

Tehnologija proizvodnje brvnara i talpara



Konstruktivna razrada proizvoda

Šta radimo?

Konstruktivna razrada



Tehnološka šema formiranja proizvoda

Kako radimo?

FPD



Kako organizujemo?/ OP



Kada puštam nalog?/ UP



Koliko prostora mi treba da smestim sve OS/ PP

No.	Material	Material description	Type	Size	Weight	Volume	Density	Modulus	Poisson's ratio	Thermal expansion	Thermal conductivity	Electrical conductivity	Magnetic permeability	Tensile strength		Yield strength		Elongation		Impact strength		Fatigue strength		Creep strength		Corrosion resistance		Weldability		Machinability		Formability		Joinability		Recyclability		Environmental impact		Cost		Availability		Lead time		Supplier		Notes																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
														U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U	L	B	D	U

redni broj	oznaka detalja	naziv sastava, naziv detalja	vrsta materijala	br. komada		dimenzije detalja(mm)			skica elementa, sastava ili detalja	operacija obradni sistem	krojenje ploča				krojenje furnira												
				u sastavu	u proizvodni	L	B	D			krojenje horizontalni	kroj. ploče	egzimiranje širokoraćna brucelica	Kontrola R.R.M	sladištenje transport	obeležavanje R.R.M	poprečno poprečne pale	prerezavanje malaze	podložno podložne pale	rezaње malaze	spajanje spajalica sa furnira koncem	Kontrola R.R.M	sladištenje transport	namatanje dvostrana lepka namotavica	postavljanje R.R.M plaštova	presovanje jednodatna kratkotraj. presa	kondicioniranje R.R.M
1	D1	Osnova postolja	Iverica	1	1	1297	381	22			○ ○ □ ▽													○ ○ ○ ▽ ○			
2	D2	Furnir lica	Buk fur	1	1	1297	381	0.55																			
3	D3	Furnir maličija	Buk fur	1	1	1297	381	0.55																			
4	D4	Kant duži	Buk fur	1	1	1297	22	0.55																			
5	D5	Vertikalna leva	Iverica	1	2	769	381	19			○ ○ □ ▽													○ ○ ○ ▽ ○			
6	D6	Furnir lica	Buk fur	2	4	769	381	0.55																			
7	D7	Kant duži	Buk fur	1	2	769	19	0.55																			
8	D8	Polica	Iverica	1	2	416	378	19			○ ○ □ ▽													○ ○ ○ ▽ ○			
9	D9	Furnir lica	Buk fur	1	2	416	378	0.55																			
10	D10	Furnir maličija	Buk fur	1	2	416	378	0.55																			
11	D11	Kant duži	Buk fur	1	2	416	378	0.55																			
12	D12	Bočna leva	Iverica	1	2	791	381	19			○ ○ □ ▽													○ ○ ○ ▽ ○			
13	D13	Furnir lica	Buk fur	1	2	791	378	0.55																			
14	D14	Furnir maličija	Buk fur	1	2	791	378	0.55																			
15	D15	Kant duži	Buk fur	1	2	791	19	0.55																			
16	D16	Kant kraci	Buk fur	1	2	381	19	0.55																			
17	D17	Vertikalna desna	iverica	1	2	769	381	19			○ ○ □ ▽													○ ○ ○ ▽ ○			

[illegible]

Tehnologija proizvodnje brvnara i talpara



Tradicionalni
način izrade

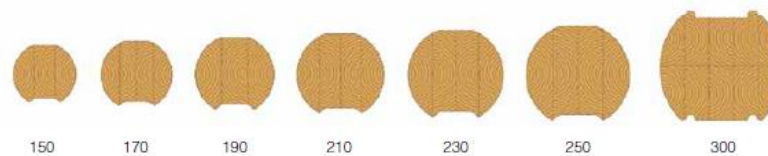
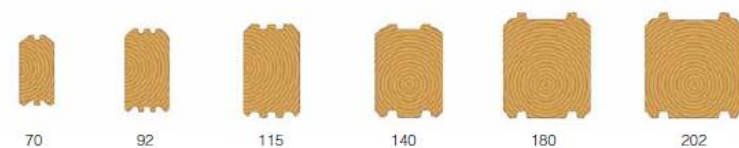
materijali



Oblo drvo



Masivno i KVH drvo



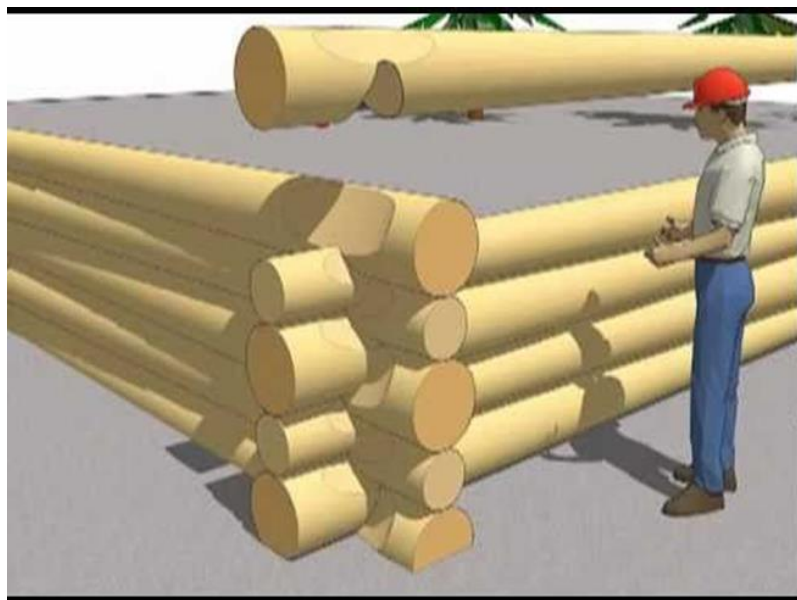
Duo i trio grede



Elementi veze

Kod brvnara

zasek



Kod talpara

Zasek

Lastin rep



Načini izrade

Tradicionalni način



Savremeni način



Tehnologija proizvodnje brvnara i talpara



**Savremeni
način izrade**

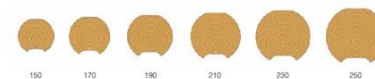
Redosled tehnoloških operacija

- Krojenja materijala (masiva)
- Dimenzionisanje poprečnog preseka
- Nastavljanje gredica po dužini
- Dimenzionisanje poprečnog preseka
- Nanošenje lepka
- Nastavljanje gredica po debljini
- Dimenzionisanje poprečnog preseka
- Izrada elemenata veze

