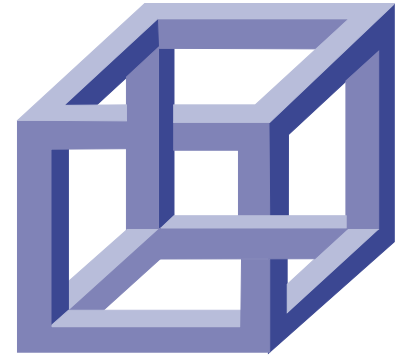


The Precast-Beton-ERP-System



Estimation
Production-Planning
Project Management
Follow-up Analysis
Invoicing

Introduction

Betsy is Europe's industry leading Enterprise Resource Planning System for precast manufacturers who produce structural and architectural elements.

It is used for estimation (pricing), production planning, control of hours and materials spent, transport planning, erection planning, productivity overviews, quantity proofs, invoicing, and analytical bookkeeping, and manages/monitors drawing and element delivery dates and production and erection dates.

Developed in cooperation with the precast industry in the eighties, Betsy was specifically designed for precast manufacturers who produce beams, columns, TT and hollow core slabs, walls, stairs, façade panels, long span prestressed beams, etc.

Use of the software in 70% of all German precast companies for nearly 20 years ensures practicability, robustness and quality. Betsy is used daily by more than 500 users in more than 140 factories in Austria, England, Germany, Hungary, Switzerland and the United Arab Emirates. Based on the knowledge of its users, the software keeps growing with their requirements.

Betsy is a state-of-the-art MS-Windows based Client Server application. It is a modular software that allows its user to use only the parts he or she needs. It provides interfacing options with CAD, production machines, bookkeeping and salary programs and comes with a complete set of data for element geometry and time ratios for a quick use of the software.

Betsy delivers information on a key click about

- projects which earn/lose money
- products which earn/cost money
- failures in estimation
- failures in production/erection
- sales value of parts in stock
- productivity
- project status (% produced, erected, invoiced)
- monthly company results (turnover, profit, etc.)

Using Betsy leads to

- savings in time
- improved organisation
- greater transparency
- fewer failures
- easy supervision of dates
- increased productivity
- decreased costs
- more profits!

Estimation

Betsy enables speedy price estimation (A-estimation) by using a minimum of input menus but also provides the option to customise the degree of detail the estimations are to have.

To help users who want to start from scratch, the software comes with predefined data (geometry and time curves) for the most common elements like beams and TT-slabs with or without prestressing, columns, columns, single layer façade elements, sandwich panels, etc.. It is easy to modify these data to the individual needs of your plant.

After cost estimation, a surcharge calculation can be made to spread overheads and profit. Additional costs, such as external consulting

costs, can also be spread throughout the estimation. All of these costs are included in a detailed estimate that can be broken up (e.g. ex works, transport, erection, etc.).

If a project becomes a contract, a final A-estimation must be performed, introducing the negotiation results and fixing all sales prices for invoicing.

The labor estimation (B-estimation) is made on the basis of the shop drawings of the precast elements. For invoicing purposes, each element must be assigned to an A-estimation item to assure a unique link between costs and sales prices.

