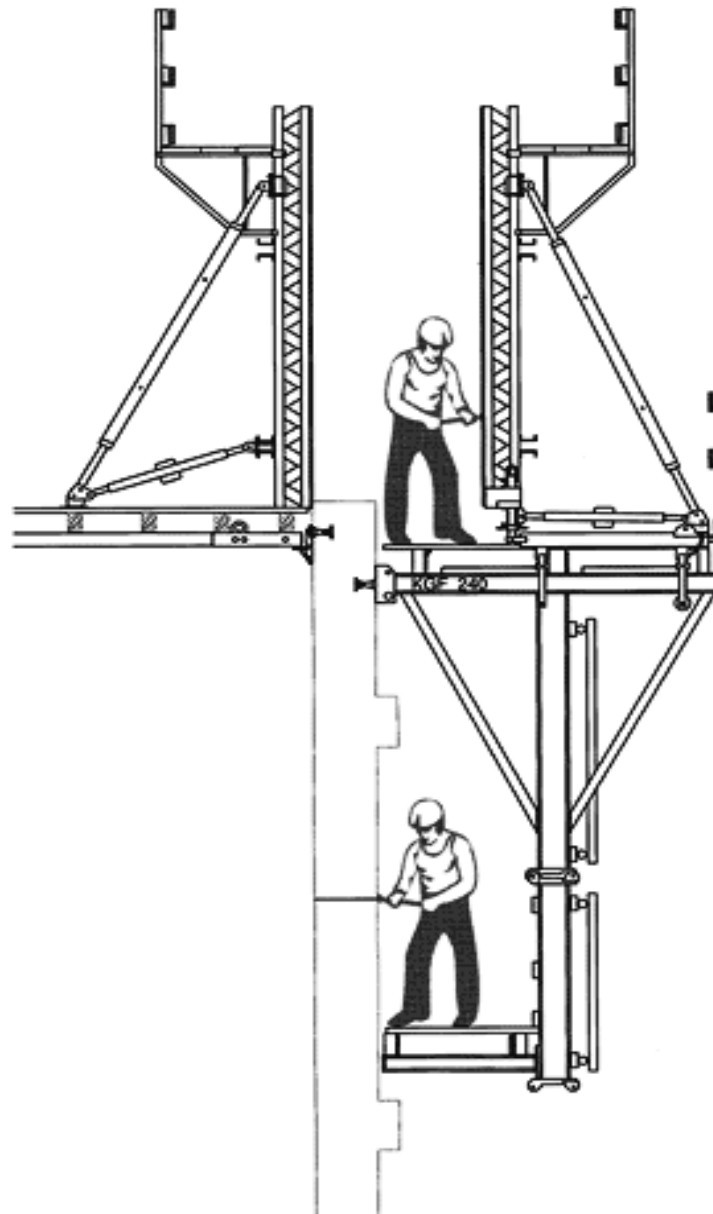


**primjer sustava oplate
stupa mosta**



**primjer sustava
penjajuće
(pomoću dizalice)
oplate stupa
mosta**





**primjer sustava
penjajuće
oplate stupa mosta**

**primjer sustava
samopenjajuće
(klizne) oplate
stupišta (pilona)
mosta**

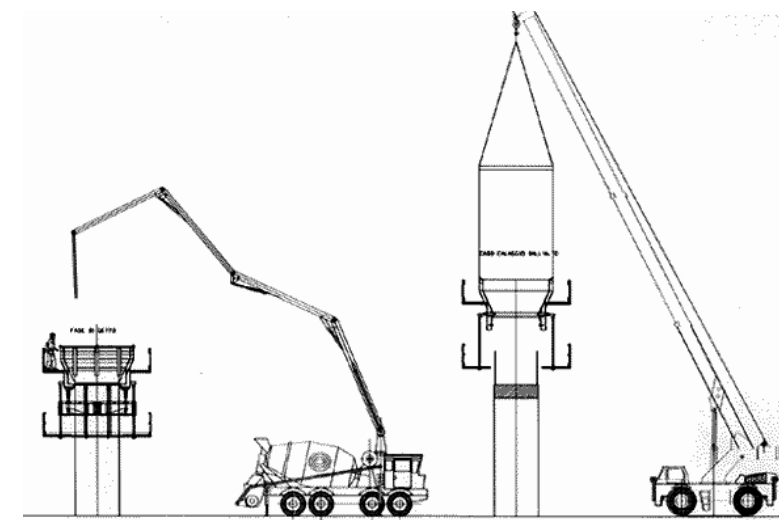
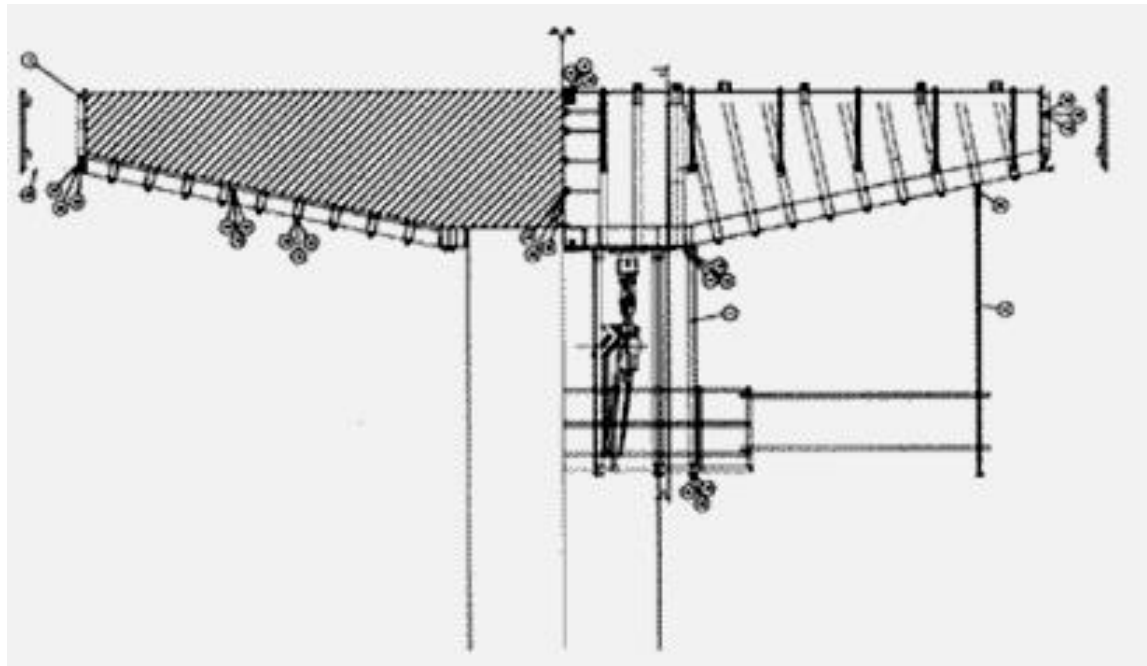