materijali



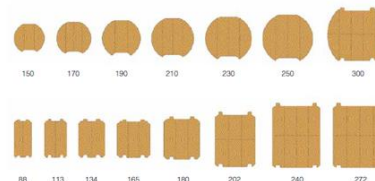
Oblo drvo



Masivno i KVH drvo



Duo i trio grede

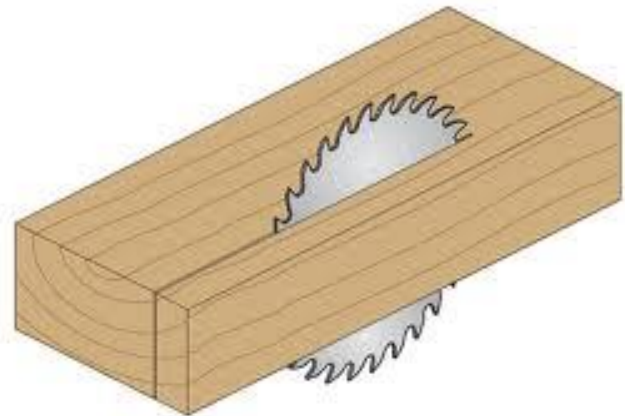


Krojenje materijala

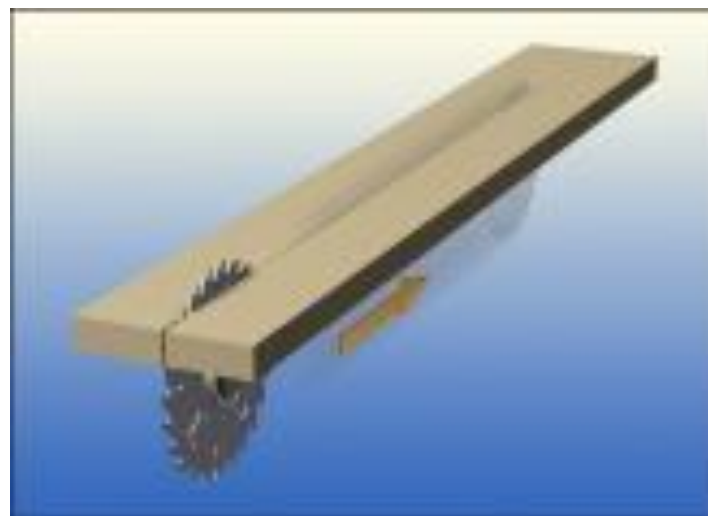
Krojenje rezane građe

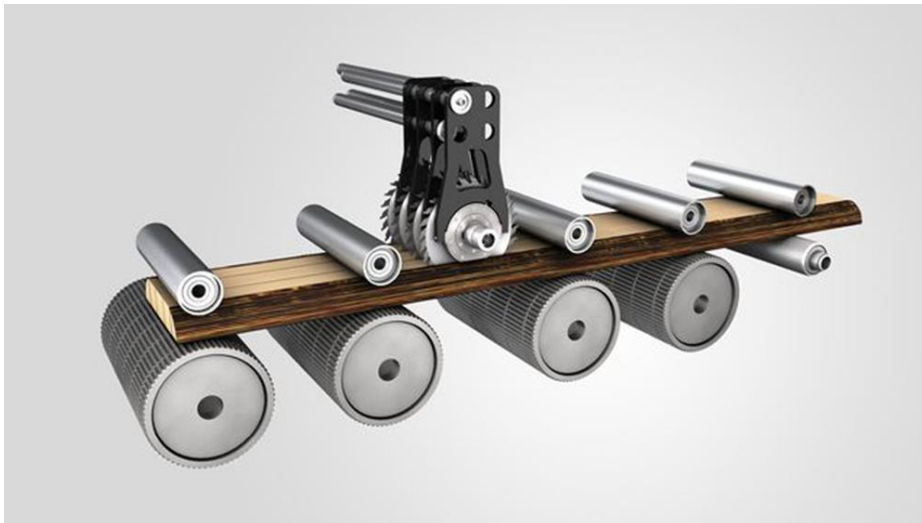
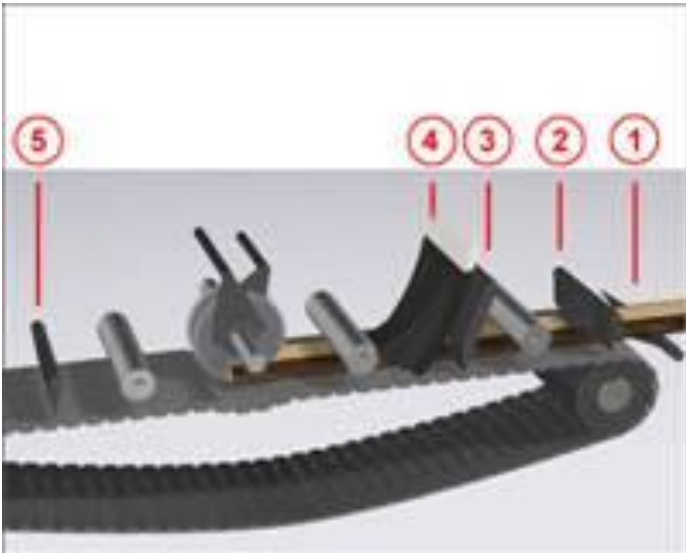
Obradni sistemi

