

User Manual

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Introduction

For a basic introduction to using the program, we recommend this video: http://www.jobshop.72.sk/?m=0EN

Job Shop is a work location in which a number of general purposes Work Place area exist and are used to perform a variety of jobs Traditional machine shop, with similar machine types located together, batch or individual production can be taken as an example.

There are 3 major constraints to be considered to schedule a job shop scheduling process.

- 1. No task for a job can be started until the previous task for that job is completed.
- 2. A machine can only work on one task at a time.
- 3. A task, once started, must run to completion.

Four major factors are used to describe a job shop scheduling problem.

- 1. Arrival Pattern
- 2. Number of Machines (Work Place area)
- 3. Work Sequence
- 4. Performance Evaluation Criterion

Types of Arrival Patterns

The arrival pattern of jobs to machines are of two forms, either static or dynamic.

- 1. Static n jobs arrive at an idle shop and must be scheduled for work
- 2. Dynamic intermittent arrival (this is often stochastic)

Number of Machines

Number of machines means the available resources of the machine shop which can be utilized to perform the arrived jobs.

Types of Work Sequence

- 1. Fixed, repeated sequence flow shop
- 2. Random sequence All patterns possible

Performance Evaluation Criterion on Job Scheduling

The performance criteria that most researches are based on following optimal job scheduling heuristics.

- 1. Make span total time to completely process all jobs
- 2. Average time of jobs in shop
- 3. Lateness
- 4. Average number of jobs in shop
- 5. Utilization of machines

6. Utilization of workers

The Gantt chart is the most convenient way to visualize plan and optimize the job shop problems. The Job Shop visual software is a Gantt chart-based job shop scheduling software which can be used for scheduling very effectively.

In this manual the features and options of the software is described and elaborated using the extrusion die manufacturing process which comes under the Low volume high flexible job shop problem category.

Since all the input data table is prepared based on below discussed process Networks, Sequences, Operations, Operation Parameters and Work Place ,a proper understanding about the process is very important.

Example process description - Extrusion Die Manufacturing

Generally, the manufacturing processes and manufacturing times of extrusion dies are varying in a large range depending on the complexity of the profile to be manufactured using the die set. There are 2 major types of extrusion dies.

- 1. Solid Dies
- 2. Hollow Dies

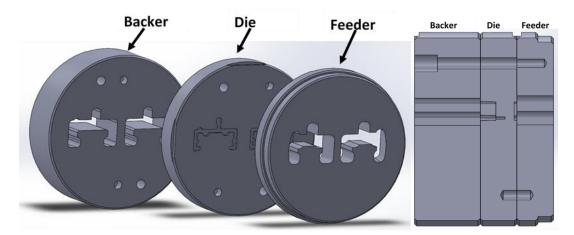
In this section a brief explanation of Extrusion Die manufacturing process for the understanding. The basic understanding of process is very crucial to understand the preparation of input data as well process optimization.

Solid Dies

A solid die set consist of 3 major parts.

- 1. Feeder
- 2. Die
- 3. Backer

Below sketches explain the major parts of a solid die set.



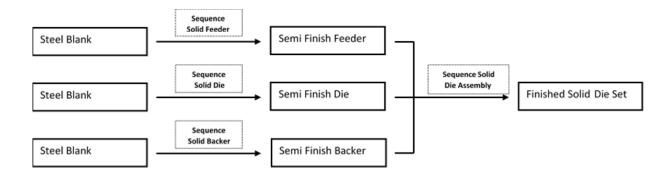
Exploded View of a Solid Die Set

Manufacturing Network of Solid Die Set

The manufacturing process network for a solid die set can be defined as below. This network has 4 process sequences.

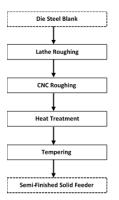
- 1. Sequence 1: Manufacturing of Feeder
- 2. Sequence 2: Manufacturing of solid die
- 3. Sequence 3: Manufacturing of Backer
- 4. Sequence 4: Assembly of previously manufactured Feeder, Solid Die and backer.

The schematic diagram of complete manufacturing network of solid die set is mentioned below.

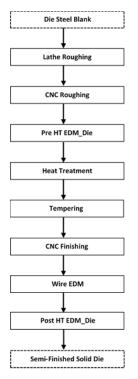


Each manufacturing Sequence is consisting of specific set of operations as below.

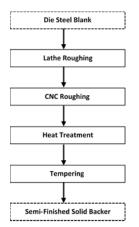
Operations of Sequence -Feeder



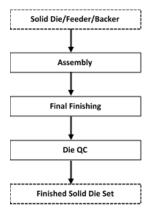
Operations of Sequence – Solid Die



Operations of Sequence - Backer



Operations of Sequence -Solid Die Assembly

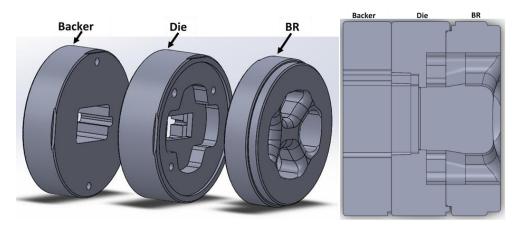


Hollow Dies

A Hollow die set consist of 3 major parts.

- 1. BR(Mandrel)
- 2. Die
- 3. Backer

Below sketches explain the major parts of a Hollow die set.