**primjer sustava samopenjajuće
(klizne) oplate stupa mosta**

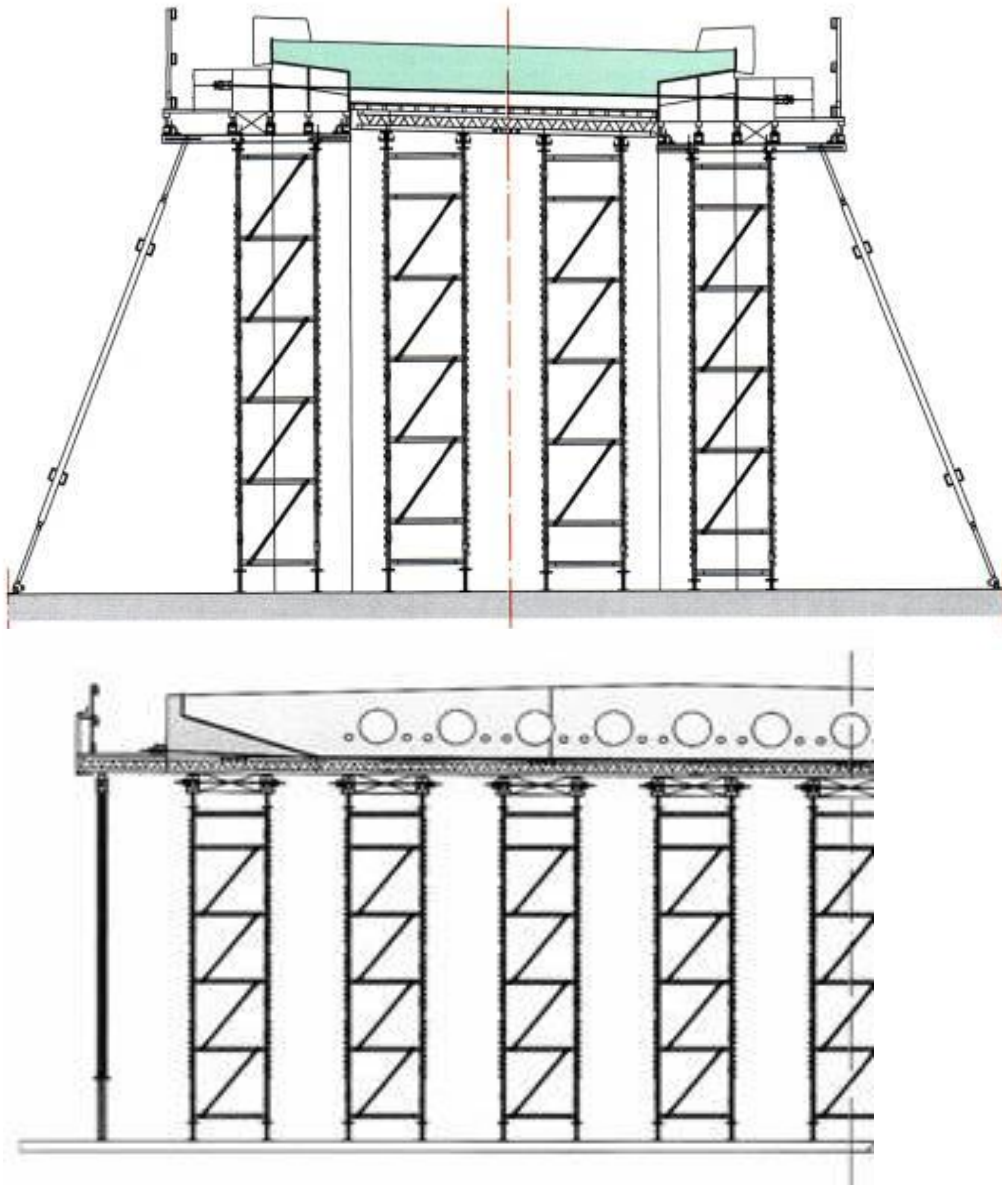


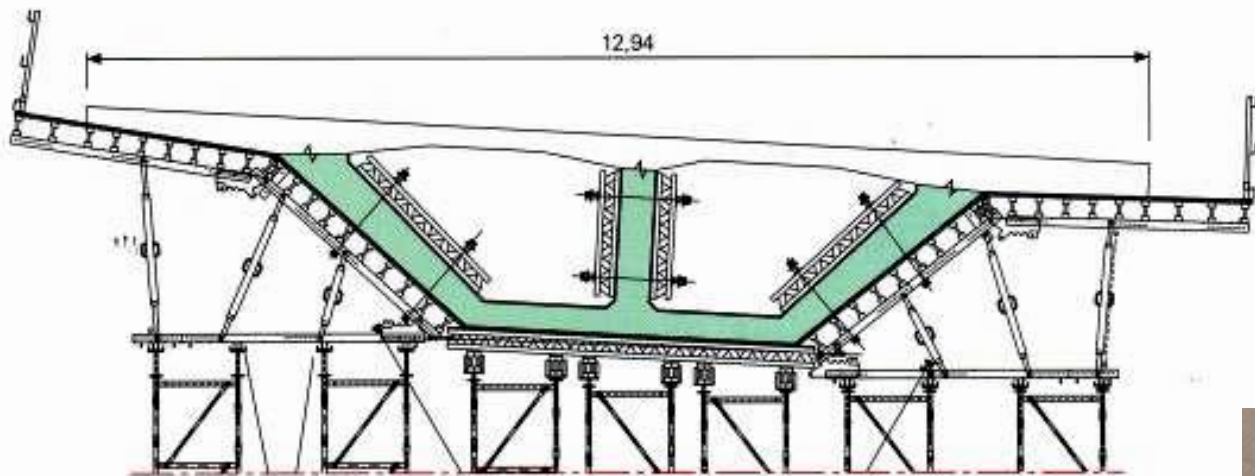
**primjer
oplate
naglavnice**



Skele i oplata rasponskih konstrukcija AB mostova

**izvedba s lakim cijevnim
skelama (sustavi
prostornih modularnih
skela)**





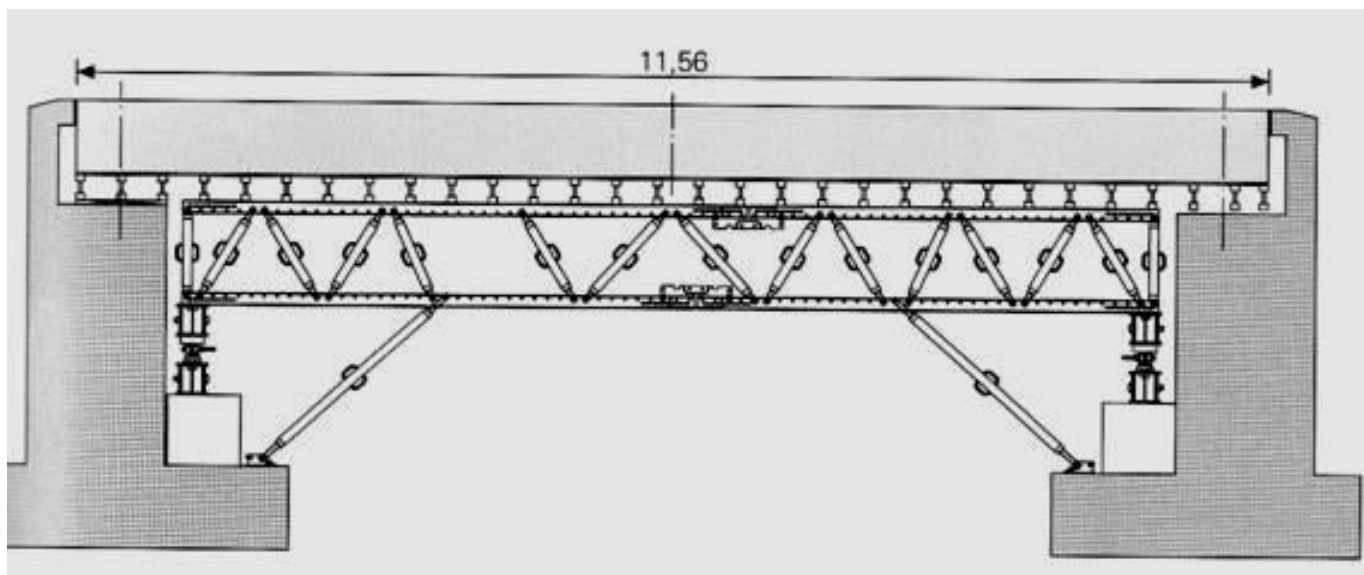
izvedba s lakim cijevnim
skelama (sustavi
prostornih modularnih
skela)





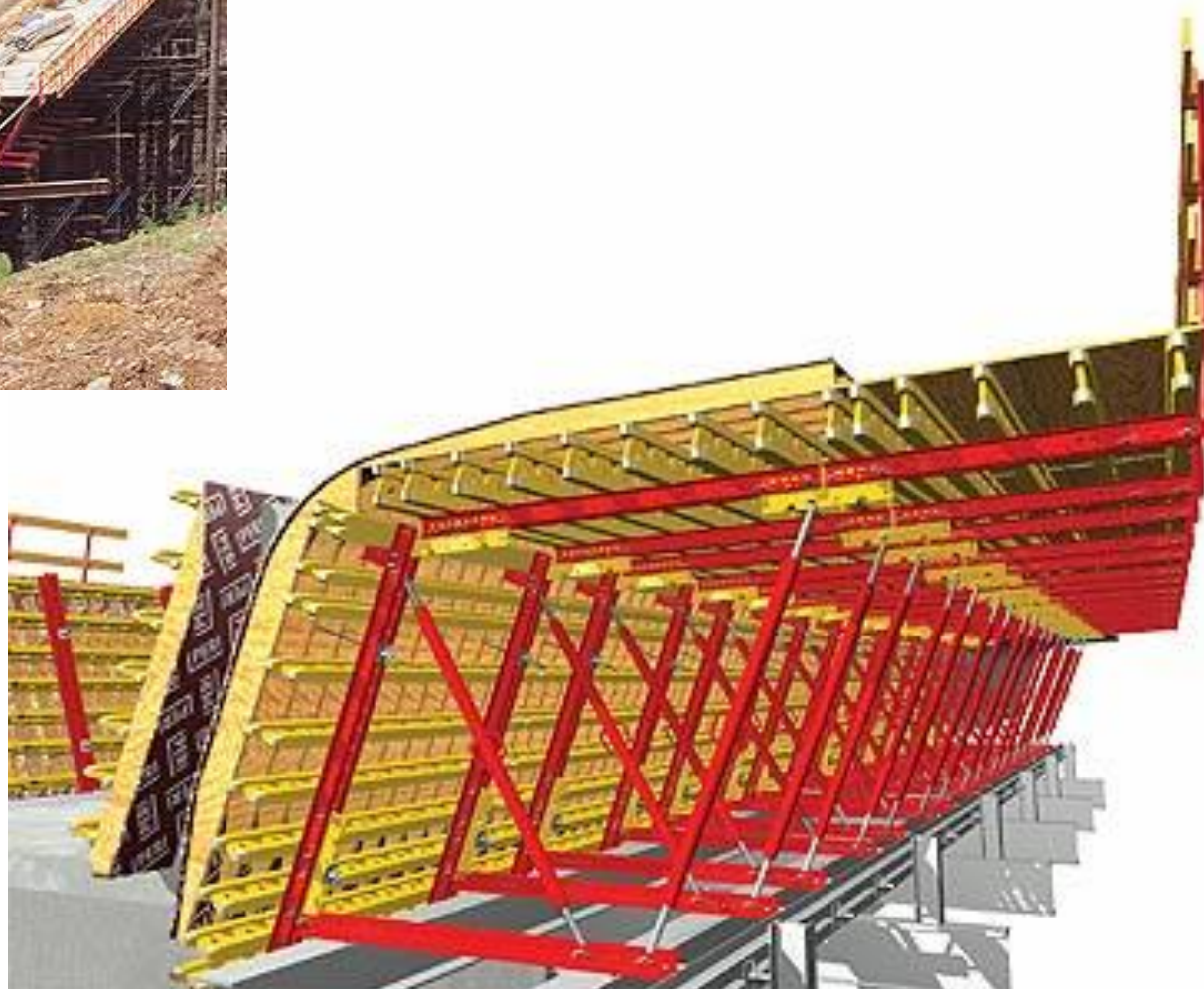
**izvedba s teškim (cijevnim i sl.)
skelama i s raznim nosačima**





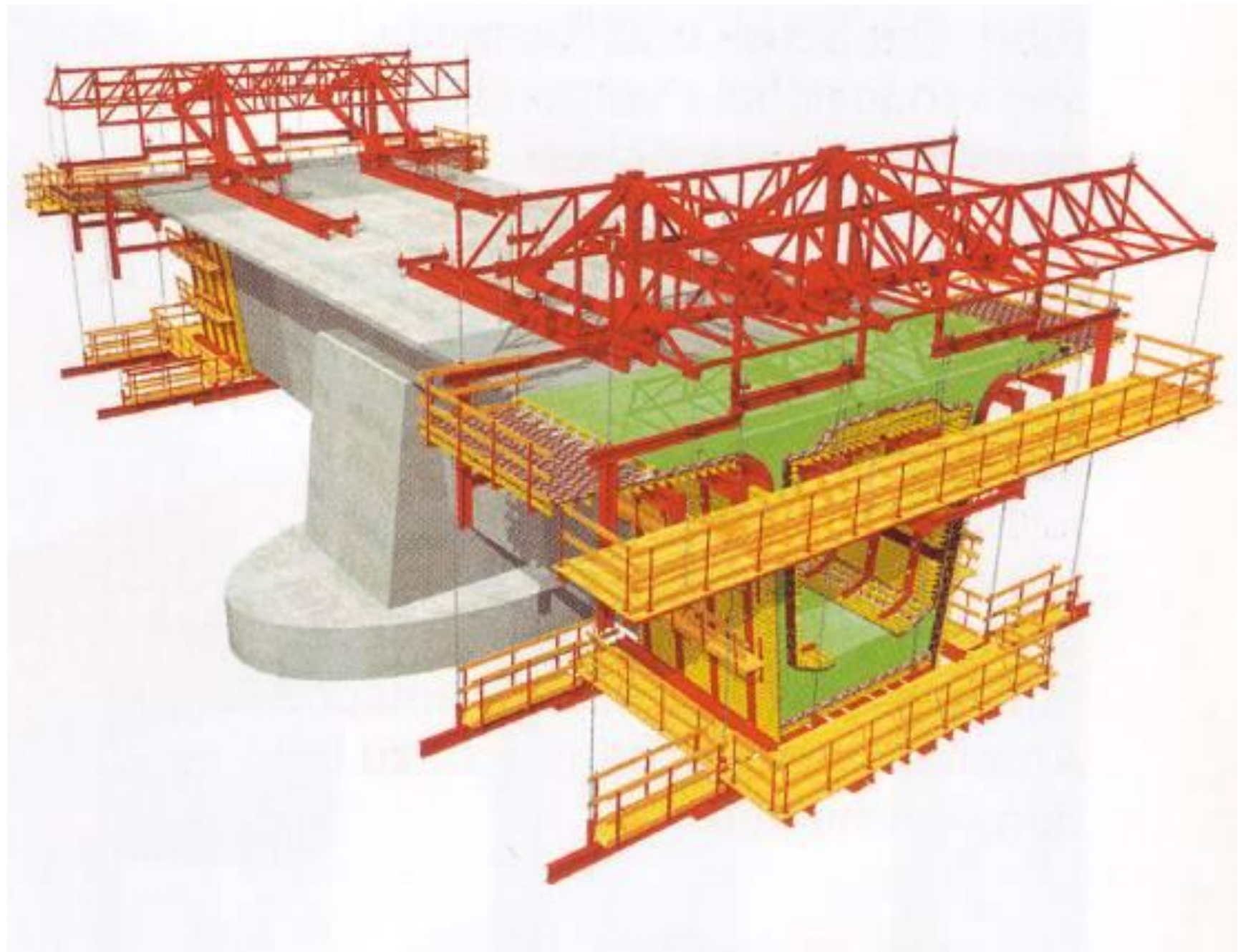
**izvedba s teškim (cijevnim
i sl.) skelama i s raznim
nosačima**