- prerezivači
- parači

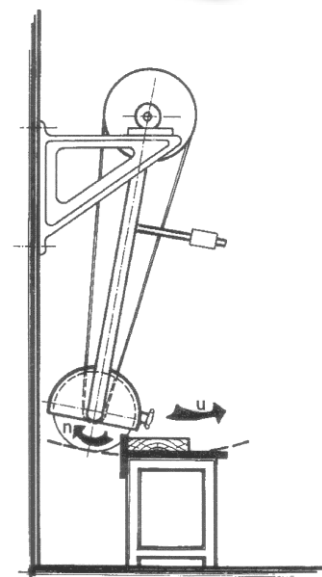
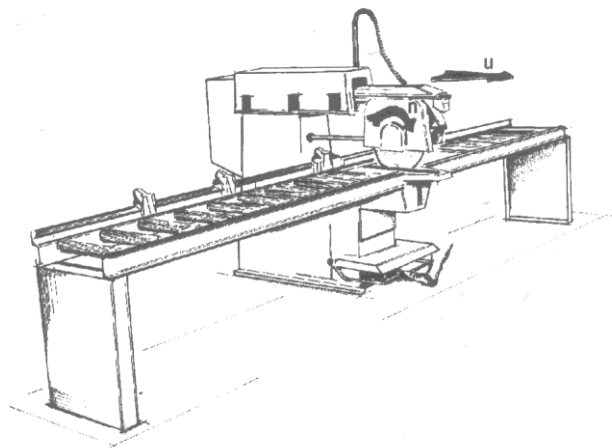
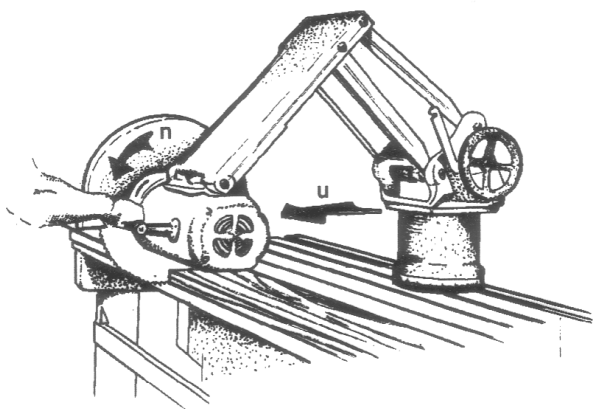


Parači





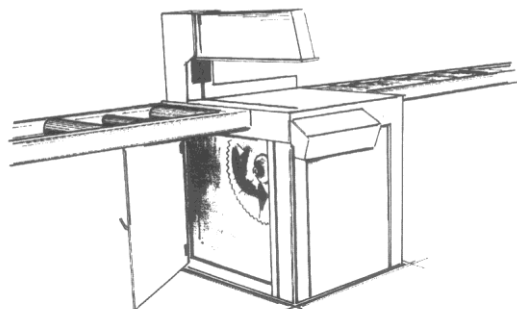
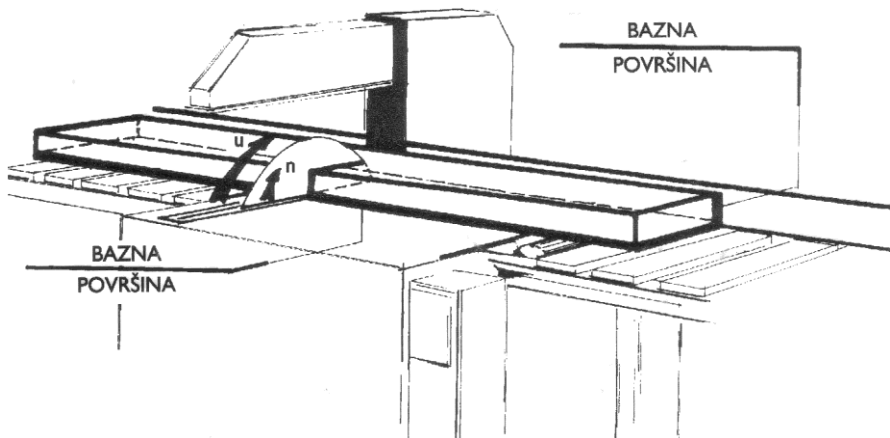
Prerezivači - nadstolni