BETSY 3.0 - Structure.mpl

Tender No.: 45950 Edinburgh MSEP All

Project header Items Estimation Basic Costs Fittings

Item	Basic	Text short	Item kind	No.	Length	Width	Depth	Vol	Conf.A	Weight	Price	Extension
C_Des	-	Design & Detailing Costs	N	1						0.00	29,112.00	29,112.00
C_Mid A	-	Mould group A	U	1						0.00	12,372.00	
C_Mid M	-	Mould Maintenance	U	1						0.00	7,223.00	
C_Mid Su	-	Mould setup	U	1						0.00	1,764.00	
C_Trans	-	Transport cost total	U	1						0.00	48,360.00	
Col 01	cov	Col 01	N	3	4,090			1.13 c50/0.28	2.73	1,145.00	3,435.00	
Col 02	cov	Col 01	N	37	3,900			1.08 c50/0.28	2.61	1,106.00	40,922.00	
Col 03	cov	Col 01	N	24	3,900			1.08 c50/0.28	2.61	832.00	22,368.00	
Col 04	cov	Col 01	N	4	3,500			0.97 c50/0.28	2.35	874.00	3,496.00	
Col 05	cov	Col 01	N	15	3,400			0.94 c50/0.28	2.27	1,005.00	15,075.00	
Col 06	cov	Col 01	N	6	3,400			0.94 c50/0.28	2.27	858.00	5,148.00	
Col 07	cov	Col 01	N	7	2,900			0.80 c50/0.28	1.94	903.00	6,321.00	
Col 08	cov	Col 01	N	2	2,900			0.80 c50/0.28	1.94	782.00	1,564.00	
Col 09	cov	Col 01	N	248	2,400			0.66 c50/0.28	1.60	769.00	190,712.00	
Col 10	cov	Col 01	N	144	2,400			0.66 c50/0.28	1.60	675.00	97,200.00	
E_Des	-	Design & Detailing Costs	N	1						0.00	29,112.00	29,112.00
E_Mid A	-	Mould group A	U	1						0.00	33,795.00	
E_Mid B	-	Mould group B	U	1						0.00	1,500.00	
E_Mid M	-	Mould Maintenance	U	1						0.00	5,652.00	
E_Mid Su	-	Mould setup	U	1						0.00	1,989.00	
E_Trans	-	Transport cost total	U	1						0.00	45,240.00	
Ebm 01	els	Edge beam (Special)	N	145	7,490	0,400	1,130	2,07 c50/1.50	5,01	1,584.00	229,680.00	
Ebm 02	els	Edge beam (Special)	N	57	7,790	0,400	1,130	2,15 c50/1.56	5,20	1,626.00	92,682.00	
Ebm 03	els	Edge beam (Special)	N	25	7,490	0,400	1,130	2,07 c50/1.50	5,01	1,584.00	39,600.00	
Ebm 04	els	Edge beam (Special)	N	5	7,790	0,400	1,130	2,15 c50/1.56	5,20	1,626.00	8,130.00	
Ebm Cor	els	Edge beam (Special)	N	20	1,125	0,400	1,130	0,31 c50/0.22	0,75	583.00	11,660.00	
P_Des	-	Design & Detailing Costs	N	1						0.00	5,931.00	5,931.00
P_Mid A	-	Mould group A	U	1						0.00	7,836.00	
P_Mid M	-	Mould Maintenance	U	1						0.00	4,704.00	
P_Mid Su	-	Mould setup	U	1						0.00	767.00	
P_Trans	-	Transport cost total	U	1						0.00	3,120.00	
Pan A	els	Edge beam (Special)	N	26	0,500	0,200	1,130	0,11 c50/0.10	0,27	290.00	7,540.00	

Prefab Calculator

Input	Description	Amount
SURF	Finish (As-shuck=0, Dressed=	1,000
DTYP	De-moulders (Long Ways=1,	3,000
LTYP	Lifters (BS loops=0, Long W/a	3,000
LEND	If beam fitted with five ends = C	
TFACT1	If rebar bought cut & bent = 0,	
Uw	Upstand width	0,200
BD	beam depth	0,150
CD	Chamber depth	0,200
DS	Downstand depth	0,175
Pw	Projection width	0,3

2/Variables

Variable	Remark	Formula to calculate value	Amount	Unit
AEENDS	Area of ends	$(BLUW \cdot HD + BPW \cdot BD + HCD \cdot BPW) / 2$	0,552	
AMS	Area of sides	$(BPW + BLUW + SQRT(HCD^2 + BPW^2)) \cdot HD$	20,544	
FINA	Finished Area	$(BD + BLUW + 2 \cdot HD + HCD + HCD + BD + DS) \cdot HL$	15,931	
ARET	Retarded / Etched area	$(BD + HCD + SQRT(HCD^2 + BPW^2)) \cdot HL$	4,553	
Rebar Area	HL * BLUW		1,498	
Mould A	AEENDS + BAMS		21,096	
Rebar	Rebar		465,750	465,75 kg
Sp.mesh	Sp.mesh			0,00 kg
Vol	AEENDS * HL / 2		2,067	
Weight	Rebar * #CONCRETE		5,009	5,01 to
Qual.qty				0,00

Fittings and other works

Fit.#	Description	Formula	quantity	Unit	Price	pS	fixed time	timeUnit	pS2	2nd timeUnit	mat.totcl	recurr
TFA03	TPA-FA 4.0T*270 MS Erection Anchor	getel(40TYP+2; #MEIGHT*1.15/2)+2	2,000	No	1,95	3		0,15	0			3,90
FS06	Pfeiler Flat Steel Anchor R300 (BZF)	getel(1; #MEIGHT*1.15/2)+2	2,000	No	1,95	3		0,15	0			3,90
S_SH	Strongforce Live Stressing Head	CEL(4L1)	8,000	No	0,50	3		0,10	0			4,00

Estimation menu

Rough and fine planning

Both rough and fine planning use a common planning board where individual elements are assigned to a date and a mould.