**izvedba s teškim (cijevnim i sl.)
skelama i s raznim nosačima**

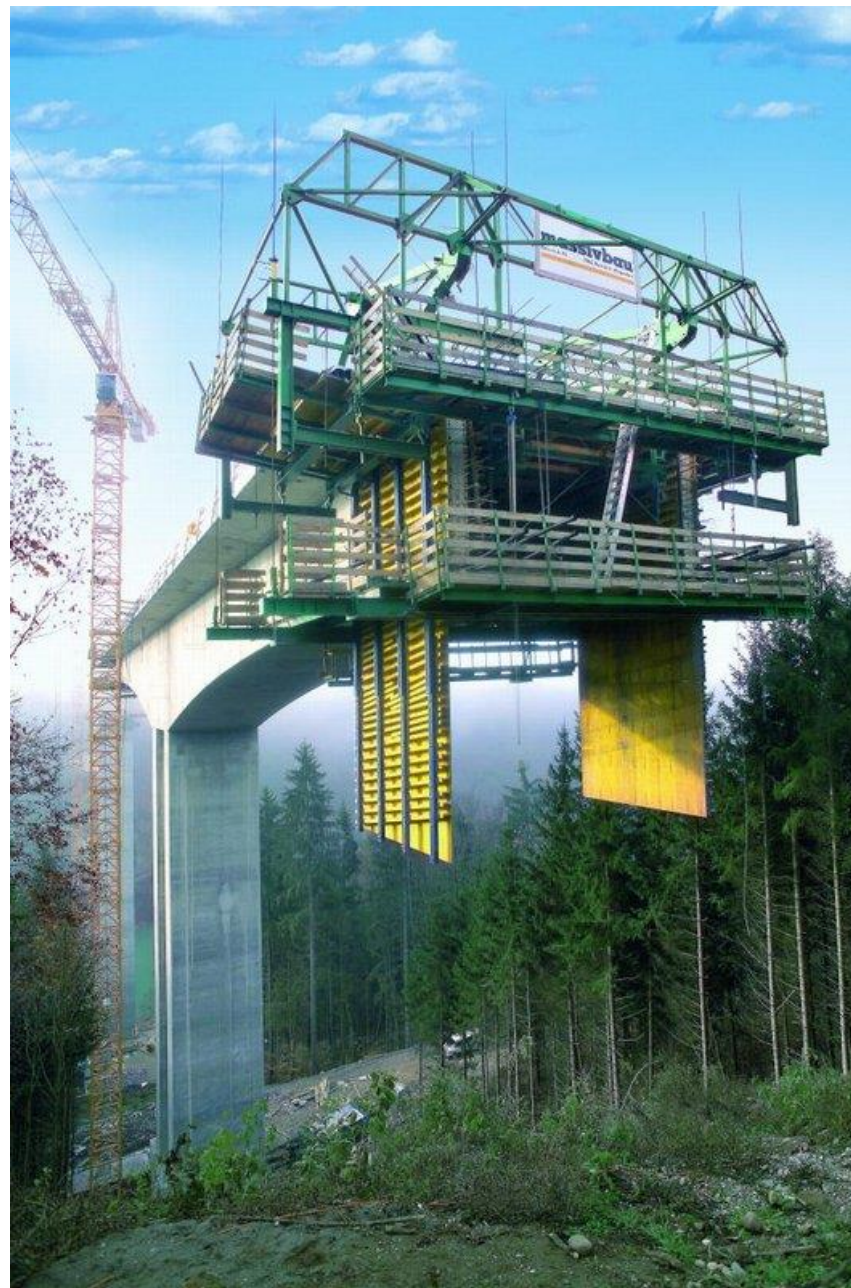


Oplate rasponskih konstrukcija mostova – izvedba bez skela

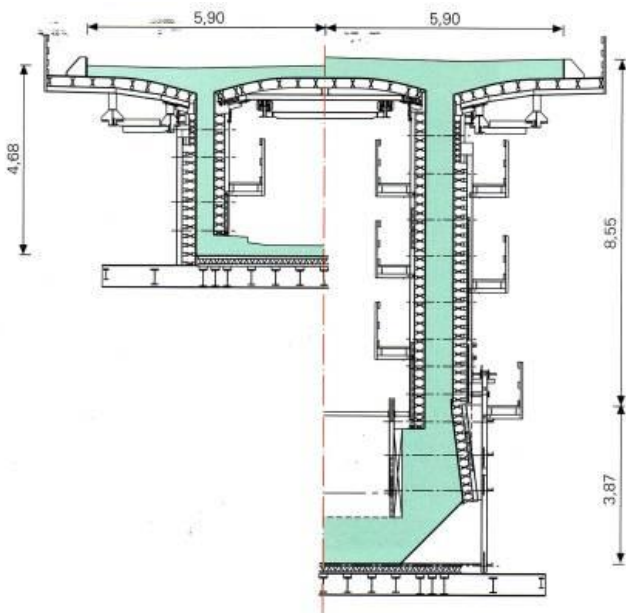
**tehnika i tehnologija
izvedbe AB mostova
slobodnim konzolnim
napredovanjem**



**tehnika i tehnologija
izvedbe AB mostova
slobodnim konzolnim
napredovanjem**



tehnika i tehnologija izvedbe AB mostova slobodnim konzolnim napredovanjem

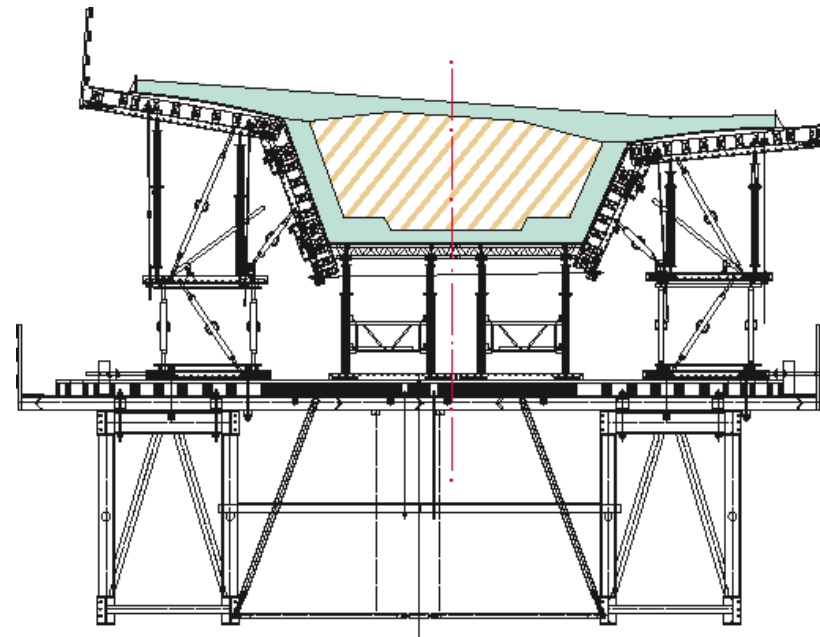
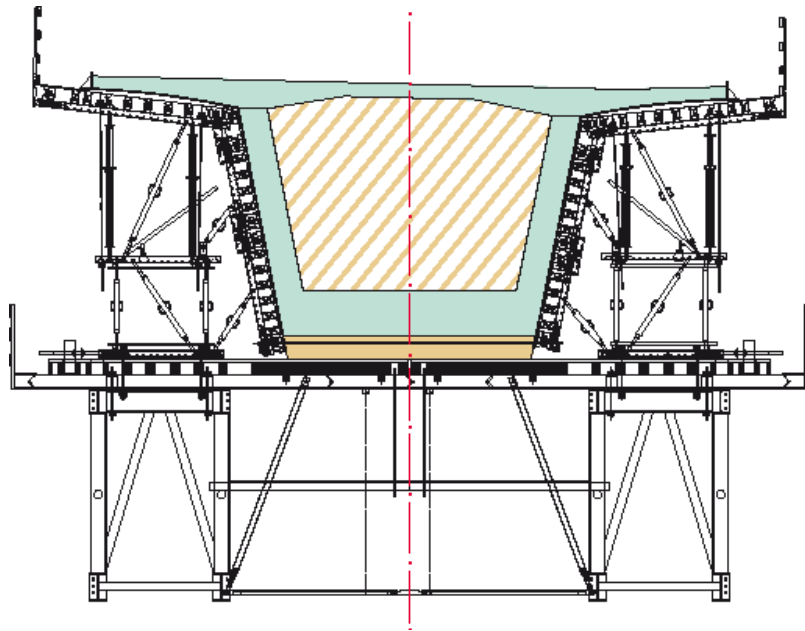


Querschnitt durch
die Schalungskon-
struktion über dem
Pfeilertisch und in
der Brückenmitte.



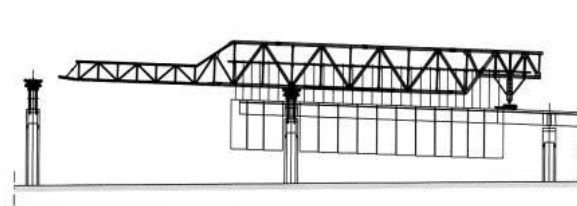


**izvedba AB mostova
premoščivanjem raspona
rešetkom koja nosi oplatu
- poduprta oplata**



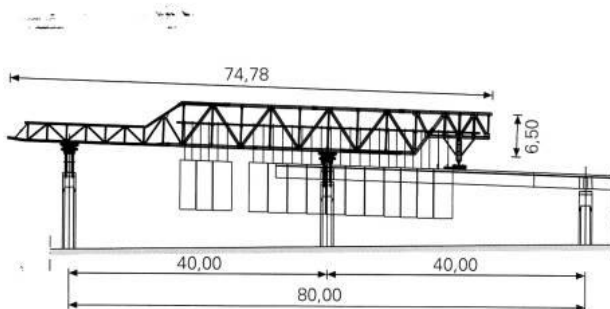


izvedba AB mostova premoščivanjem raspona rešetkom koja nosi oplatu - poduprta oplata



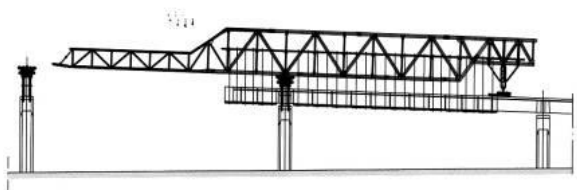
Schritt 1:

Das Ausschalen geschieht durch Aufklappen der VARIO Einheiten.



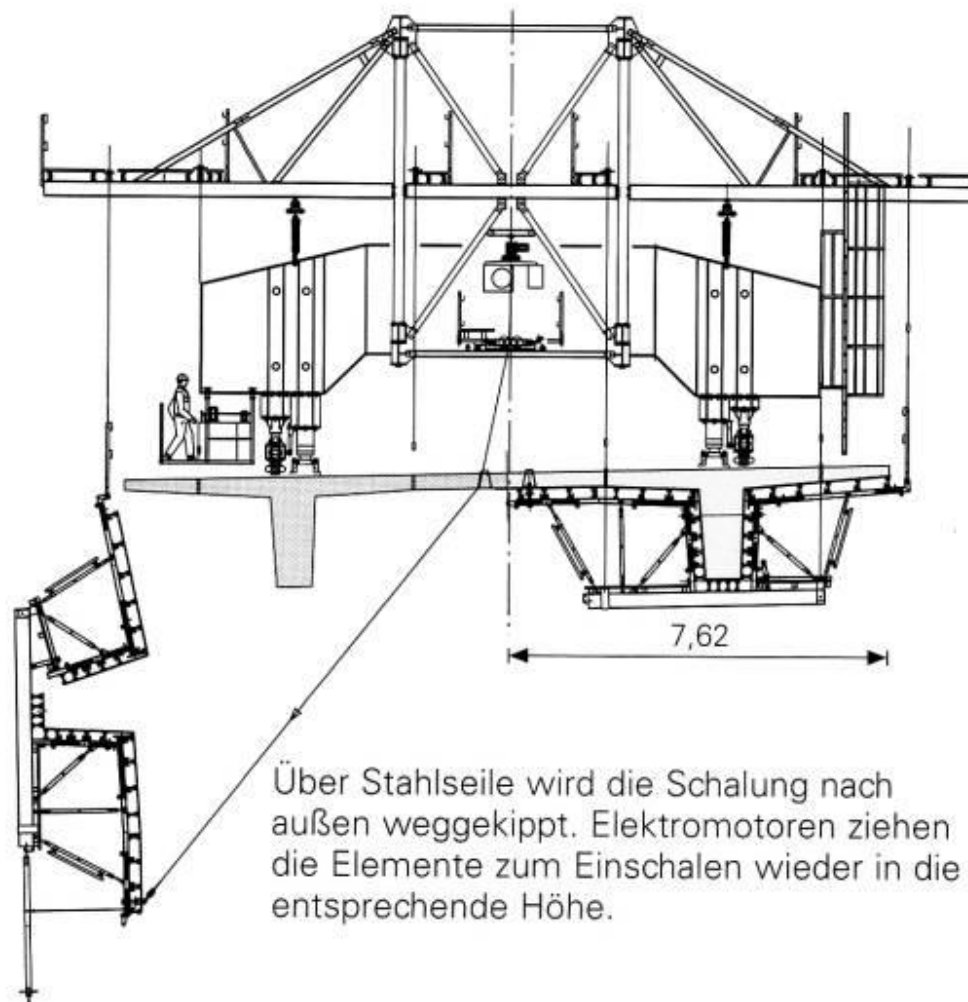
Schritt 2:

Zum Verfahren des Freivorbauwagens bleiben die VARIO Einheiten aufgeklappt. Dieser Vorgang geschieht hydraulisch in 1,40 m Abschnitten.



Schritt 3:

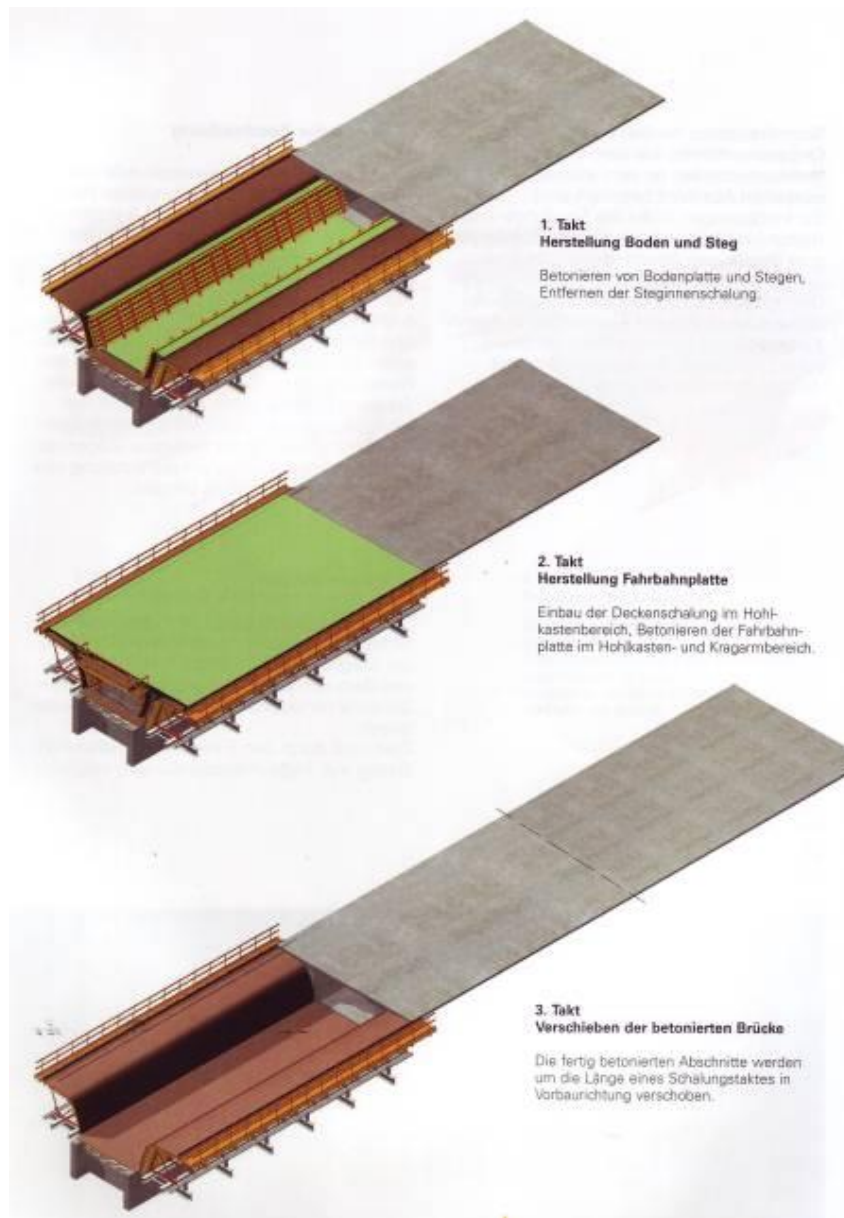
Das Einschalen läuft in umgekehrter Reihenfolge zum Ausschalen ab.