Prerezivači - nadstolni



Prerezivači - podstolní



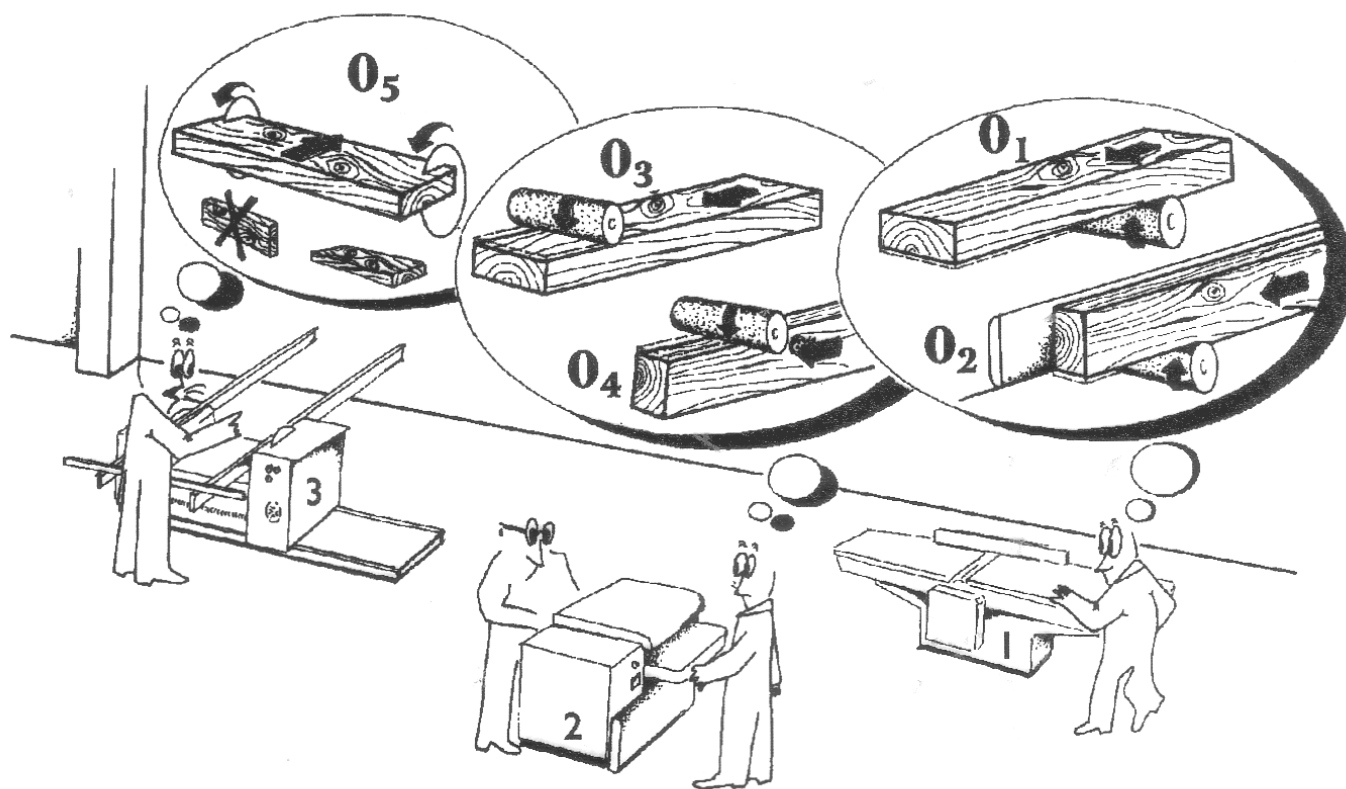
Prerezivači - podst





Dimenzionisanje i konačna obrada detalja

Dimenzionisanje detalja od masiva prizmatičnog oblika primenom 5 operacija

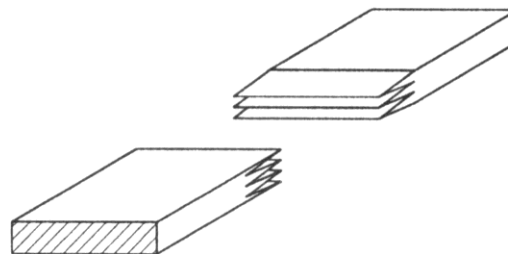
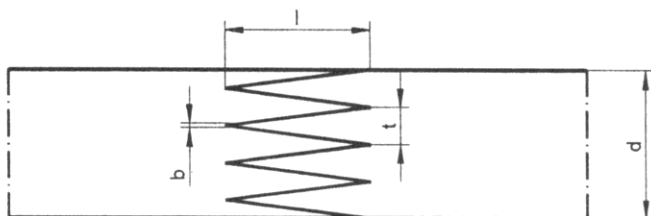


Dimenzionisanje detalja od masiva prizmatičnog oblika

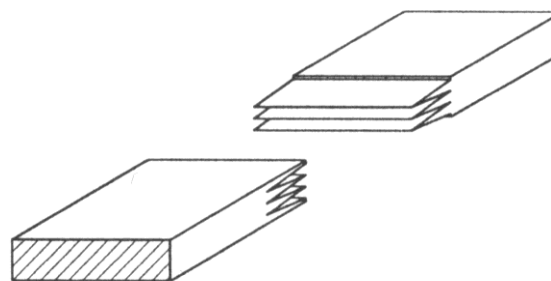
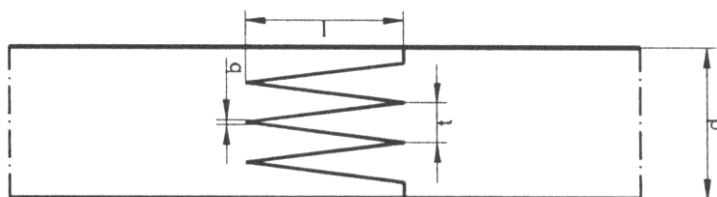




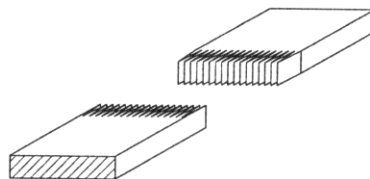
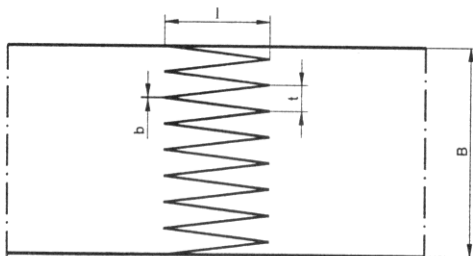
Nastavljanje gredica po dužini



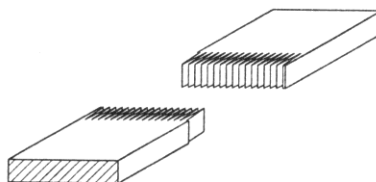
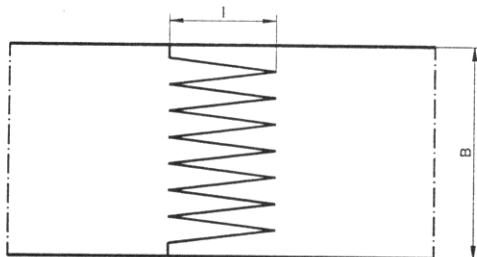
Bočni klinasto zupčasti spoj –tip A