SP/PC - Standard - Plan day: 20.05.2007 - Week: 21

Mould	20.05	21.05	22.05	23.05	24.05	25.05	27.05	28.05	29.05	30.05	31.05	01.06	03.06	04.06	05.06	06.06	07.06
1.B1	B1 (6)	B1 (6)	B1 (7)	B1 (6)			B1 (9)	B1 (10)	B1 (11)		B1 (12)	B2 (9)					
1.B2	L1 (9)	L1 (9)	L1 (9)	L1 (9)			L1 (9)	L1 (9)	L1 (9)		L1 (9)	L1 (9)					
1.FB1	F1 (9)	F1 (9)	F1 (9)	F1 (9)			F1 (9)										
1.FB2	W26 (9)	W29 (1)	W29 (2)	W26 (2)			W26 (3)	W22 (2)									
1.KT1	W1 (1)	W7 (5)	W7 (6)	W7 (7)			W8 (3)	W8 (4)	W7 (9)	W7 (6)	W7 (6)	W4 (1)	W4 (2)				
1.KT2	W12 (1)	W2 (2)	W2 (3)	W2 (4)			W3 (1)	W3 (2)	W1 (9)	W1 (6)							
2.S1	C1 (9)	C5 (7)	C5 (2)	C5 (3)			C5 (4)	C2 (9)	C2 (9)								
2.S2	S1 (4)	S1 (4)	S1 (4)	S1 (4)			S1 (4)	S1 (4)	S1 (4)								
2.S3	C1 (9)	C1 (2)	C1 (9)	C1 (4)			S1 (4)	C3 (7)	C3 (2)								
2.HL							S1 (4)	S1 (4)									
2.TS																	
2.IT	PF2 (0)	PF2 (0)	PF2 (0)	PF2 (0)			PF2 (0)	PF2 (0)									
inmold.constr.h	31,8	2,1	1,3	1,8			1,8	1,									
inmold.h	216,5	213,8	221,1	229,2			223,3	204,									
production.h	70,9	65,8	72,2	75,2			75,3	69,									
Concrete.gp.3	43,3	45,1	42,9	44,3			45,0	38,6	28,7		26,7	24,5	4,0	4,0	4,0	4,0	3,0
Weight (t)	108,2	102,6	107,2	110,8			112,6	96,6	71,9		71,9	61,4	11,9	11,9	11,9	11,9	7,1
No.	13	12	13	13			15	13	10		9	6	1	1	1	1	2

Planning board and integrated viewer

For rough planning, items from the A-estimation can be used. Fine planning is developed from the results of the labor estimation and based on final element drawings. Assignment of elements to moulds is done via drag and drop. Daily hours required for different production steps and materials used are automatically updated after a drop has been completed.

The software comes with an integrated drawing viewer that helps select the best-fitting mould by showing the drawing of the previous part details in a separate window.

Different tasks require different layouts of the planning board. For a long term overview, the space provided for a date should be limited to a minimum and element labels should have project colours to enable quick overviews about the duration of the project. The production manager usually prefers to have element labels highlighted in traffic-light colours for ease of status identification. The colours indicate whether a given element has been produced (green) or can be produced (yellow), whether the time between the production and delivery dates of an element is insufficient (orange), or whether the element cannot be produced (red).