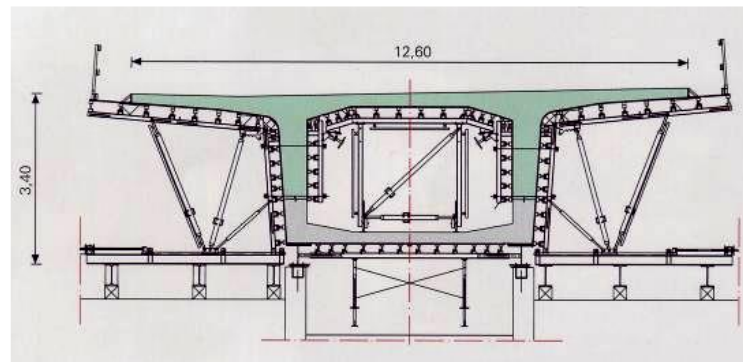
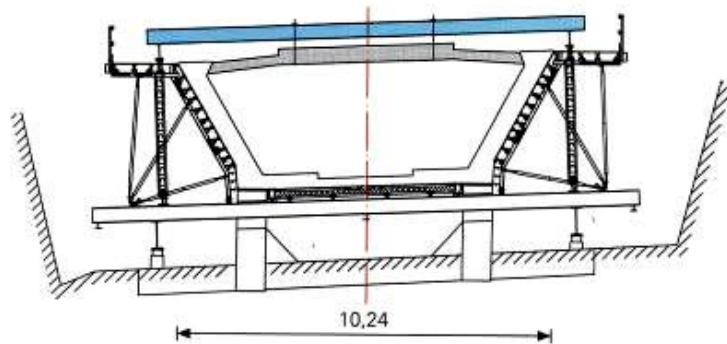
tehnika i tehnologija izvedbe ab-mostova premošćivanjem raspona rešetkom koja nosi oplatu - ovješena oplata



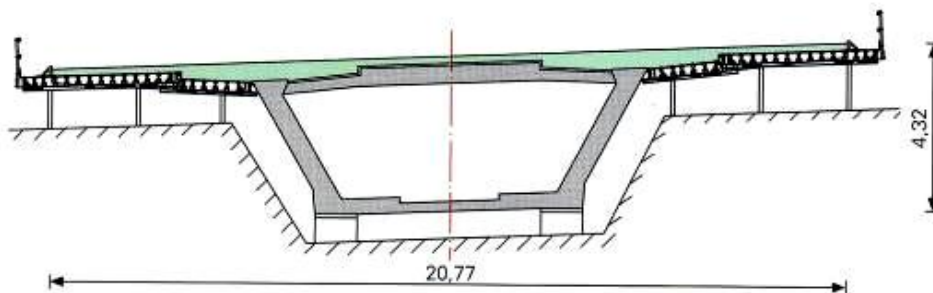
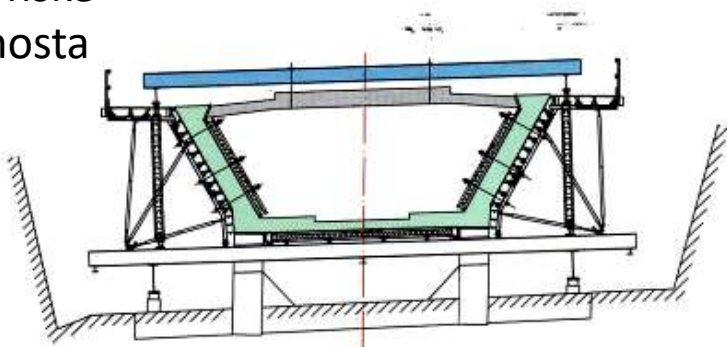
**tehnika i tehnologija izvedbe ab-mostova premošćivanjem raspona
rešetkom koja nosi oplatu - ovješena oplata**



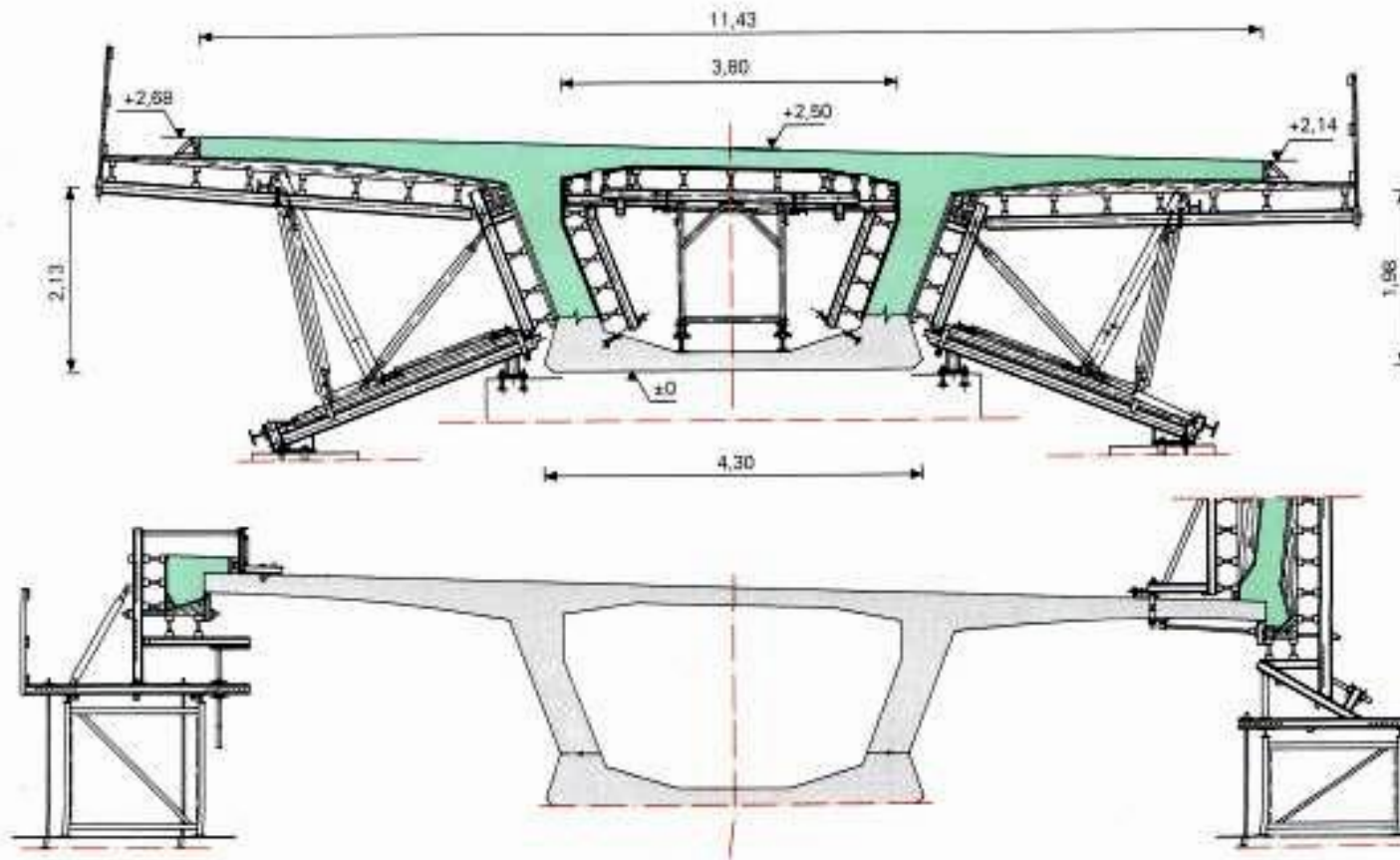
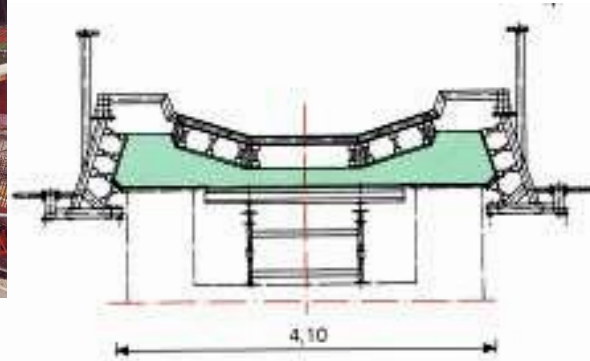
tehnika i tehnologija izvedbe AB mostova naguravanjem rasponskih konstrukcija



Oplata sandučastog
presjeka rasponske
konstrukcije mosta



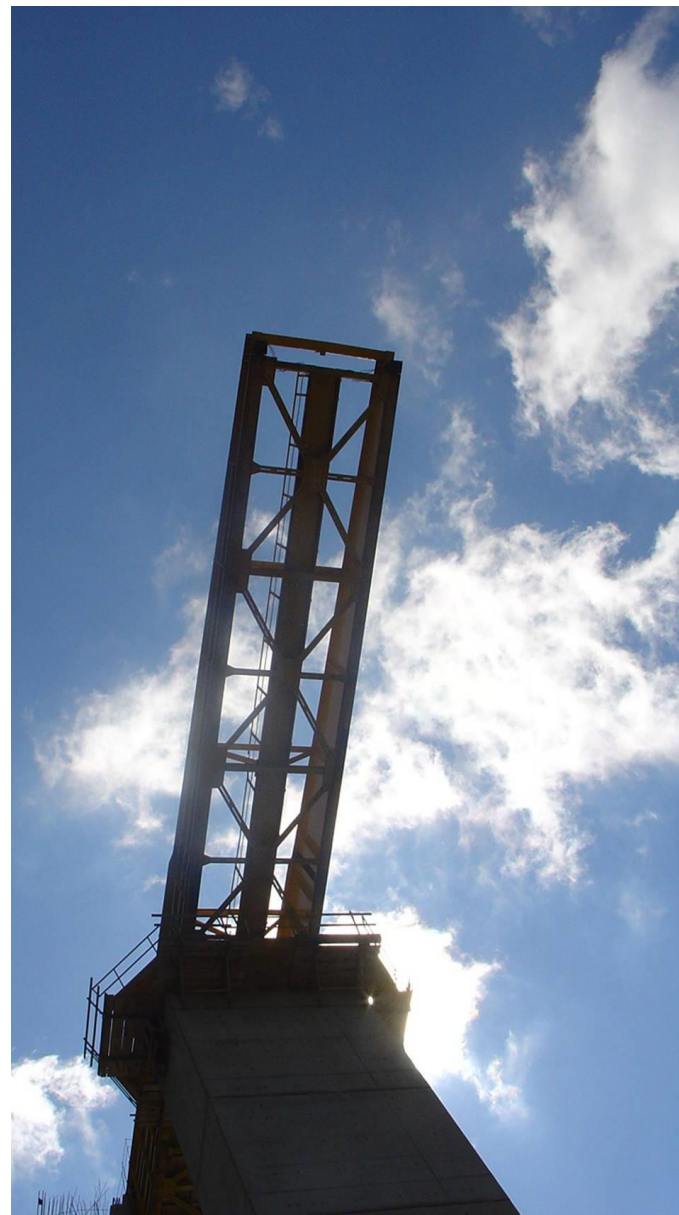
**tehnika i tehnologija
izvedbe AB mostova
naguravanjem
rasponskih konstrukcija**