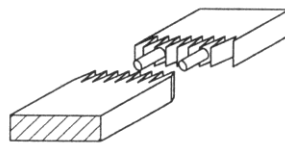
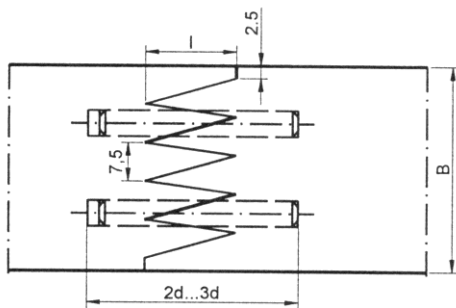
Bočni klinasto zupčasti spoj –tip B



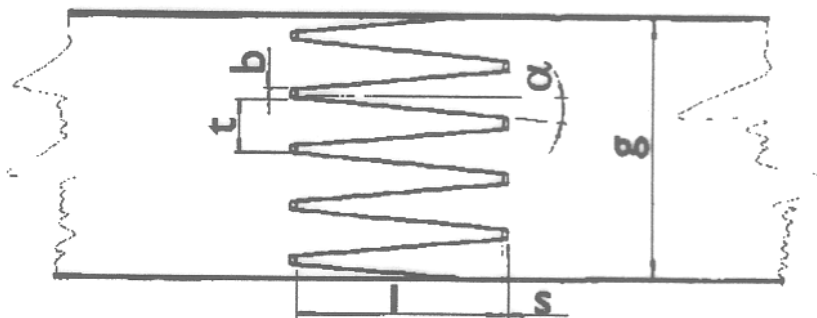
Stranični klinasto zupčasti spoj – tip A



Stranični klinasto zupčasti spoj – tip B



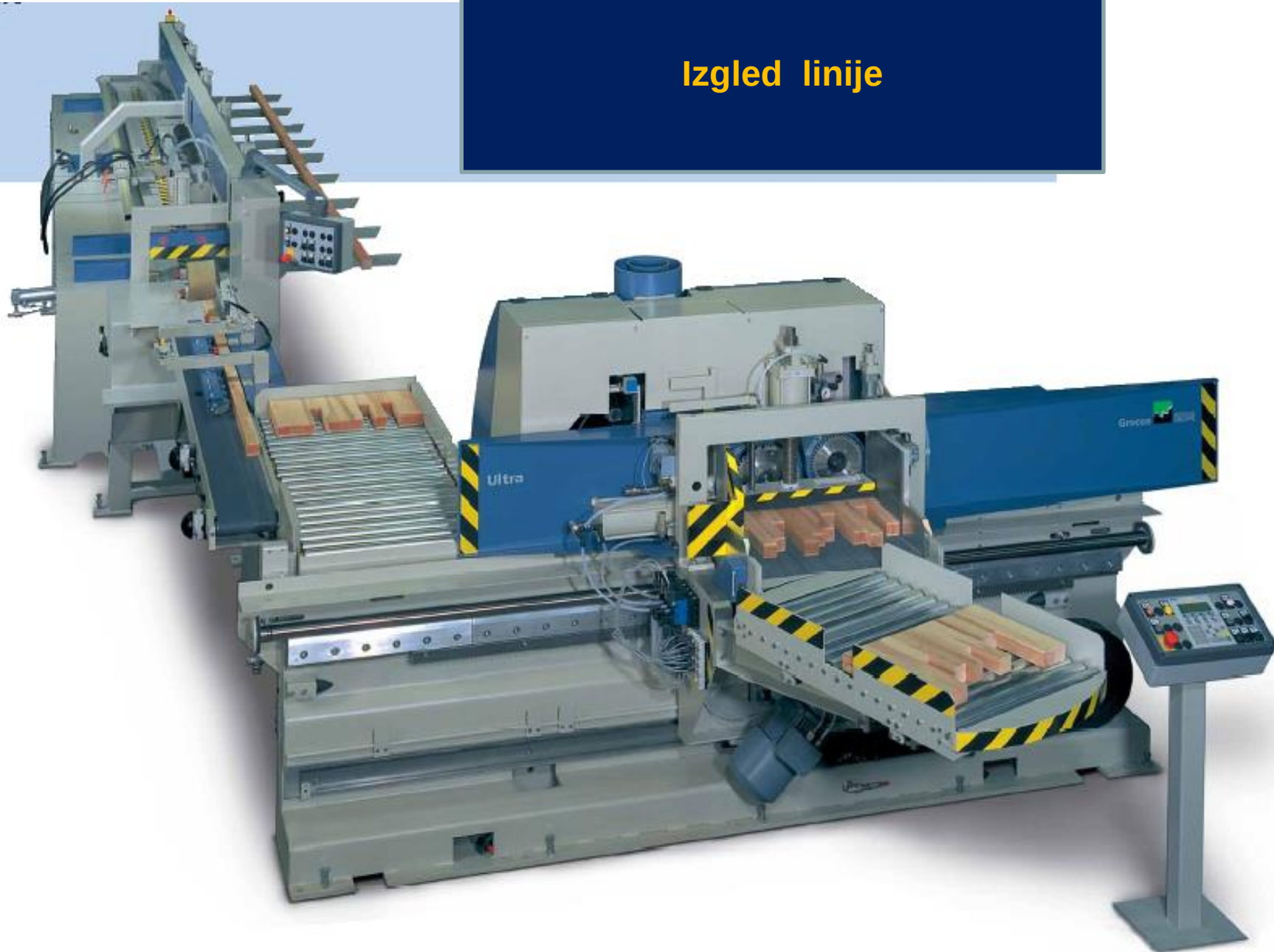
Stranični klinasto zupčasti spoj – tip B, ojačan tiplovima