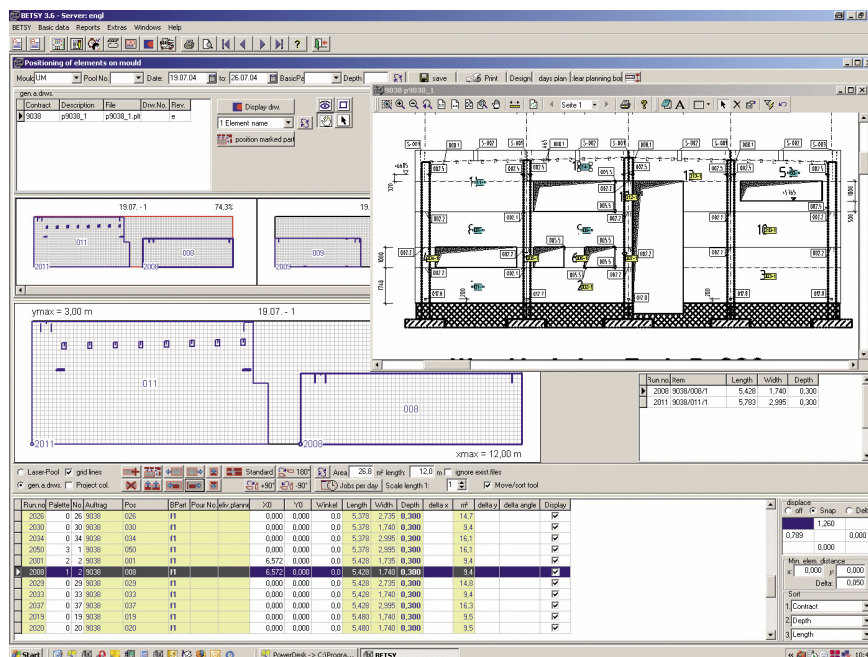
Distinctions planning preslabs, hollow walls and hollow core slabs

Preslabs, hollow walls and hollow core slabs are usually produced with special equipment on dedicated production units like carousel moulds and long flat beds with abutments for the strands.

The detailed assignment of an individual pre slab element is normally done by the master pro-

duction computer. To ensure a proper planning that takes into account the work load and free capacities, the Betsy user just plans a complete floor or a stack of pre slabs into the carousel system. Betsy provides the master computer with all necessary data and automatically receives a production ready signal for each element.

Hollow core slabs are special because they are grouped into different depths and types of strands before they are assigned to a casting bed. Allocation of HC slabs to delivery units can be done before or after the planning process.



If done before planning, complete delivery units can be planned as a single unit. To produce elements that need longitudinal or inclined end cuttings with a minimum of wastage, planning of these elements can be done with help of a graphical tool.

Graphical mould planning

Prefab element list, transport and erection planning

For each element, the prefab element list contains element dimensions, weight, mould to be used, production date, dates for drawing and element delivery, place of element in building and in yard, erection sequence number, delivery note and invoice number and the element production and delivery status.

Based on these data, e.g. transport and erection planning is performed and delivery notes written.

A first prefab element list of a project can be derived from a copy of the items of the A-estimation or from a spread sheet import from the design department. The joint use of a single database system ensures that all changes made to the prefab element list are automatically also made in all other parts of the software. All changes made in the planning board (production date or mould) or in the elements geometry (B-estimation), in turn, are shown in the element list.

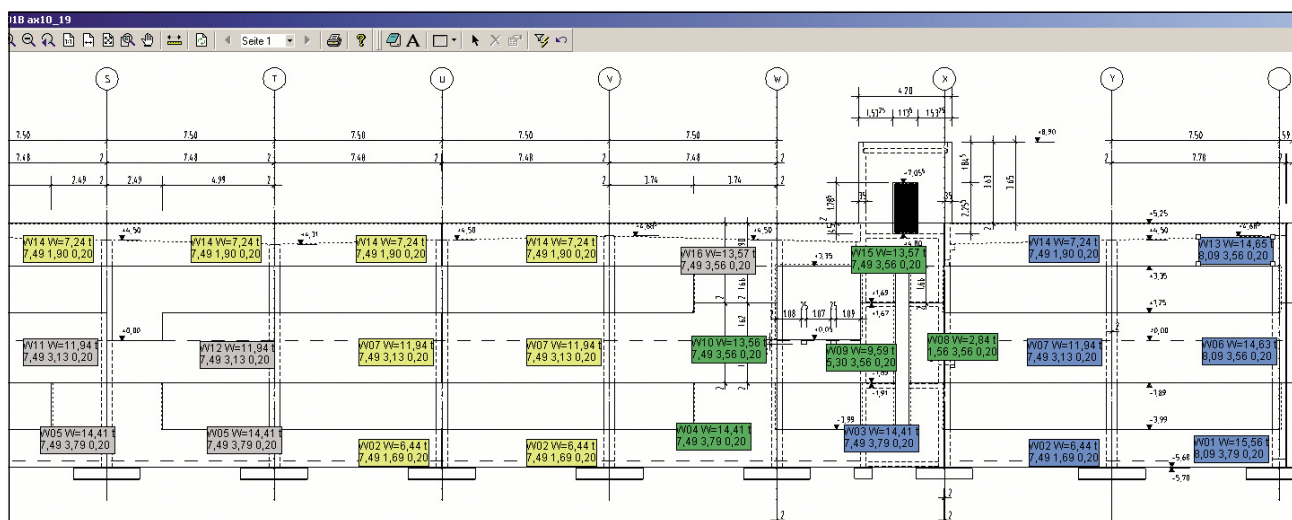
Graphically supported erection and delivery planning