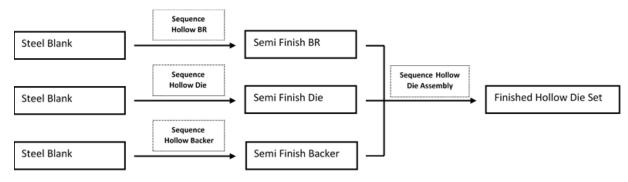


Manufacturing Network of Hollow Die Set

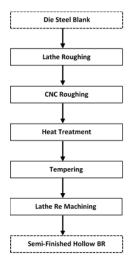
The manufacturing process network for a hollow die set can be defined as below. This network has 4 process sequences.

- 4. Sequence 1: Manufacturing of BR(Mandrel)
- 5. Sequence 2: Manufacturing of Hollow die
- 6. Sequence 3: Manufacturing of Backer
- 7. Sequence 4: Assembly of previously manufactured BR, Hollow Die and backer.

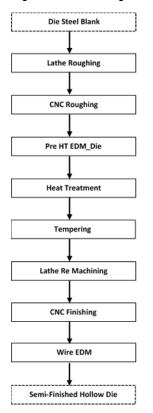
The schematic diagram of complete manufacturing network of Hollow die set is mentioned below.



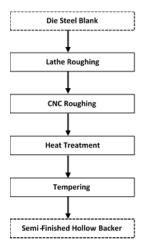
Operations of Sequence -BR (Mandrel)



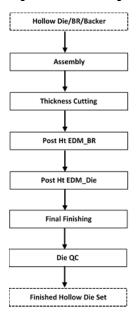
Operations of Sequence -Hollow Die



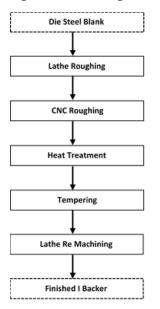
Operations of Sequence -Backer



Operations of Sequence – Hollow Die Assembly



Operations of Sequence – I Backer



In addition to the above defined dies sets, Separate plates also can be manufactured depend on the requirement.

Operation Parameters

For each operation following unique parameters can be defined as below.

- 1. The work place operation performed
- 2. The stage of the operation in the sequence
- 3. Duration of the operation
- 4. Duration of the operation with along with the operation time
- 5. Setting time

Work Place area, Available Machines and Operation allocation

In the machine shop following Work Place area areas and resources are available.

- 1. Manual Lathe
 - a. 1 Manual Lathe machine (Working Time -8 Hours)
- 2. CNC Milling
 - a. 1 CNC Milling Machine (Working Time 24 Hours)
- 3. Wire EDM (EDM)
 - a. 1 Wire EDM Machine (Working Time -24 Hours)
- 4. EDM
 - a. 3 EDM Machines (Working Time 24 Hours)
- 5. HT Work Place area
 - a. One Heat Treatment Furnace (Working Time 24 Hours)
 - b. One Tempering Furnace (Working Time 24 Hours)
- 6. Assembly
 - a. One Assembly Helper (Working Time 8 Hours)
 - b. One Assembly Expert (Working Time-16 Hours)
- 7. Quality
 - a. One QC Personal (Working time 8 Hours)

The Operations to be performed in each Work Place area can be defined as below.

1. Manual Lathe Work Place area

Since only one machine and operator is available to perform both of below tasks, Separate time slots for each operation need to be allocated. Based on the work load For Lathe Re machining operation 8.00AM to 12.00AM and for Lathe Roughing operation 12.00AM-5.00PM time slots were allocated.

- a. Lathe Roughing (Operation Time 8.00AM to 12.00PM)
- b. Lathe Re machining ((Operation Time 12.00PM to 5.00PM)

2. CNC Milling Work Place area

Since only one machine and operator is available to perform both of below tasks, Separate time slots for each operation need to be allocated. Based on the work load For CNC Finishing operation 6.00AM to 11.00AM and for CNC Roughing operation 11.00AM-6.00AM time slots were allocated.

- a. CNC Roughing (Operation Time 11.00AM-6.00AM)
- b. CNC Finishing (Operation Time 6.00AM to 11.00AM)
- 3. Wire EDM Work Place area

Only the Wire EDM operation is performed in this machine and therefore the total available time can be utilized to perform the operation.

- a. Wire EDM Machining (Operation Time 6.00AM-6.00AM)
- 4. EDM Work Place area

Since 3 Machines are available in the Work Place area Sperate machine for each operation can be allocated and therefore the total available time can be utilized to perform the operation.

- a. Pre HT EDM_Die (Operation Time 6.00AM-6.00AM)
- b. Post HT EDM_BR (Operation Time 6.00AM-6.00AM)
- c. Post HT EDM_Die (Operation Time 6.00AM-6.00AM)
- 5. Manual HT Work Place area
 - a. Heat Treatment (Operation Time 6.00AM-6.00AM)
 - i. Only One heat treatment furnace is available in the work shop and the time taken for one HT batch is about 8 Hours. Based on the cycle time 2 slots for 2 batches were allocated.
 - b. Tempering (Operation Time 6.00AM-6.00AM)
 - i. Only One tempering furnace is available in the work shop and the time taken for one Tempering batch is about 6 Hours. Based on the cycle time 3 slots for 3 batches were allocated.
- 6. Assembly Work Place area
 - a. Die Assembly (Operation Time 8.00AM-5.00PM)
 - i. One Skilled worker is allocated for this operation.

Since only skilled employee is available to perform both of below tasks, Separate time slots for each operation need to be allocated. Based on the work load For Final Finishing operation 8.00AM to 11.00AM and for Thickness Cutting operation 11.00AM-10.00PM time slots were allocated.