Veličine geometrijskih karakteristika kod spojeva
izloženih visokom i srednjem naprezanju

Grupna naprezanja	l	t	b	v
	mm			
Visoko i srednje mehaničko naprezanje	7,5	2,5	0,2	0,08
	10	3,7	0,6	0,16
	20	6,2	1	0,16
	50	12	2	0,17
	60	15	2,7	0,18
Srednje mehaničko naprezanje	4	1,6	0,4	0,25
	15	7	1,7	0,24
	30	10	2	0,2

Izgled linije



3 tehnološke celine

- 1. T.C. – deo za izradu el.veze



- 2.T.C. – prebacivač



- 3.T.C. - presa





Dimenzionisanje detalja od masiva prizmatičnog oblika



Nastavljanje gredica po
debljini

Lepkovi

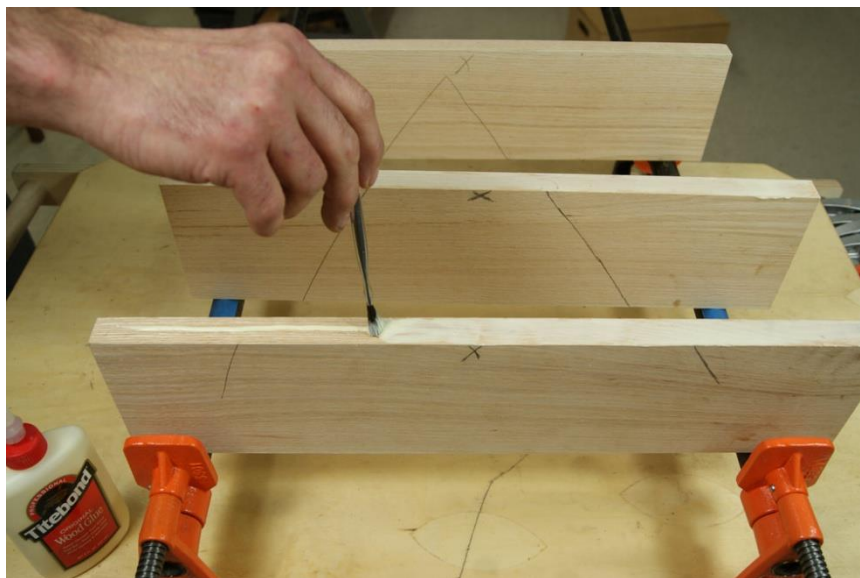
- FF / RF
- $T = 18 \div 22^{\circ}\text{C}$
- $P = 1,5 \text{ N/mm}^2$
- $q = 250 \text{ g/m}^2$