**Oplata sandučastog
presjeka rasponske
konstrukcije mosta**



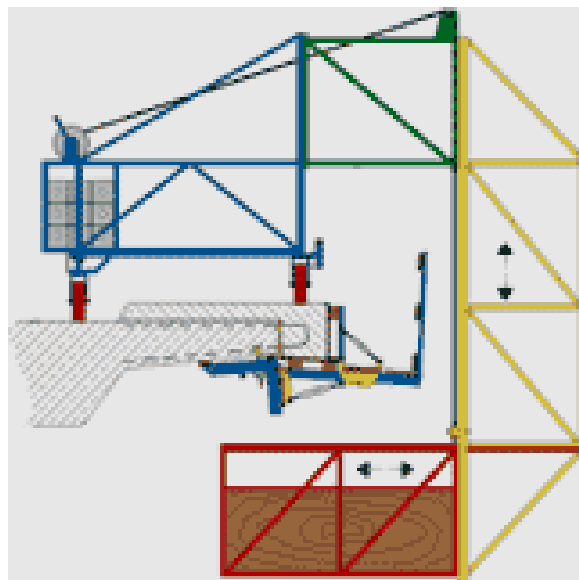
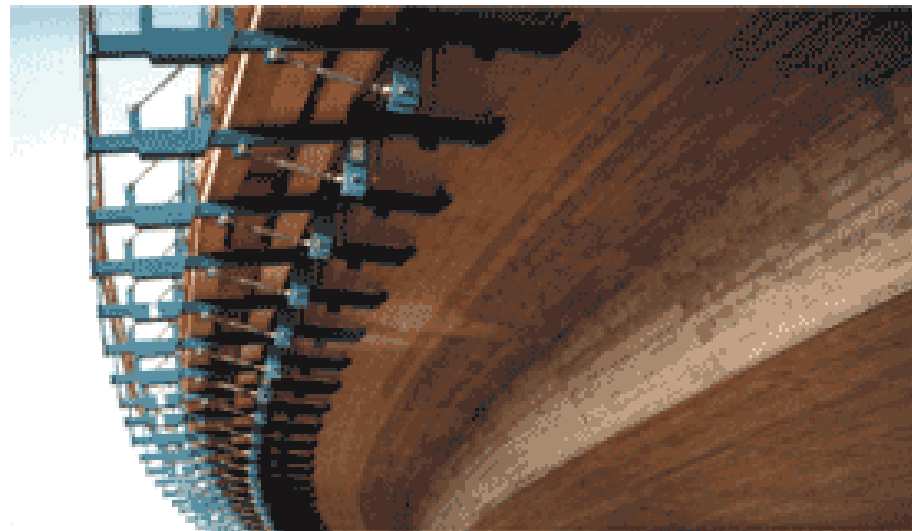
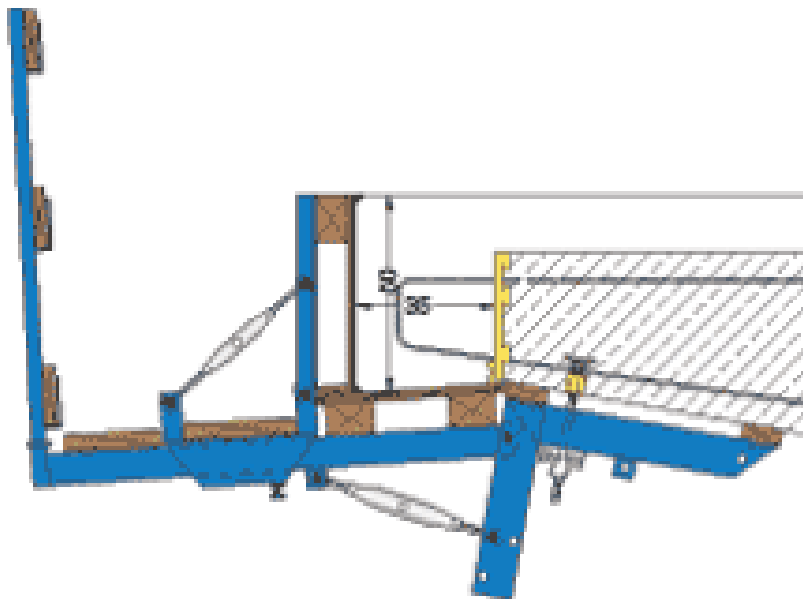
tehnika i tehnologija izvedbe AB mostova naguravanjem rasponskih konstrukcija Most Bajer-Fužine



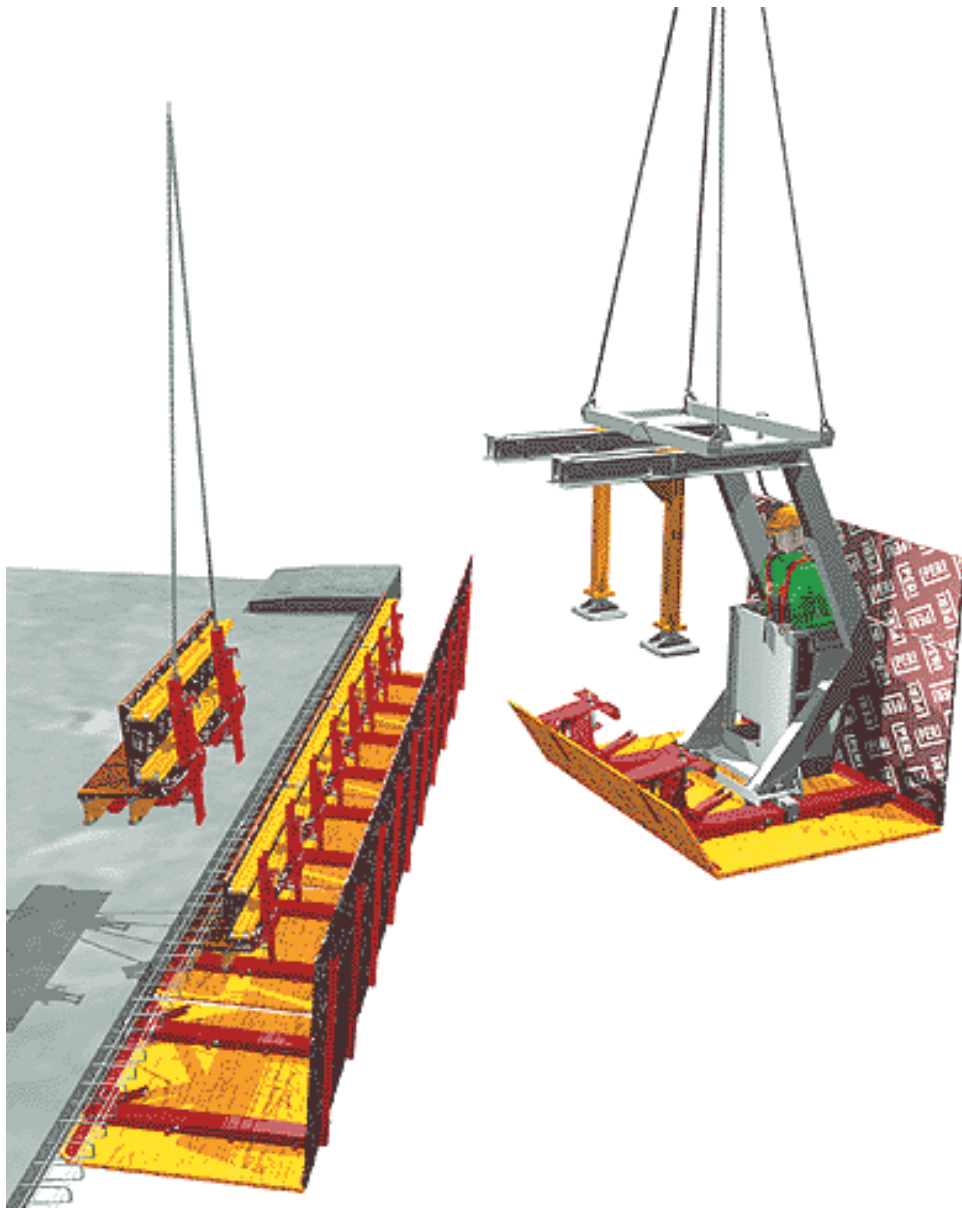


**tehnika i tehnologija izvedbe AB mostova
naguravanjem rasponskih konstrukcija
Most Bajer-Fužine**

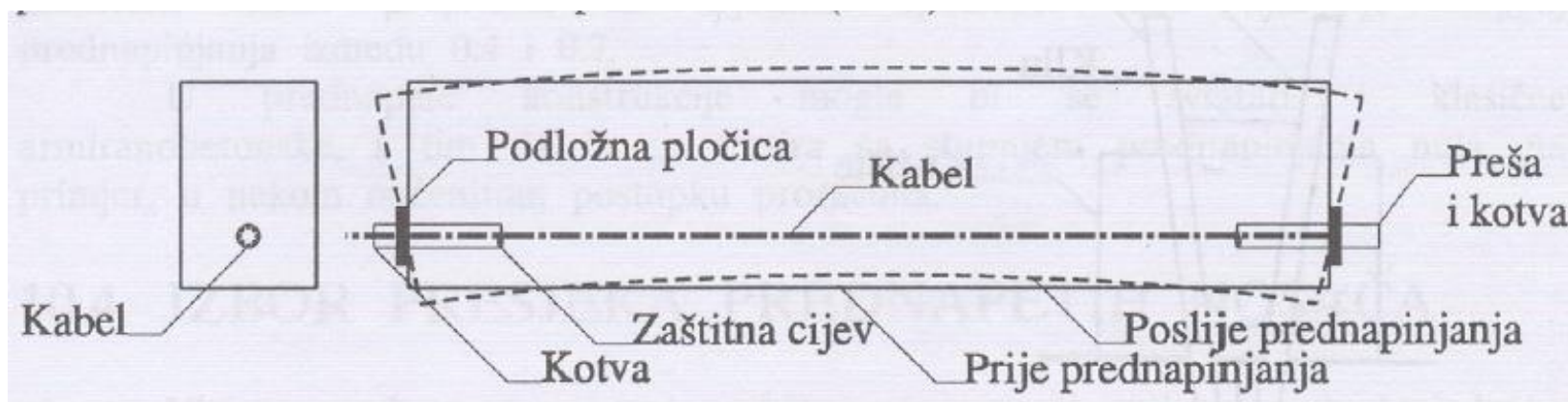
Skele i oplata pomostja

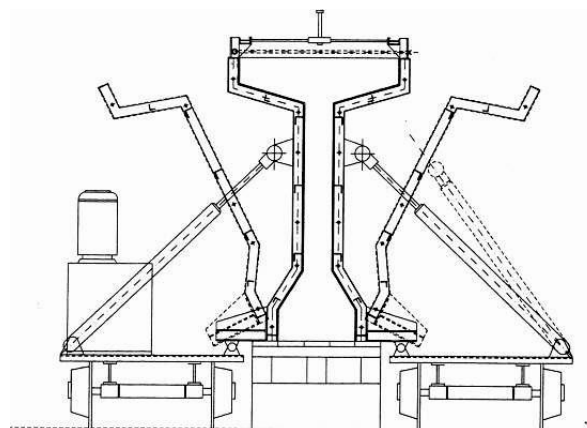
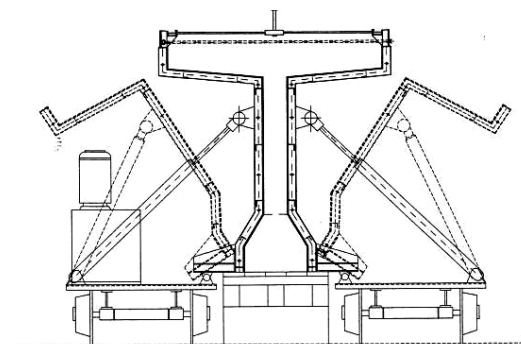
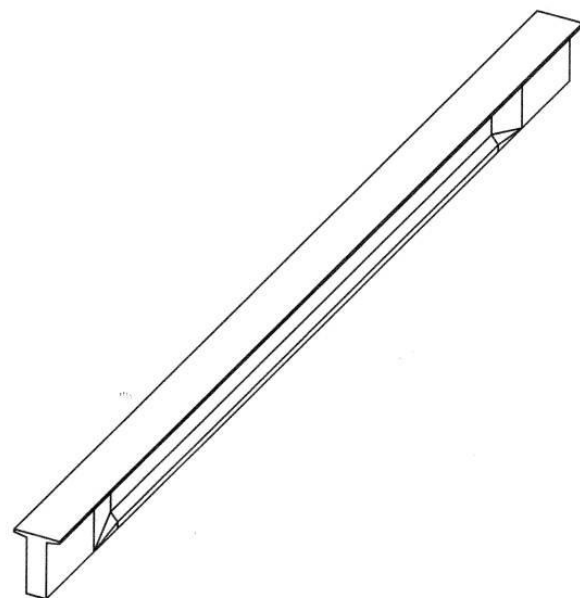