- b. Final Finishing (Operation Time 8.00AM to 11.00AM)
- c. Thickness Cutting (Operation Time 11.00AM-10.00PM)

The Work Place areas in the job shop, Available machines in the work shop, Operation time and operation hours can be summarized to below table.

Work Place ID	Work Place Area	Work Place Name	Operation Time	Operation Hours
1	Manual Lathe	Lathe_Roughing	11:00-22:00	11 Hours
2	Manual Lathe	Lathe_Remachining	06:00-11:00	5 Hours
3	CNC Milling	CNC_Roughing	11:00-06:00	19 Hours
4	CNC Milling	CNC_Finishing	06:00-11:00	5 Hours
5	CNC WEDM	WEDM	06:00-06:00	24 Hours
6	EDM	Pre HT EDM_Die	06:00-06:00	24 Hours
7	EDM	Post HT EDM_Die	06:00-06:00	24 Hours
8	EDM	Post HT EDM_BR	06:00-06:00	24 Hours
9	Manual Milling	Milling	08:00-17:00	8 Hours
10	Manual HT	HT	06:00-12:00, 16:00-22:00	24 Hours
11	Manual HT	Tempering	06:00-10:00, 14:00-18:00, 22:00-02:00	24 Hours
12	Manual	Assembly	08:00-17:00	8 Hours
13	Manual	Thickness Cutting	11:00-22:00	11 Hours
14	Manual	Final Finishing	06:00-11:00	5 Hours
15	Die Quality	QC	08:00-17:00	8 Hours

Table Description

1. tConfig

The tConfig table is not important. The program stores the data of the last runt here. Start time, calendar filter... etc.

2. tDays

This table is used to define the working date pattern and input data to the software. This table express the time related details such as working hours, working time and work time intervals etc. This is initial data table. After defining the data table don't need to change the table once there is no change in the days arrangement.

a. wd_type

This parameter defines the type of the working day. This parameter is defined by using a Upper case char, A to Z. This parameter will link with the wkp_days of the table tWorkPlace and provide the relevant time details

b. wd_name

This parameter defines the name of the work day type. A string is used to provide the information and this parameter is only for the informative purpose.

c. wd_intervals

This parameter defines the work times and intervals of shift arrangement. A string is used as the data format and this parameter is used to get the information on basic scheduling interface. (example: 06:00-12:00, 12:30-18:00, 18:30-22:00)

3. tHoliday

This table is used to give the information about standard holidays of the year. this table consist of only dates which are in **DD/MM/YY**. This table is also an initial table.

4. tPause

In the tPause table, you can specify exceptions to the working hours of machines for a contrast machine and day.

The picture below shows that machine 11 is working according to the AAAAA000 work plan, but will not work on 13.4.2020.

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JobShop Visual Technology		¥¥+£?24 ⊟	≧ ¤ % ≁ छ 0 ▲ Ѧ 0 ዶ 5	
	2020.02.12 c 6.00 9:00 12:00 15:00 18:00 21:00 -	3:00 6:00	2020.02.13 9:00 12:00 15:00 18:00 21:00	3:00 6:00 9:00
Workplace-11 2011				
2. Workplace-14 2014				
3. Workplace-1 2001	Workplace	×		
4. Workplace-9 2009		tra davs		
5. Workplace-10 2010	Name Workplace-11 Day	DavTvpe wp id		
6. Workplace-3 2003				
7. Workplace-4 2004	Code name 2011	· · · · · · · ·		
8. Workplace-8 2008	Area name			
9. Workplace-5 2005				
10. Workplace-12 2012	Days type AAAAA000			
11. Workplace-2 2002				
12. Workplace-15 2015	Capacity 1,00			
13. Workplace-13 2013	Preference 1,00	>		
14. Workplace-16 2016				
15. Workplace-7 2007				
16. Workplace-18 2018	OK	Cancel	Imported dates	
17. Workplace-6 2006	· · · · · · · · · · · · · · · · · · ·		Se imported dates	
18. Workplace-23 2023			Table name Import pa_id	pa_ma <u>pa_dav</u> pa_daytype
19. Workplace-25 2025			1	11 13.2.2020 0
20. Workplace-20 2020			tPause (4)	4 5.4.2019 B
21. Workplace-19 2019			Generate dates Clear table	
22. Workplace-27 2027			Export all tables	
23. Workplace-29 2029				
24. Workplace-28 2028			Irregular work time of workplace (machine).	
25. Workplace-21 2021			pa_id: id-number pa_ma: workplace id from tWorkplace	
ACIDE AC and advantage of a			pa_ma, workplace to from tworkplace	

5. tWorkPlace

This table is used to define the information of machines to the scheduling software. This is also an initial data table. If the machine set up has not changed, The data table don't need to be changed. Following information were fed in to the software using this table.

a. wkp_id -

This parameter is used to define the identity of the work place. A unique integer from 1...n is used to define this parameter. This parameter links to the *opr_wkp_id* in tOperations (Table of operation) to give the information where the operation should be performed.

b. wkp_code -

This parameter defines the short code of work place using a string of max 60 chars. This parameter is used for informative purpose.

c. wkp_name -

This parameter defines the name of the work place using a string of max 60 char. This parameter is used for informative purpose.

d. wkp_area -

This parameter defines the area or category of work place using a string of max 60 char. This is used for informative purpose.

e. wkp_prefer -

This parameter defines the order of machine list that should be shown in the Software interface or Determines the order of the machines in the representation, the machines are shown on the left. This was explained in the video. This parameter is defined using decimal numbers and the maximum is 999

f. wkp_capacity- multiplier capacity of the machine (decimal)

This parameter defines the capacity of the machine or in other word how many operations can be performed at any given time. Decimal numbers were used to define the parameter.

g. wkp_days-

This parameter defines the days types of the week and holiday by TDAYS table. As an example: 'AAAAA000', which means that it works from Monday to Friday in the 'A' type schedule. Saturday, Sunday and holidays do not work.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Holiday
А	А	А	А	А	0	0	0

Above initial five table will define the work pattern and resources of the job shop. Below four tables will define the jobs related information which need to prepare the production schedule.