Nanošenje lepka

- Četka
- Valjak – ručni
- **Nanosačica lepka**

Nanošenje lepka

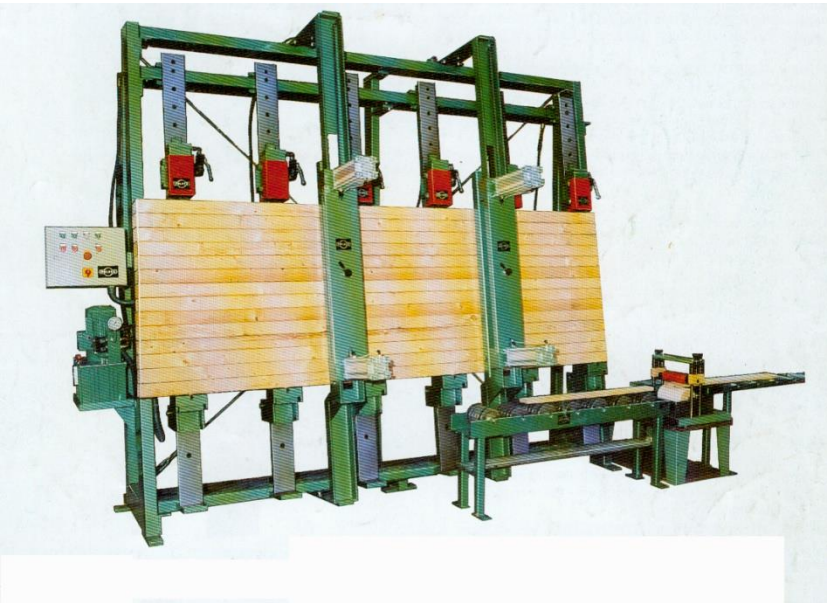
- Četkom
- Valjkom – ručnim





Ramovske prese

- jednostrane



- dvostrane







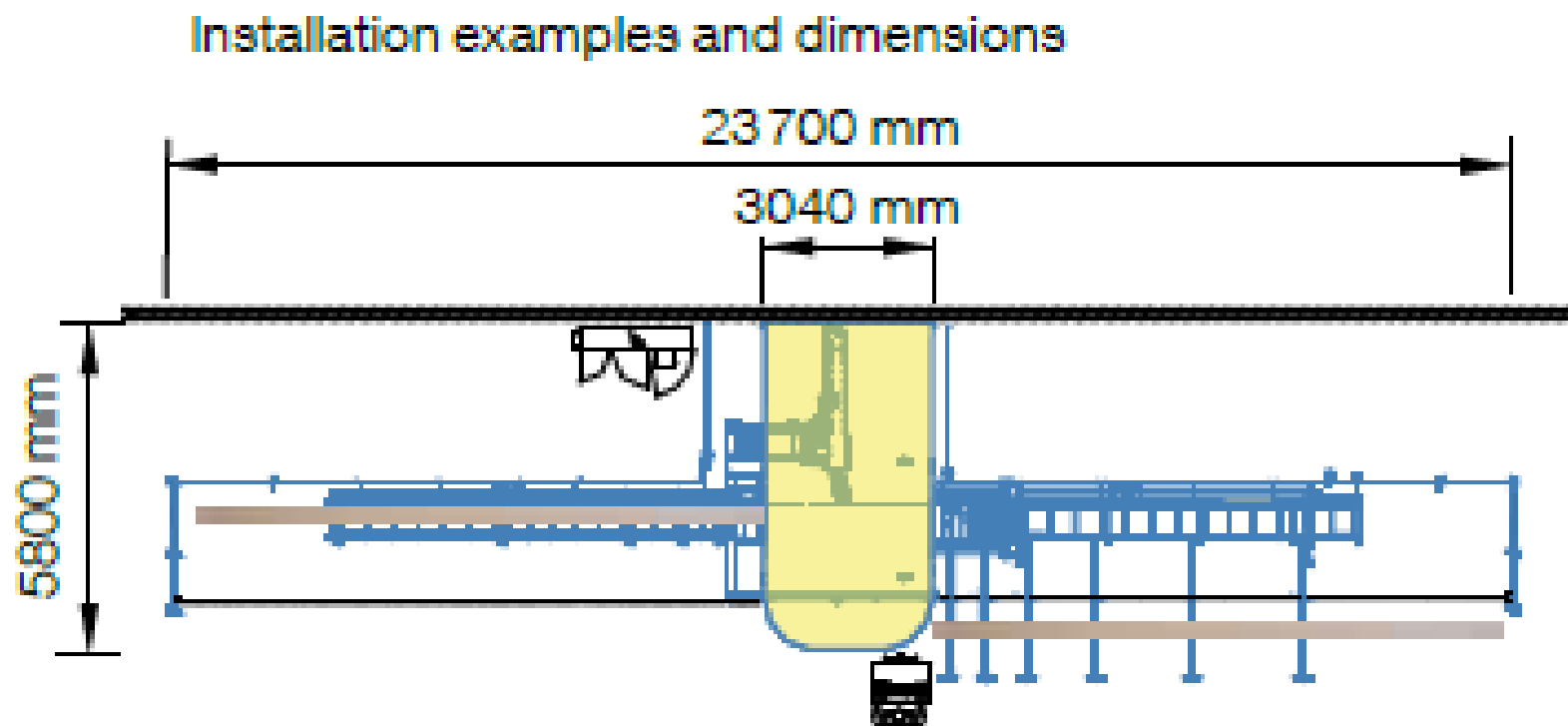
Hundegger cnc
Obradni sistem

Opšti podaci o mašini

- Naziv mašine:
- CNC centar za izradu elemenata za objekte od drveta
- Proizvođač:
- Hundegger
- Tip:
- K2i
- Br.radnih glava
- 3 (1+2)

Geometrijski sistem

- Radni prostor mašine



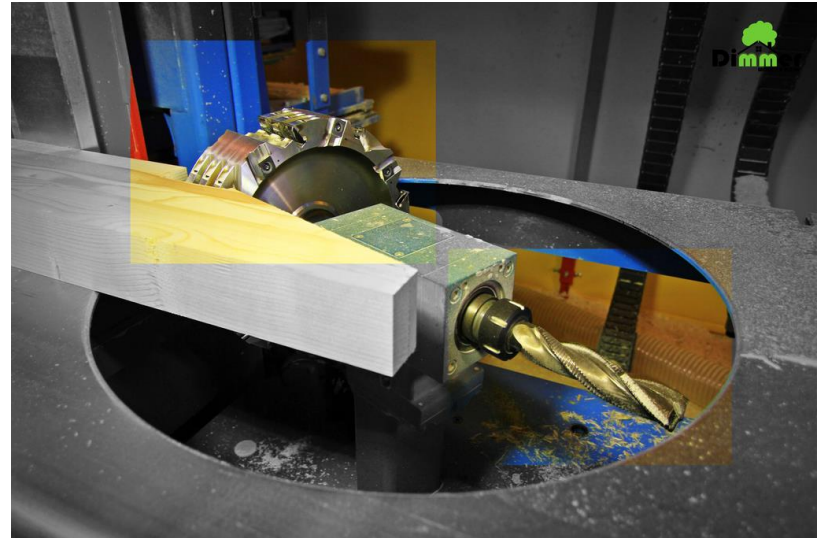
Geometrijski sistem

- Geometrijske karakteristike mašine
- $B_{min} = 60\text{mm}$
- $B_{max} = 450\text{mm}$
- $D_{min} = 20\text{mm}$
- $D_{max} = 300\text{mm}$
- $L_{min} = 600\text{mm}$
- $L_{max} = -$