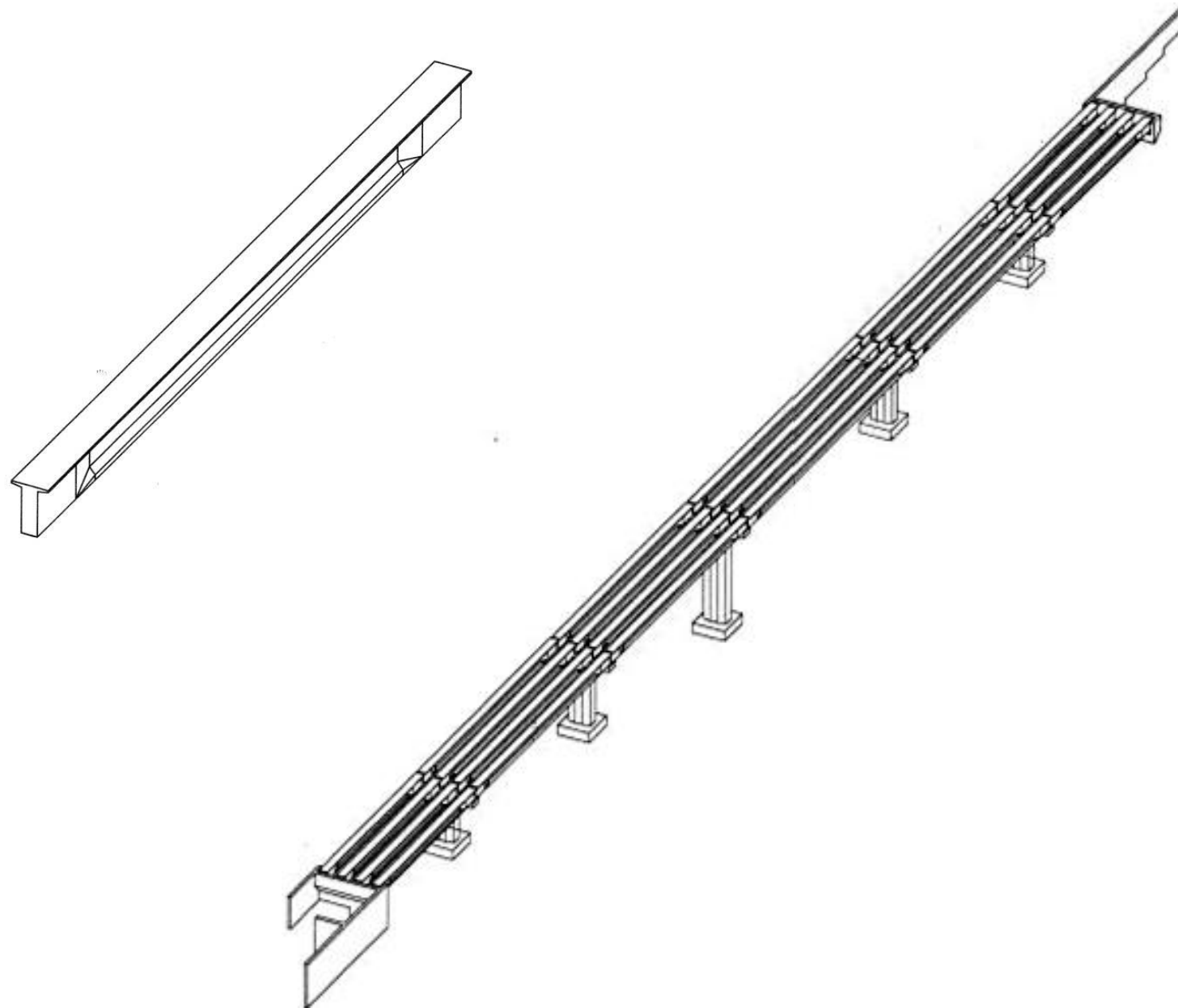


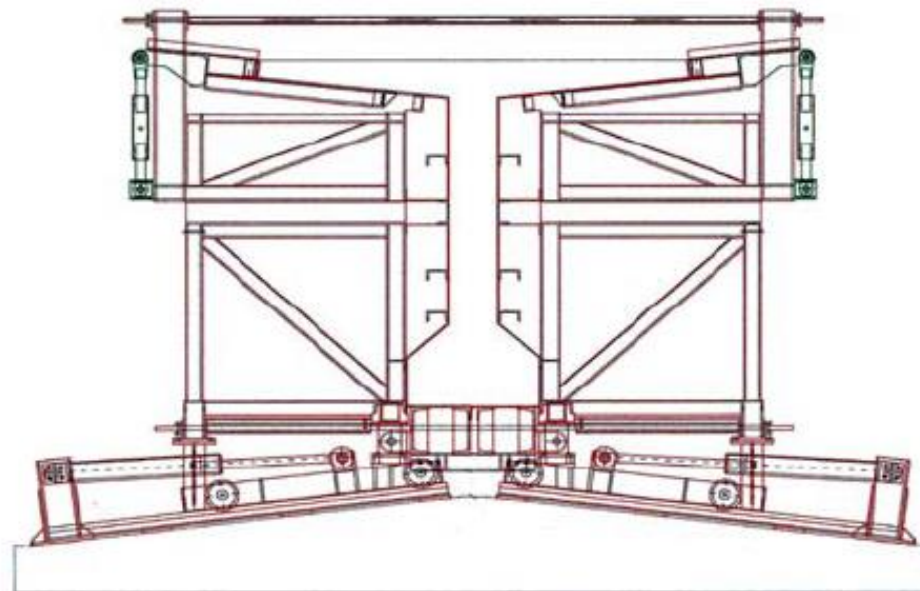
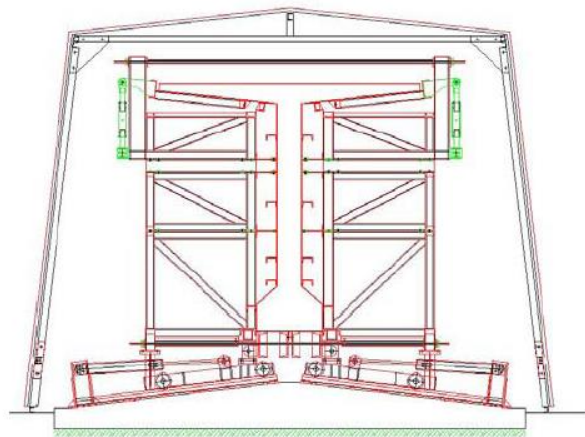
Izrada AB nosača montažnih mostova





**Oplata za
prefabricirane
AB nosače**

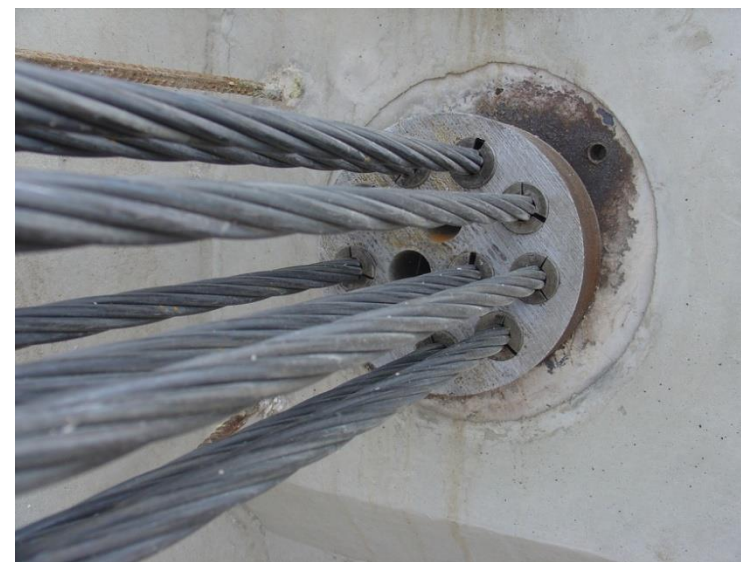
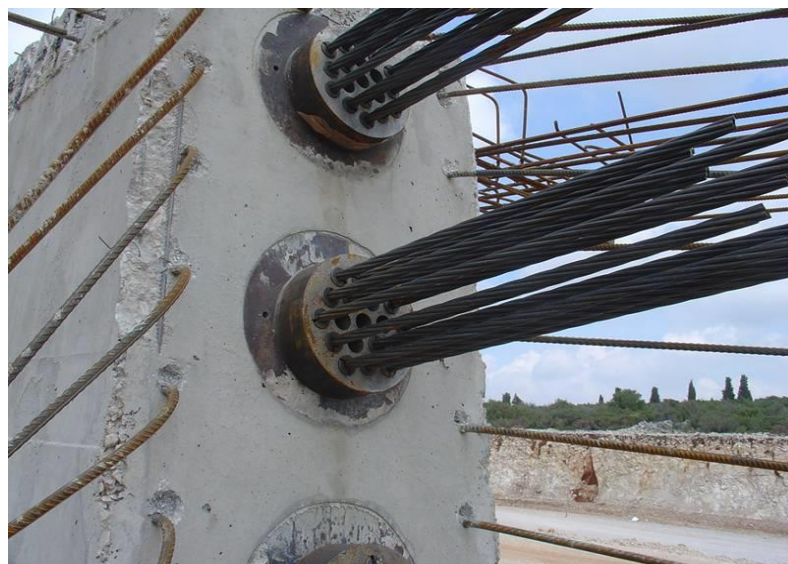