6. tJob (Table of Jobs)

This table is used to define the information about received jobs for scheduling. For every new schedule this table should be prepared freshly. Below information was included in the table.

a. job_id

A unique integer is used to define the job and is used as the job identification. This *job_id* makes the connection between the tNetwork (Table of Network) and tJob (Table of Jobs)

b. job_name

The job name which is related to the job_id is defined here. This will be used for ease of identification and informative purposes. The maximum length is 60 char.

c. job_start

This information defines the earliest start date of the job. This can be defined by the job shop scheduler as per the requirement of the customer as well as the current Work In Progress jobs.

d. job_stop

This information defines the deadline of the job. This can be defined by the scheduler by considering the customer requirement and the relevant factors such as Logistic issues etc.

e. job_prefer

This parameter defines the preference of the job. Here the default value is 100% and consider every job has the same preference. If you need to change the preference of the job it can be done by reducing the preference value of non-urgent jobs.

f. job deadline

This parameter defines the importance of the job dead line. Here integer 1/0 is used to provide the information.

1-The dead line is compulsory and must have to meet during the scheduling.

0 - The dead line is informative and not to be considered during the scheduling.

g. job disabled

This parameter defines whether the job is in active stage or inactive stage. If the job doesn't want to be considered for the current schedule this parameter can be used to control. Here integer 0/1 is used to provide information.

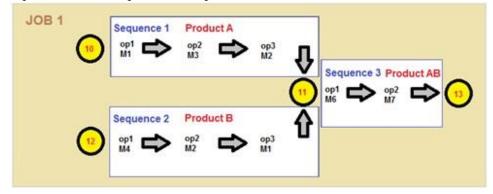
0- The job should be considered for the scheduling. (Default Value)

1- The job should not be considered for scheduling

7. tNetwork (Table of Network)

8.

The concept of network, Sequence and Operations were discussed below.



Let's take this network as an example and discuss the way of defining the network, Sequences and operation for the process.

In this job there are 3 networks and 3 sequences. (Network_1 = Seq_1, Network_2=Seq_2, Network_3=Seq_3)

Start of Network 1 is indicated by 10 and end is 11

In Network 1 the raw material is subjected to 3 operation and the product A was produced.

Start of Network 2 is indicated by 12 and end is 11

In Network 2 the raw material is subjected to 3 operation and the product A was produced

Start of Network 3 is indicated by 11 and end is 13 In Network 3 the product of Seq 1 and Seq 2 is taken as the input for the process and the final product AB was produced.

(A unique integer has been used to indicate the start of the sequence. The end result of both Seq1 and Seq2 is same and therefore the same in tiger is used to indicate the end of sequence. The start of the sequence 3 is indicated by 11 and the end is 13.)

a. net_id

A unique integer is used to define the network and is used as the network identification. This net_id links the tNetwork (Table of Network) and tSequence (Table of Sequences)

b. nt_job_id

This parameter links the network and the *job_id* of tJobs.

c. net_a_id

This parameter indicates the starting node of the network. (In above example for Seq 1 the integer is 10)

d. net_b_id

This parameter indicates the end node of the network. (In above example for Seq 1 the integer is 11)

9. tSequence (Table of Sequences)

a. seq_id

This parameter is used to define the sequence. This *Seq_id* links the tSequence (Table of sequence) and tOperations (table of operation). For each and every Sequence in network, a unique integer has to be used. In above example for Seq 1, Seq 2, Seq3 unique integer 1,2,3 can be used respectively. Since the relation of rows in tNetwork and tSequence are in 1 :1, There best practice is to use same number for *Seq_id* and *net_id*.

b. seq_net_id

This *seq_net_id* links the tNetwork (Table of Network) and tSequence (Table of Sequences)

c. seq_name

This parameter is indicating the name of the production sequence and the maximum length of the name is 60 chars. This parameter is used for informative purposes.

d. seq_product

This parameter is indicating the product drawing or number which is used for informative purpose. The maximum length is 60 Char.

10. tOperation (Table of Operations)

a. opr_id

This parameter is indicating the operation identification. For every operation in sequence has to be defined using a unique integer. In above example, for Seq 1 there are 3 operation as Op 1, Op 2, Op 3. The integer 1,2,3 can be used as *opr_id* respectively.

b. opr_seq_id

This *seq_net_id* links the tNetwork (Table of Network) and tSequence (Table of Sequences) As above example for all 3 operations, the sequence ID 1 has to be used.

c. opr_wkp_id

This parameter indicated the workstation which perform the operation. This parameter creates the link between the tOperation(Table of operation) and tWorkplace(Table of workplace).

d. opr_ix -

This parameter indicates the position of operation in the sequence. To define this parameter, Sequential numbers has to be used. Below example will explain the *opr_ix* clearly. For different sequences same numbers can be used as *opr_ix*.

opr_id	opr_seq_id	opr_wkp_id	opr_ix
1	1	1	1
2	1	3	2
3	1	6	3

4	1	10	4
5	1	11	5
6	1	2	6
7	1	4	7
8	1	5	8

e. opr_td

This Parameter defines the duration time of the operation in minutes.

f. opr_tij

This parameter defines the duration of operation along with the transport time in minutes.

g. opr_ts

This parameter defines the setting time of operation in minutes.

h. opr_started

This parameter defines the status of the operation using 3 integers as below.