Kinematski sistem

- Glavno kretanje









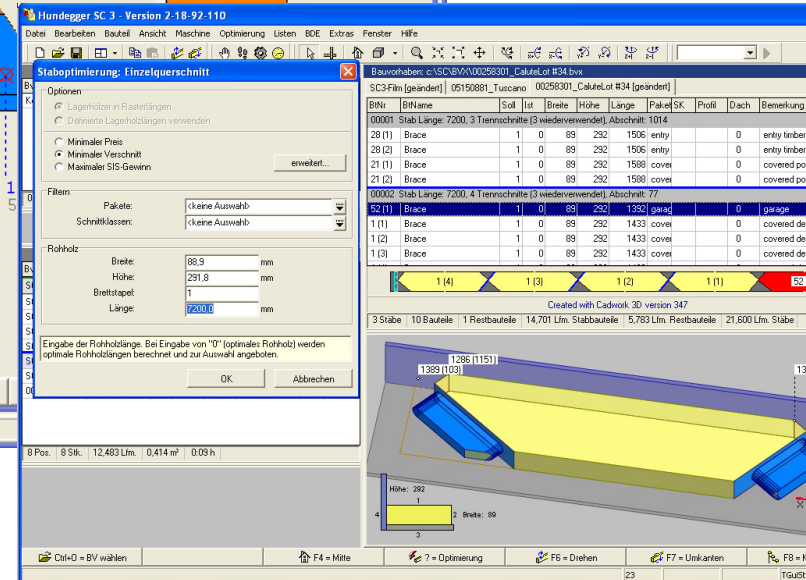
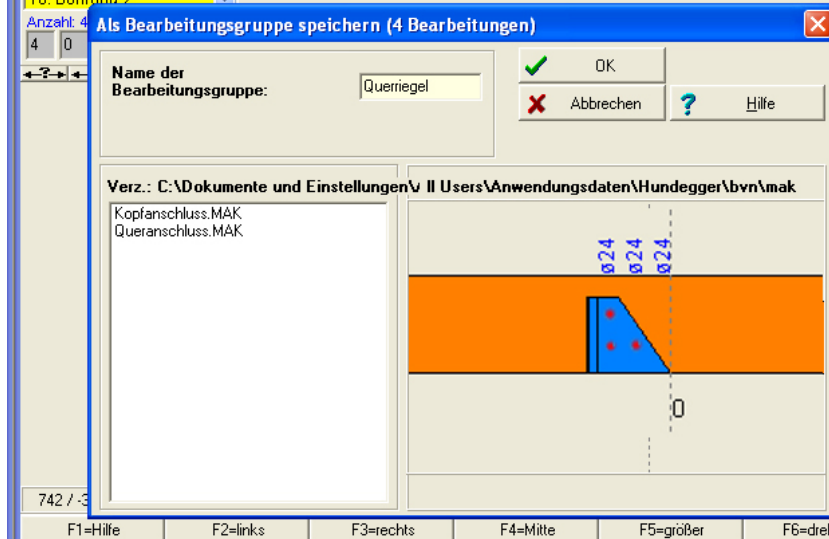
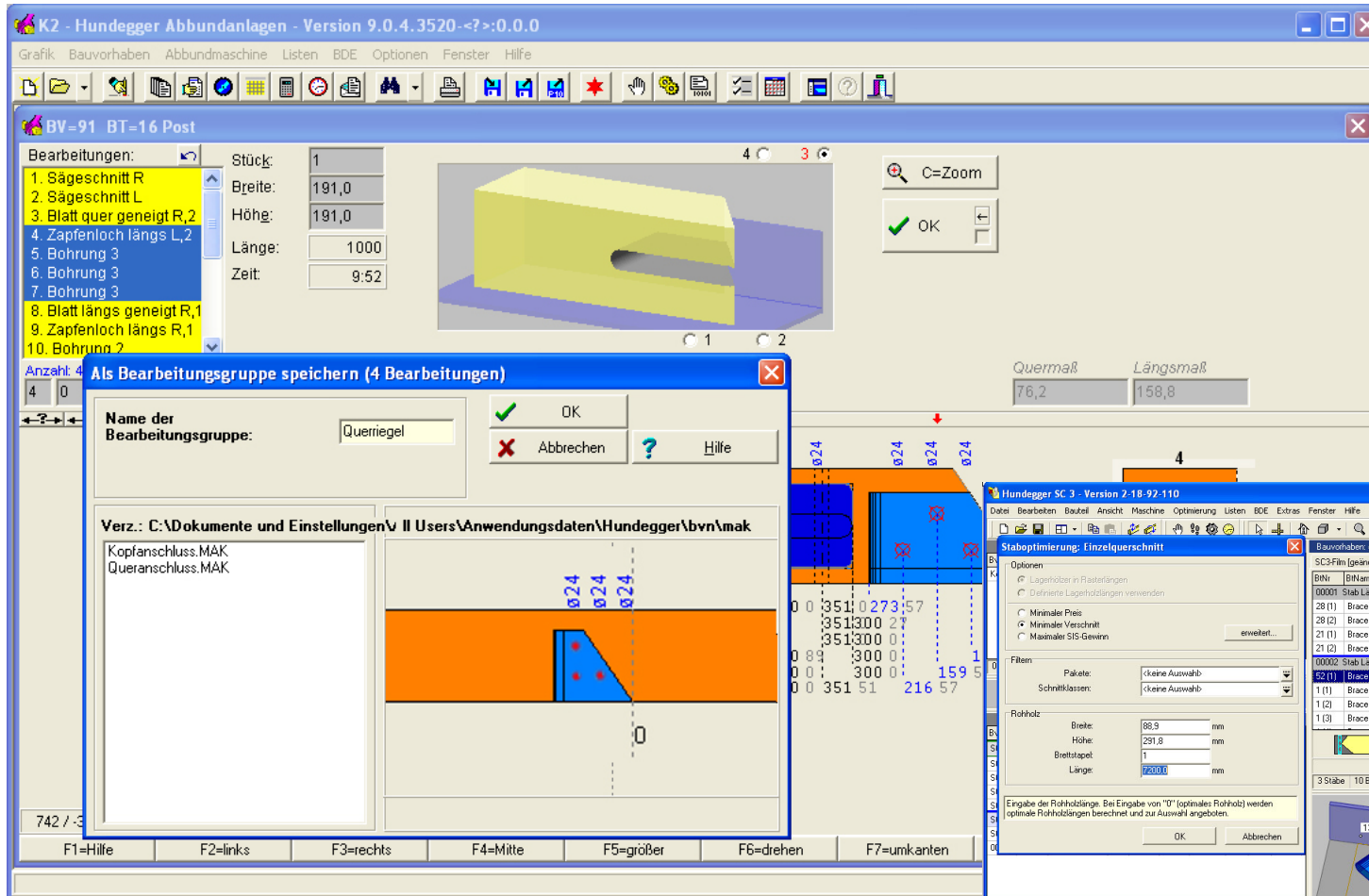


Kinematski sistem

- Pomočno kretanje

Energetski sistem

Upravjanje sistemom



Baziranje i pozicioniranje