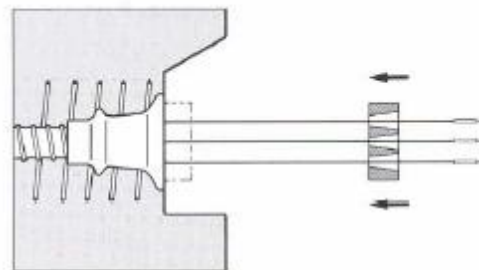




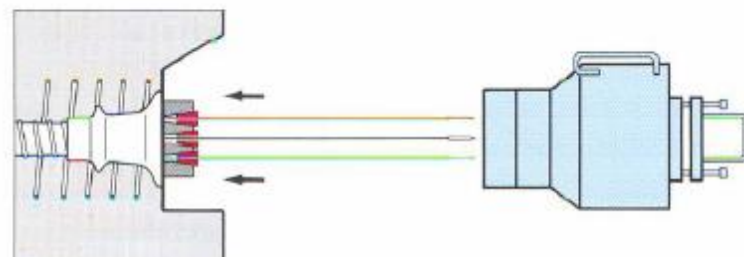
glava i kotve



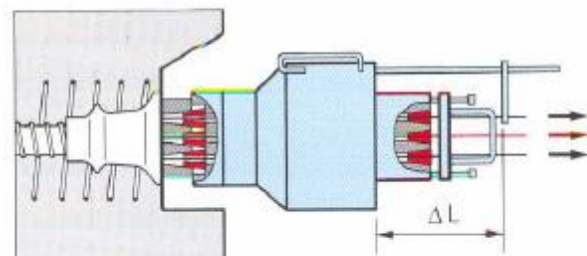
uvučeni kablovi spremni za utezanje



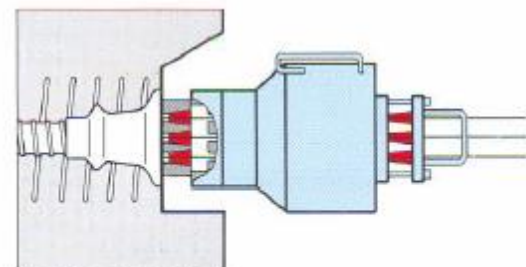
Placing of anchor head and wedges



Positioning of the jack



Stressing



Seating of wedges



Placing of anchor head



Positioning of jack



Stressing, measuring, seating of wedges

hidraulička preša za utezanje kablova





**Kalup za
betoniranje
prednapetih AB
nosača na
gradilištu**





**površina betona sa
zračnim mjehurićima**



**površina elementa –
lice betona**

**mjerenje
nadvišenja u
polovici raspona**





**gotovi elementi –
poduprti na podlozi**

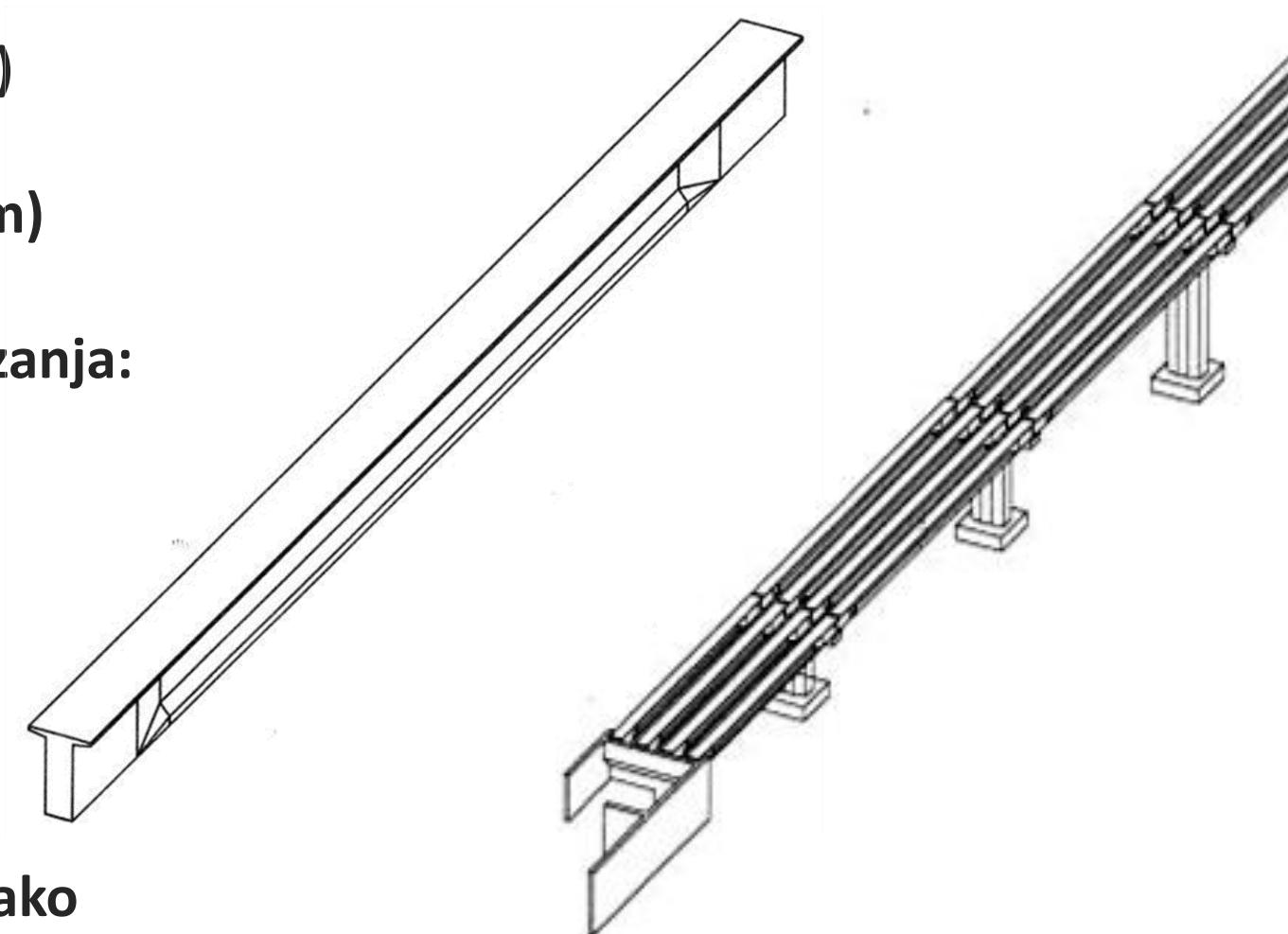


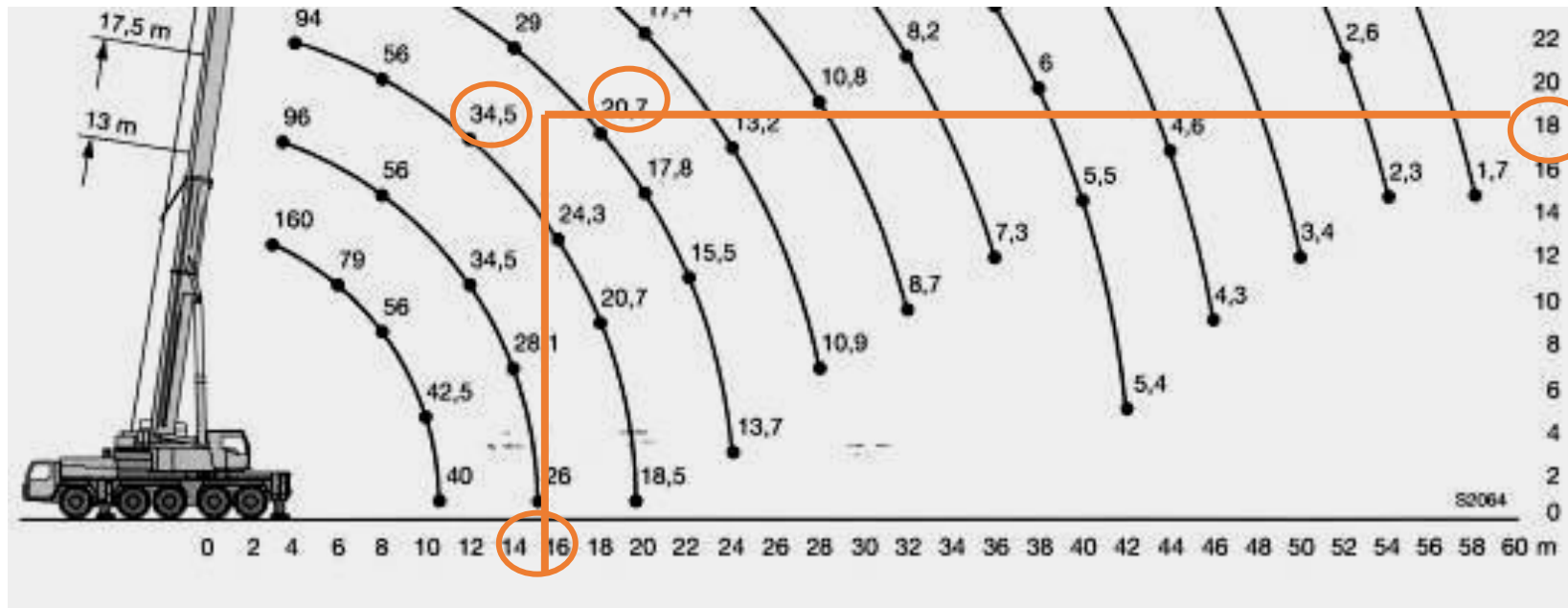
Montažna gradnja mostova - podizanje nosača

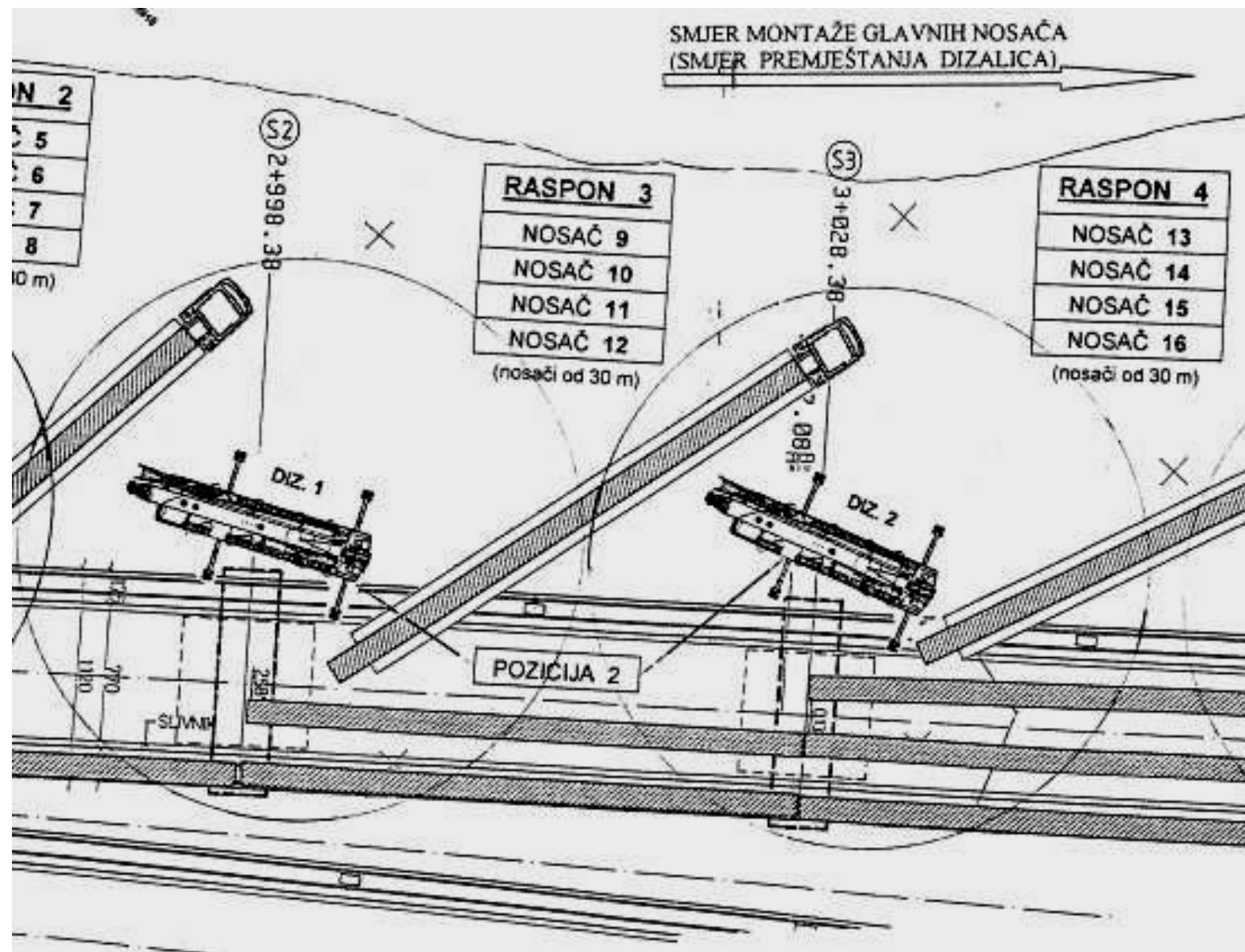
Obilježja nosača i dizanja:

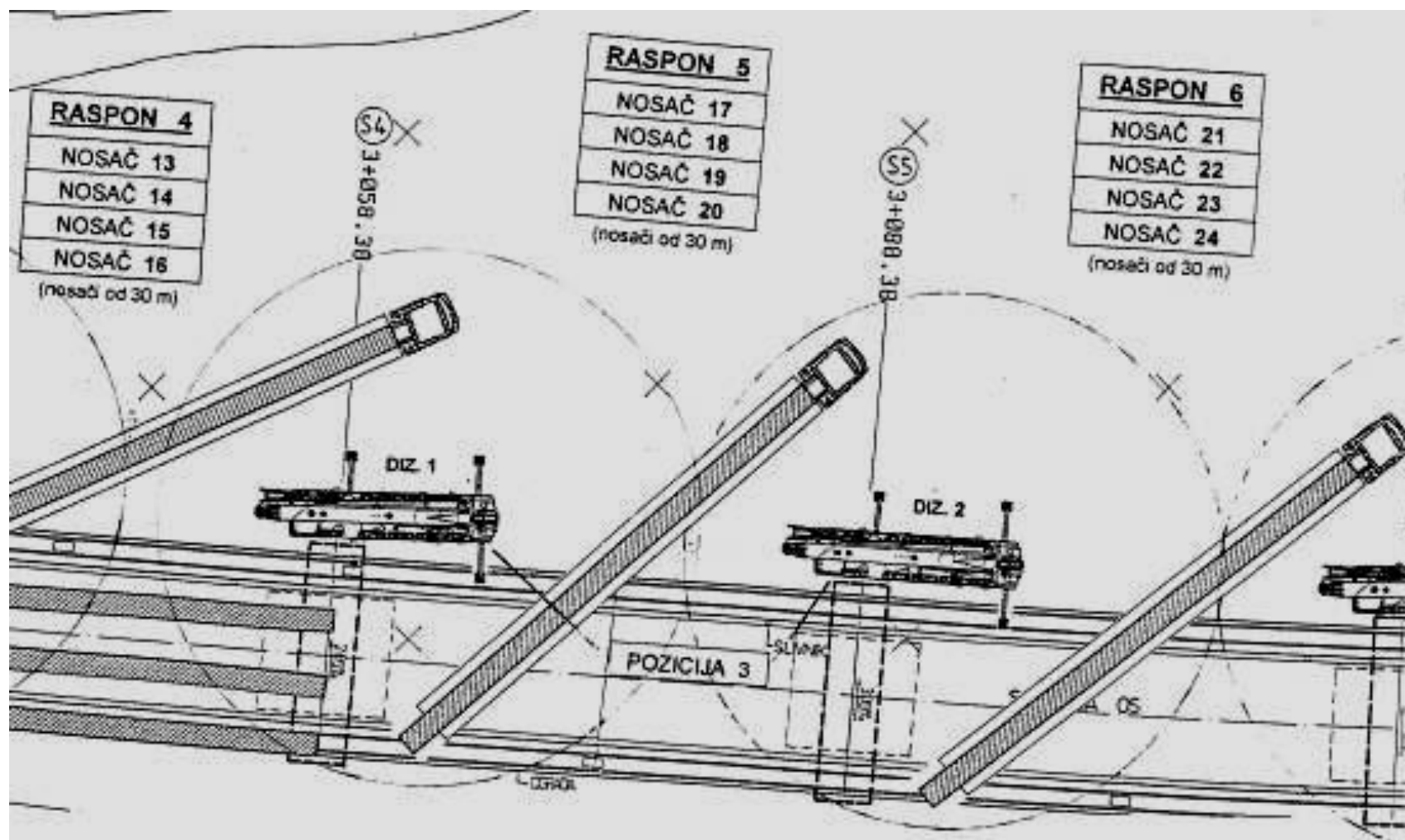
- isti poprečni presjek
 - duljina nosača 22 m (8 kom)
 - masa nosača 44 t
 - duljina nosača 30 m (20 kom)
 - masa nosača 57 t
 - primjer izračuna max. visine dizanja:
visina nosača 1,8 m
+ max. visina stupa 15,5 m
= dizanje ~18 m
- => max. dohvat (promjer) 15 m