- -1 :- Operation not realized
- 0 :-Operation has not started
- 1 :- Operation has started.
- i. opr_name

This parameter defines the name of the operation and this is used for informative purposes. The maximum length of the name is 60 char.

j. opr_pc

This parameter defines the number of pieces subjected to the operation. The number of pieces should be defined using decimal numbers. This parameter is used for informative purposes.

How to create tables for specific jobs (With Example)

Let's take that the machine shop has received following 5 jobs on 2020-04-01. All these 4 jobs should be started in 2020-04-06 and the deadlines are as per the below table.

Job Description	Job_name	job_start	job_stop
Hollow Die Set	BR-001	2020/04/06	2020/04/22
Solid Die Set	SLD-001	2020/04/06	2020/04/20
Solid Die	SLD-002	2020/04/06	2020/04/13
I Backer	IBC-001	2020/04/06	2020/04/14

Based on the received date and sequence of receiving, job number were assigned to the jobs as follows.

Job Description	Job_name	Job_id
Hollow Die Set	BR-001	200401001
Solid Die Set	SLD-001	200401002
Solid Die	SLD-002	200401003
I Backer	IBC-001	200401004

Simplest way of table preparation is first prepare the basic table in one sheet and prepare the detailed tables in separate sheets.Lets analyze and define the networks and sequences of the process.

- 1. First job is a Hollow Dies Set(refer the manufacturing net work of hollow die set.)
 - a. Initially the Backer, Hollow BR and Hollow die have to be manufactured separately.
 - b. Then those 3 parts have to send to Assembly process and the assembly sequence have to be followed to complete the job.
 - c. net_id can be defined using unique integers as below.

Job_id	net_id	Description
200201001	1001	Backer Process
	1002	Hollow Die Process
	1003	Hollow BR Process
	1004	Hollow assembly process

d. Net work 1001,1002,1003 are starting from separate row materials and ended up with the same point. Network 1004 is started from end point of above 3 networks and ended up in a separate point.as this point *net_a_id* and *net_b_id* can be defined as follows.

Job_id	net_id	net_a_id	net_b_id
200201001	1001	1	4
	1002	2	4
	1003	3	4
	1004	4	5

e. As above recommended the best practice is use *seq_id=net_id*. As per the recommendation Sequence number can be assigned as below. In addition to that, the process description is used as the *seq_name* for clarity of information.

Job_id	net_id	net_a_id	net_b_id	seq_id	seq_net_id	seq_name
200201001	1001	1	4	1001	1001	Backer Process
	1002	2	4	1002	1002	Hollow Die Process
	1003	3	4	1003	1003	Hollow BR Process
	1004	4	5	1004	1004	Hollow assembly process

f. To manufacture a Backer, blank work piece has to go through 5 operations. To manufacture a Hollow Die, a blank workpiece has to go through 10 operations. Due to the size of the table only the Backer and Hollow Die is used to elaborate the table preparation part.

Job_id	net_id	net_a_id	net_b_id	seq_id	seq_net_id	seq_name	seq_product	opr_name	opr_id	opr_seq_	i opr_wkp_	opr_ix
200201001	1001	1	4	1001	1001	Backer Process	Backer	Lathe Roughing	1	1001	L 1	1
								CNC Roughing	2	1001	L 3	2
								нт	3	1001	L 10	3
								Tempering	4	1001	l 11	4
								Polishing	5	1001	L 9	5
	1002	2	4	1002	1002	Hollow Die Process	Hollow Die	Lathe Roughing	6	1002	2 1	1
								CNC Roughing	7	1002	2 3	2
								Pre HT EDM_Die	8	1002	2 6	3
								нт	9	1002	2 10	4
								Tempering	10	1002	2 11	5
								Lathe Remachining	11	1002	2 2	6
								CNC Finishing	12	1002	2 4	7
								WEDM	13	1002	2 5	8
	1003	3	4	1003	1003	Hollow BR Process						
	1004	4	5	1004	1004	Hollow assembly process						