Information from marked elements in general arrangement drawings according to production progress (e.g. yellow: drawing available, green: element cast, blue: element delivered) is very useful, but only available to those who have access to these drawings. Betsy offers this information in a digital form, allowing for entirely new working methods for erection and delivery planning.

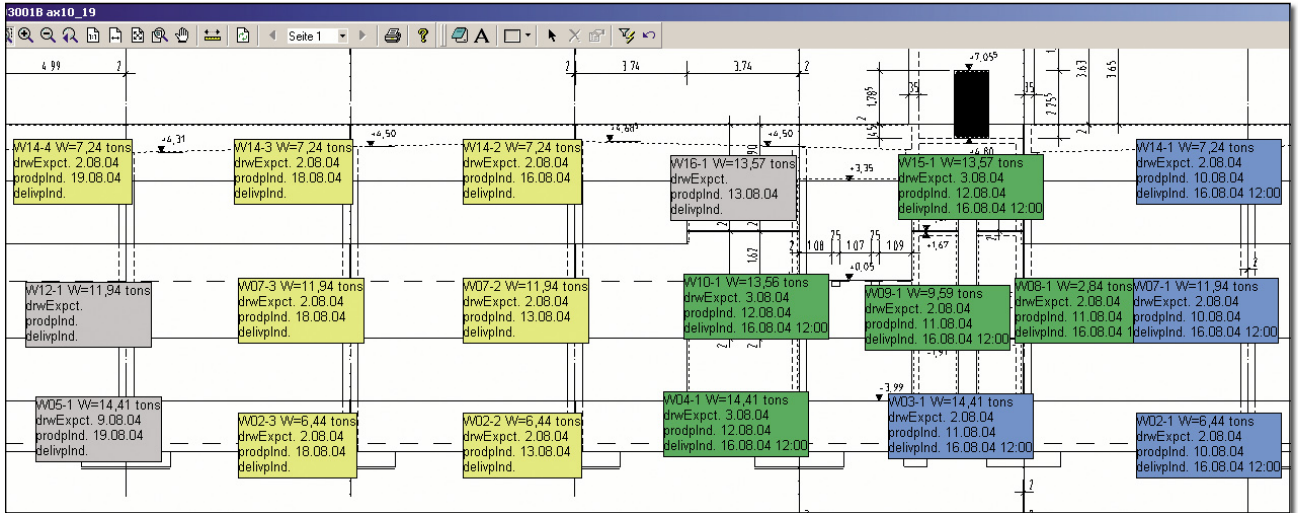
Based upon plot output files, element labels from data base are visualised in a separate layer but displayed as a single drawing on screen. In addition to the production progress which is shown as different label background colours, all other element data can be shown as part of the label (e.g. planned production date, planned delivery date, etc.).

Successive clicks on selected labels can be used to determine the erection sequence. In the same way, several elements can be marked for assignment to a common delivery date.

Used in a computer network, this tool is available to all network users at any time.