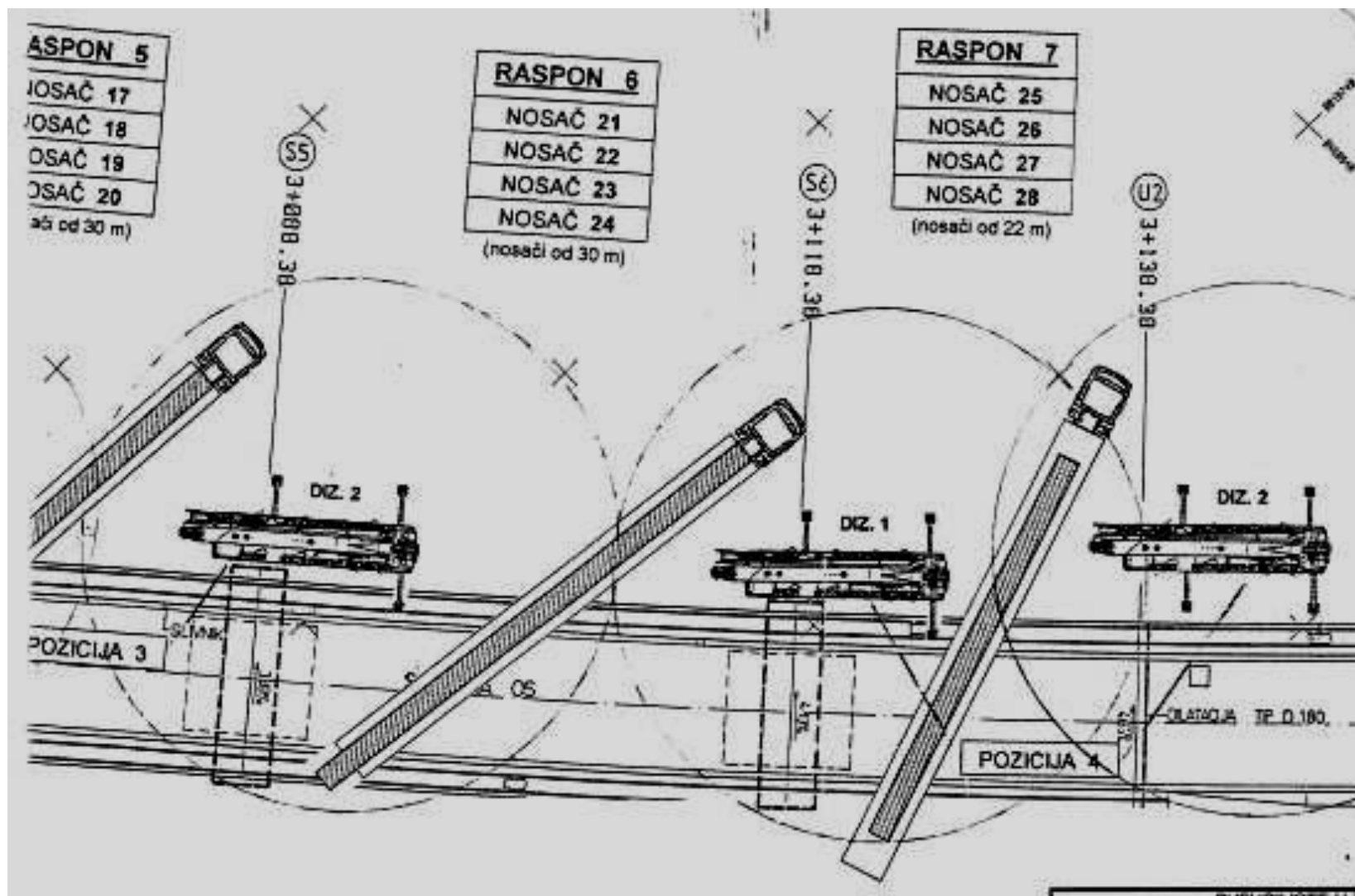
- Puno veća kontrola i sigurnost ako se koriste dvije autodizalice















**prijevoz AB nosača mosta
posebnim vozilom**





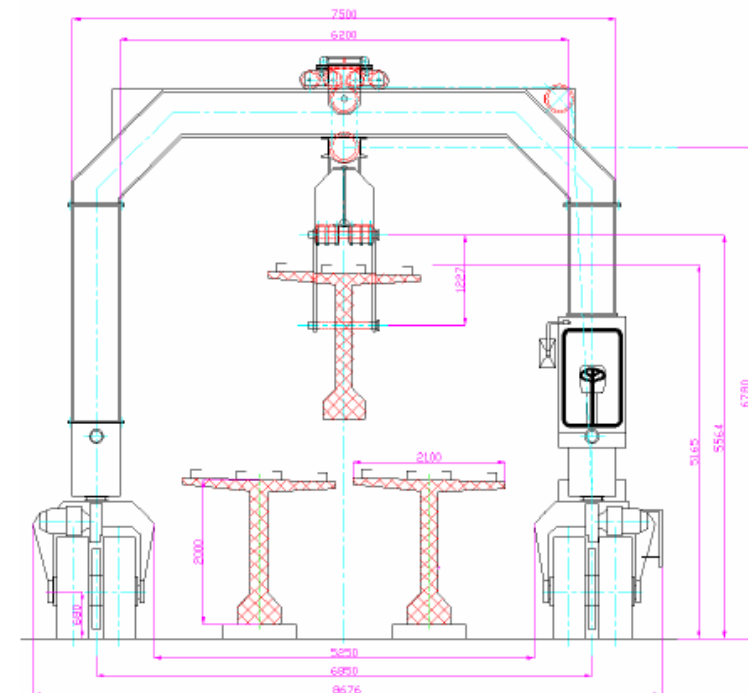
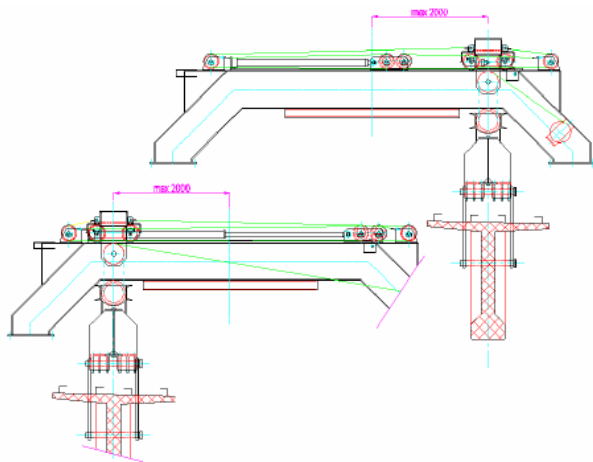
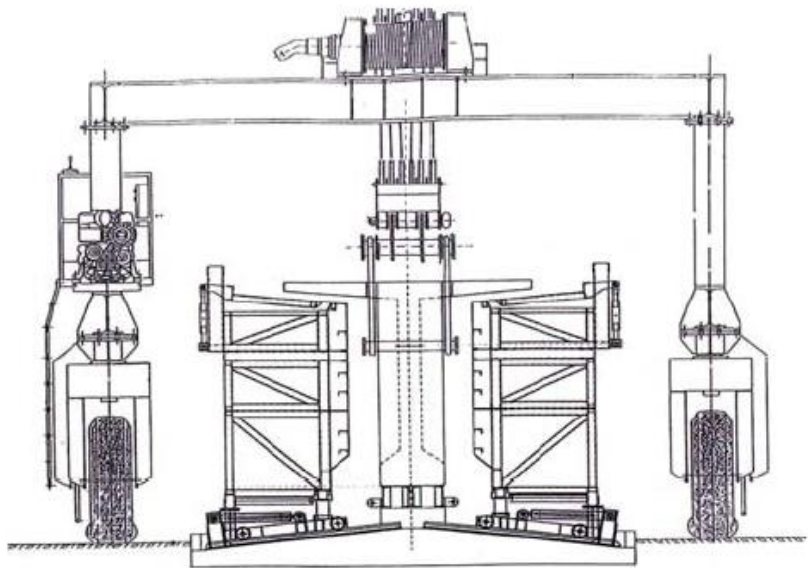




ležajevi



Montažna gradnja mostova - navlačenje nosača



Gradilišni transport AB nosača



Gradilišni transport AB nosača

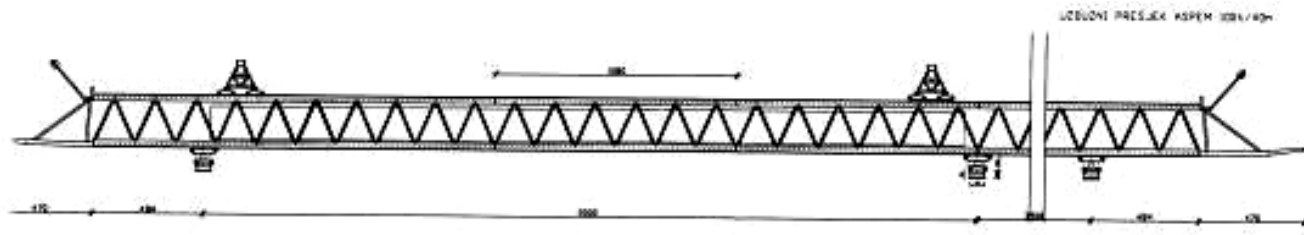


Gradilišni transport AB nosača





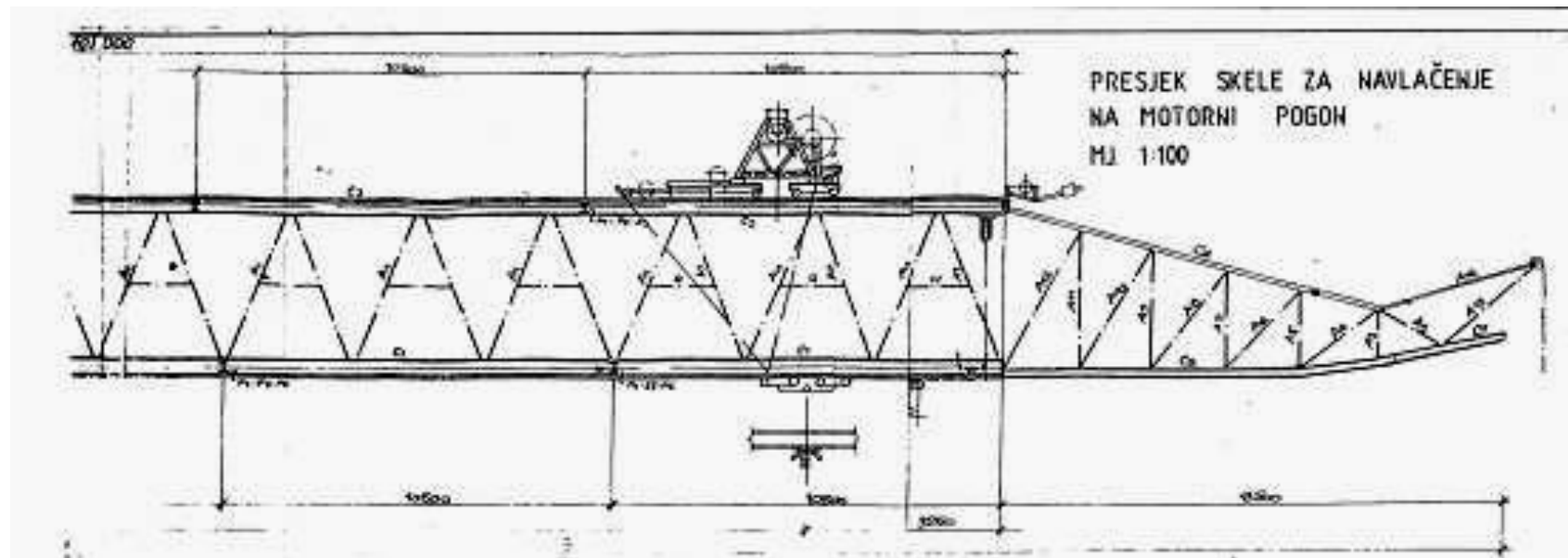
Gradilišni transport AB nosača



Montaža prefabriciranih AB greda navlačnim skelama



Montaža prefabriciranih AB greda navlačnim skelama





Unutrašnjost rešetke dizalica









**dio konstrukcije s postavljenom
gornjom zonom armature**





Pristupni putevi

Montažna gradnja mostova - sastavljanje nosača