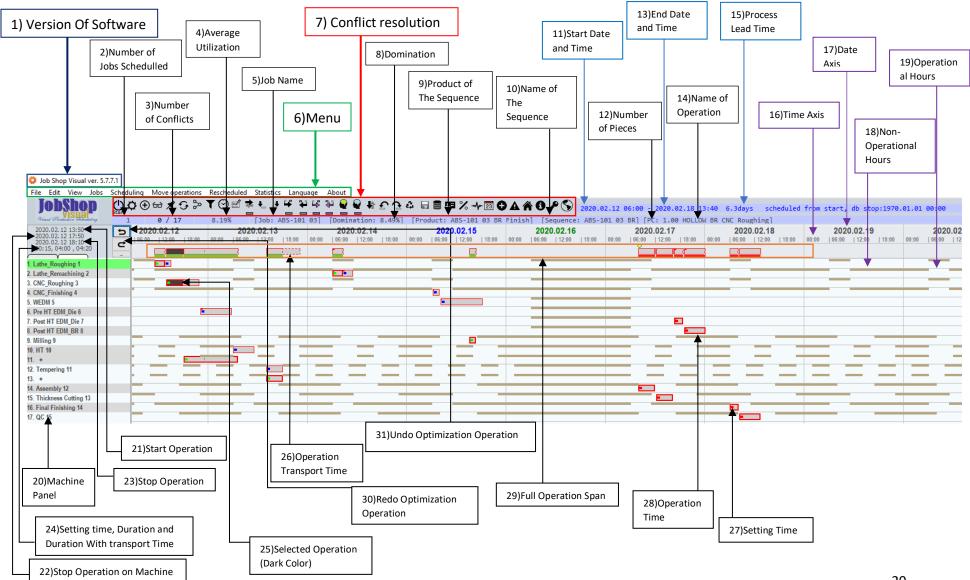
For the ease of understanding of opr_ix concept,2 different colors were used for the network 1001 and 1002. Using this basic table separate data tables with all relevant information can be prepared very easily. By following the same procedure this table can be elaborated to next 2 processes of hollow BR as well as remining manufacturing orders.

When preparing the tables, it is very important to avoid repeating numbers where the unique integer required. When assigning numbers to net_a_id field and net_b_id filed it is very crucial to avoid blending number. Because it will lead to mixing up of network and critical mistakes in scheduling process.

You can find the example data tables in download page along with the master data sheet. (opr_td, opr_tij, opr_ts values are assumed values only)

GUI of software

Basic Features of software interface.



Description of Basic features of Software interface

- Version of Software This tab displays the version of the software.
- Number of jobs schedulled This tab show the number of jobs schedulled in the program.
- 3. Number of conflicts

This Tab show the number of capacity conflicts in created schedule. If there is no any conflict it will show in black color and as (00/17). The meaning of firstdigit is the number of conflits. The meaning of second digit is number of operations schedulled in the software. If there is a conflict, the number colors will be red.

4. Average Utilization

This value shows the utilization of the machines for each day (max. 7 days).

- 5. Job Name This tab shows the name of the job.it will show the *job_name* column of the table tJobs.
- 6. Main Menu

This part consist of main functions of the soft ware.these parts will be discussed in the next section seperately.

7. Shortcut Menu

This part consist of shortcuts of main functions of softwrae.

8. Domination

Dominance is calculated on the basis of the amount of work and employment preference. The ratio of work value and preference can be set by a coefficient. If the coefficient is 0.5, the amount of work and preferences will be taken into account: dominance 50% - 50%. Dominance determines the importance of individual jobs.

9. Product of sequence

This tab show the final product of the sequence of current selected operation. This shows the seq_product of tSequence table.

10. Name of the sequence

This tab show the Name of the sequence of current selected operation. This shows the seq_Name of tSequence table.

11. Start date and time

This tab shows the start date and the time of the entire Job.

12. Number of pieces

This tab shows the number of pieces processing in the current operation.

13. End date and time

This tab shows the end date and the time of the entire Job.

14. Name of operation

This tab shows the name of the operation which was mentioned in the opr_name in the tOperation table.

15. Process lead time

This tab show the total time taken to complete the job.

16. Time Axis

This is axis show the time of a date in the schedule.

17. Date Axis

This axis show the date of schedule.

- Non Operationa Hours
 This area which is highlighted in grey color show the non operation time period of relavant machine.
- 19. Operational Hours

The are without highlighted strip show the operation hours of relavant machine.

- 20. Machine Panel This area shows the machines(workstations)scheduled in the process
- 21. Start Operation This tab show the start time of selected operation.
- 22. Stop operation on machine This tab show the stop time of selected operation on machine
- 23. Stop Operation This tab show the stop time of selected operation with logistic operations.
- 24. Setting time, Duration and Duration With transport Time This tab shows the time details of slected operation such as setting time, Duration and Duration with transport in hours and minutes.
- 25. Selected operation When we select an operation that operation will be shown in a dark color.
- 26. Operation Transport time The operation transport time will be shown with dashed outline.
- 27. Setting Time Setting time will be shown as a dark color line in the middle of the opration tab.
- Operation time
 Operatione time will be shown with outline and filled with color. For different jobs the color will be changes.
- 29. Full Operation Span This ara graphically represent all the ioperation in one line.
- 30. Redo optimization Operation This tab can be used to re do an optimizing operation.
- 31. Undo optimization operationThis tab can be used to Undo an optimizing operation.

Functions of Software

File Menu

🔅 Job Shop Visual ver. 5.7.7.1				
File Edit View Jobs Schedulin	g Move operations	Rescheduled	Statistics Langu	age About
Imported data	🖈 😏 🐎	▼ 🕑 🗹 🤻	≧ŧ_J₩¥	(박 철 💆 🖉 👫
Checking imported data	/ 17	8.19%	[Job: ABS-101	03] [Domination:
Reload machine data Reload jobs data	2.12 2:00 18:00	202 00:00 06:00	0.02.13 12:00 18:00	2020.02.14 00:00 06:00 12:00
Save or Load unfinished plan		,		
Program Restart			-	
4. CNC_Finishing 4				
5. WEDM 5				
6. Pre HT EDM_Die 6				
7. Post HT EDM_Die 7				
8. Post HT EDM_BR 8				
9. Milling 9				
10. HT 10		-		
11. +		1		
12. Tempering 11				
13. +				

In the file menu there are 6 sub menus which are directly involved in operation.