General arrangement drawing including element labels layer



General arrangement drawing with detailed element label information

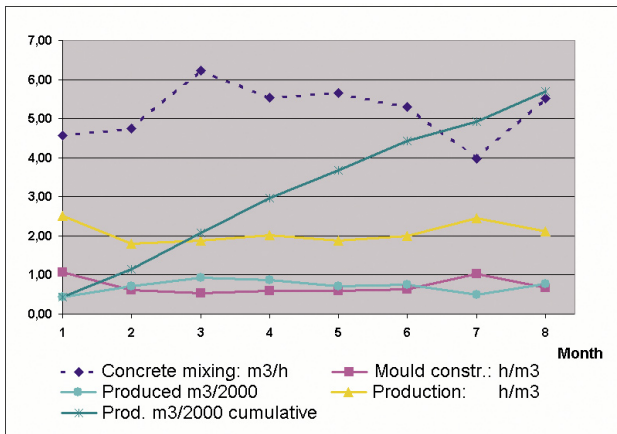
A call for elements from site is just possible, as the display of the expected drawing dates in the design department or the graphical selection of elements for truck load planning in the dispatch department.

Acknowledgement and estimated/true value comparison

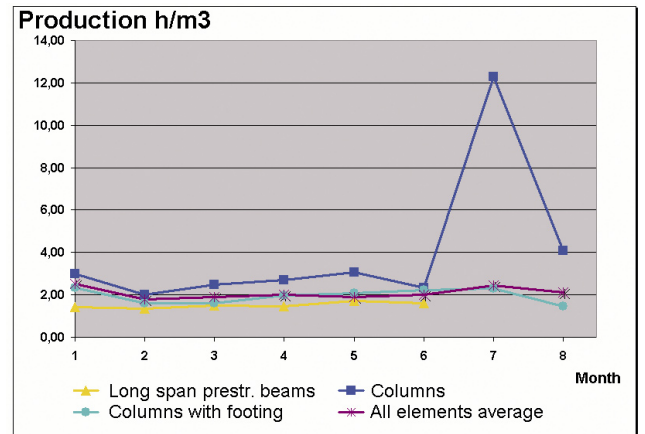
Acknowledgement of the individual work steps can be triggered in the planning board and the relevant hours required for completing them can be recorded. The production hours can also be collected manually and keyed in using the Betsy

reporting module. In both cases, the breakdown of the hours spent for manufacturing the parts in the individual production steps is done automatically.

The degree of precision depends on the amount of work that went into recording. Here, the user can define whether every production step performed on a precast part is to be reported, or whether the estimation is to be based on the



Productivity, general



Productivity of selected elements

accumulated hours in a production step in a hall only. In any case, the recorded hours are compared with the rated hours and the hours of the contract budget so that productivity and revenue development for any given job can be assessed.

Independently from individual jobs, productivity overviews for types or groups of elements can be derived for definable periods. They enable the user to assess whether the estimation is using correct hours/m³ ratios for the different

production steps and element types and shows the influence of work load and capacities on productivity. The graphical presentation of these values makes it easy to identify trends and deviations.

Materials consumed for production, inventories for internal performance messages, fittings requirement lists, etc. can all be selected from the extensive list area. The lists can easily be adapted to individual preferences by making use of the integrated report generators.

Invoicing

The requirements for proper invoicing depend on the type of the underlying contract. If you have a global contract with only a single total, the follow-up analysis mentioned above will give you sufficient information about profit and loss. If, according to your tender, you have to invoice each individual element or if you have agreed to more complicated arrangements like invoicing façade elements in m² or invoicing additional steel under a specific tender item, Betsy supports you in the best possible way, eliminating annoying work but providing the client with easy to check quantity proofs.

Interfacing

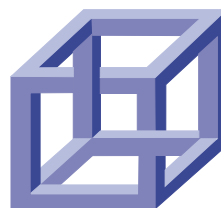
Betsy is a truly open system. Data export to analytical bookkeeping, salary programs and master computers of production machines can be performed just as easily as an import of data from spread sheets or from CAD systems. Exporting data to analytical bookkeeping always requires you to customise the contents to be exported to the client needs and to apply the accounting codes that are provided by the client system. This also applies when the Betsy analytical bookkeeping module is used.

IBB, the company behind

IBB - Consultants & Engineers, since 1986, now in second generation, only works for the pre-cast concrete industry that produces structural and architectural elements. We offer all services for the efficient implementation and use of Betsy. Since January 2003, IBB has been a member of the German Precasters Organisation (Fachvereinigung Deutscher Betonfertigteilbau e.V.).

Computer software for the prefabrication plant - from price calculation to invoicing, from work preparation to decision making reports for the management - is our business!

You'd like to know more about Betsy?
Please contact us:



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