- 1. Imported data
- 2. Checking imported data
- 3. Reload Machine data
- 4. Reload Jobs Data
- 5. Save or Load Unfinished Plan
- 6. Program Restart

The functions of each sub operation are discussed below.

Imported Data

🔅 Job	Shop Visual ver. 5.7.	7.1							
File	Edit View Jobs	Scheduling Move of	operations	Rescheduled Sta	tistics Language	About			
J	DShop Visual	U to the start					£ £ 6		-
	.02.1406:00	1 0 / 5 2020.02.1		8.19% [Jo 2020.0)	ob: ABS-101 03	[Domination: 2020.02.14		[Produ	2020
2020	.02.1408:30 .02.1408:50	C 06:00 12:0		00:00 06:00 1				00:00	06:00
	0, 02:30 , 02:50		1						
1. Lathe	🜻 Imported dates						_		×
2. Lathe 3. CNC	Table asses	<u>Import</u>	cf_code	cf_name	cf_value	cf_comment	cf_ix		^
4. CNC	Table name tConfig (1)) i	1 prefer koef	0.4000	preferece coeficien		1	
5. WEDI	tConfig (1)	`		2 Start app	26358120			2	
6. Pre H	tDays (2)			3 Visible days	AAAAAAA			3	
7. Post	tHoliday (3) tPause (4)		· · ·	4 Days filter	1			4	
8. Post 9. Millin	c tWorkplace (5)	-							
9. millin 10. HT 1	tJob (7) tNetwork (8)								
11. +	tSequence (9)								
12. Tem	tOperation (10)								
13. +									
14. Asse									
15. Thic 16. Fina									
10. Fina 17. QC									
11. 40									
	Machin	vo odit							
	doC	edit							
	CSV file	ort O SQL file							
	File name								
	Sperator								
	, ~								
	Use field list from	first line							
	Ignore first line								
	All table fields								
		Import							<u> </u>
L									*

In the top left corner drop down list of tables which will be used in scheduling calculations. Meaning content and preparation methods of these table are discussed in the part of *how to prepare data tables* part

The table can be prepared in CSV Format of as an SQL file and can be imported to job shop visual platform. To import these files first select the table type from drop down list and then <u>Import</u> Hyper link should be clicked.

First the file type of input file (CSV or SQL) should be selected.

Then the File name in Left down corner will be activated. the required file path can be browsed and selected.

Then there is a check list to give the import instruction of tables. The recommended practice is to prepare the tables as per the sample and import without column heading row.

Finally, by pressing IMPORT common button the tables can be imported.

Checking Imported Data

After importing data this function can be run to identify the errors of data tables. If there is any problem in data tables such as repeated Integers or link issues in networks it will show the errors.

Reload Machine Data

This function is used to reload the work places. Once the Reload machine data tab is clicked, it will show below massage box.

Job Shop Visual ver. 5.	7.7.1
File Edit View Jobs	Scheduling Move operations Rescheduled Statistics Language About
JobShop	Ů ੈ ⊕ ↔ ★ ⊖ ≫ ▼ ⊖ ≝ ≢ Ł ≯ ¥ ¥ ¥ ¥ ₽ ₽
Viewel Production Webedaling	1 0 / 17 8.19% [Job: ABS-101 03] [Dominatic
2020.02.14 06:00 2020.02.14 08:30 2020.02.14 08:50	to 2020.02.12 2020.02.13 2020.02
00:30, 02:30 , 02:50	
1. Lathe Roughing 1	
2. Lathe Remachining 2	
3. CNC Roughing 3	Confirmation
4. CNC Finishing 4	
5. WEDM 5	
6. Pre HT EDM_Die 6	Do you want to reload workplaces?
7. Post HT EDM_Die 7	
8. Post HT EDM_BR 8	
9. Milling 9	
10. HT 10	Yes No
11. +	
12. Tempering 11	
13. +	
14. Assembly 12	
15. Thickness Cutting 13	
16. Final Finishing 14	
47.0045	

After confirming the task by pressing "Yes" The task will execute and show the below Massage.

If you don't want to do Reload machine data task you can abort by pressing "No"

🌻 Job Shop Visual ver	. 5.7.7.1					
File Edit View Jo	bs Scheduli	ng Move operation	ns Rescheduled	Statistics	Language	About
JobShop		⊕ iii ★ ⊙ 8 0 / 17	» ▼ 🕑 🖻 8.19%	≱ 🛃 🛃 	₩ ₩ ₩ BS-101 03]	
2020.02.14 06:00 2020.02.14 08:30 2020.02.14 08:50 00:30, 02:30, 02:50	t) U	2020.02.12 06:00 12:00 18:0		20.02.13 0 12:00	18:00 00:0	2020.02 0 06:00 12
1. Lathe_Roughing 1						
2. Lathe_Remachining 2						
3. CNC_Roughing 3						
4. CNC_Finishing 4 5. WEDM 5 6. Pre HT EDM_Die 6 7. Post HT EDM_Die 7 8. Post HT EDM_BR 8 9. Milling 9 10. HT 10	Information	eload was successful	, you need to reca	ilculate plan	×	
11. + 12. Tempering 11 13. + 14. Assembly 12				ОК		
15. Thickness Cutting 13 16. Final Finishing 14 17. QC 15				_		

After Executing the "Reload machine data" task it will show above massage and by pressing "OK" you can abort from the task.

Important: -After Reloading machine data, the planning process should be restarted,

Reload Jobs Data

This function is similar to the "Reload Machine Data" and this can be used to reload the jobs.

🔅 Job Shop Visual	ver. 5.7.	7.1										
File Edit View	Jobs	Schedu	ling	Move op	erations	Resch	eduled	Statistic	s Langu	age	About	
Jobsho	-		≯⊕	60) ≯ 0 / 1	€ %	₹ C 8,19	_	-	ABS-101		₩ ₽	2
2020.02.14 06:00	ioung	_				8.19				031	1	
2020.02.14 08:30		5	1 06:00	20.02.12	2 18:00	00:00	1 06:00	0.02.13	\$ 18:00	00:00	1 06:00	20.0
2020.02.14 08:50 00:30, 02:30 , 02:5	50	C	100.00	12.00	110.00	00.00	100.00	12.00	10.00	00.00	00.00	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Ň	]			<u> </u>	1			<u> </u>			
1. Lathe_Roughing 1												-
2. Lathe_Remachining 2	2										• •	
3. CNC_Roughing 3					-							
4. CNC_Finishing 4	Confirr	nation	-			X						_
5. WEDM 5												
6. Pre HT EDM_Die 6												
7. Post HT EDM_Die 7	6	Relo	nad iol	hs and re	schedule?							
8. Post HT EDM_BR 8			100	os unu re	schedule.							
9. Milling 9											_	
10. HT 10		_				[	-					
11. +			Yes		No			_			_	_
12. Tempering 11			_			_		-				
13. +					_							
14. Assembly 12												
15. Thickness Cutting 1	3											
16. Final Finishing 14												
17. QC 15												

After confirming the task by pressing "Yes" The task will execute and show the below Massage.

If you don't want to do Reload Jobs data task you can abort by pressing "No"

🜻 Job Shop Visual ver. 5.7.7.1				
	luling Move operations			
Jobshop Dised Tredection Whitedelting	℣⊕⇔ℋℨ⅀⅀	▼⊗₫≉	┶╶┵╄ [°] ╡	нк жа <b>е</b> (
5	2020.02.12		.02.13	2020
C	06:00   12:00   18:00	00:00   06:00	12:00   18:00	00:00   06:00
	i			
1. Lathe_Roughing 1				
2. Lathe_Remachining 2				
3. CNC_Royahing 3				
<ol><li>CNC_Fini Informácia</li></ol>		×		
5. WEDM 5				
6. Pre HT E				
	iences of jobs was successfi	ul 📃 👘		
8. Post HT I				
9. Milling 9				
10. HT 10	ОК			
11. Temperi	OK			
12. Assembly 12				
13. Thickness Cutting 13				
14. Final Finishing 14				
15. QC 15				

After Executing the "Reload Jobs data" task it will show above massage and by pressing "OK" you can abort from the task.

Important: -After Reloading jobs data, the planning process should be restarted,

## Save or Load unfinished Plan

This function is used to save the current plan or load an old plan.

JU Nime	<b>bŞ</b>		operations Rescher ★ 😏 🐎 🗡 🎯		iage About
		2020.02 C 		<b>2020.02.13</b>   06:00   12:00   18:00	<b>202</b> 00:00   06:00
au	Save	e or Load			×
	Id	Name	Start_at	Save_date	User_ic 🔺 📃
NO 🕨	24	Jan 21 -Jan 29 Corrected	20/01/21 6:00:00 PM	1 20/01/21 10:28:42 AM	C
VEL	23	PLAN20200121102654	20/01/21 6:00:00 PM	20/01/21 10:26:54 AM	C
re	22	PLAN20200113185435	20/01/13 6:00:00 AN	4 20/01/13 6:54:35 PM	C
os	21	plan testiing 1	20/01/13 6:00:00 AN	1 20/01/13 6:54:29 PM	C
ill	20	PLAN20200102233339	20/01/03 6:00:00 AN	4 20/01/02 11:33:39 PM	C
нт	19	PLAN20200102231549	20/01/03 6:00:00 AN	1 20/01/02 11:15:49 PM	C
Te	18	JAN 3 _11	20/01/03 6:00:00 AN	1 20/01/02 11:15:34 PM	C
As	17	Jan 6	20/01/02	20/01/02 7:30:06 PM	C
Th	16	JAN 5	20/01/02	20/01/02 3:41:08 PM	c
Fir	15	JAN 4	20/01/03 6:00:00 AN	1 20/01/02 2:41:09 PM	C
QC	14	JAN 4	20/01/02	20/01/02 2:29:15 PM	C
	13	JAN 3	20/01/03 6:00:00 AN	4 20/01/02 12:59:13 PM	C
	12	JAN 3	20/01/03 6:00:00 AN	1 20/01/02 12:54:20 PM	c 🗸 🗸
<					>
Sa	ve nam	e			ete All

In the Save tab the Schedule name can be given and can be saved by pressing "Save" Button.

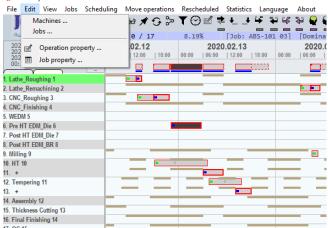
To load an old plan, you can select the plan and press the load button.

# Edit Menu

There are 4 functions under the "Edit" Menu.

- 1. Machine
- 2. Jobs
- 3. Operation Property
- 4. Job Property

🔅 Job Shop Visual ver. 5.7.7.1



#### Machines

This function is used to edit the machine data of tWorkplace table.

File Edit View J							
TohShor		Move operations			iguage About		A 🗆
Viena						-	
Giand Frederics Western	7 1	0 / 17	8.19% [3	Job: ABS-1	01 03] [Domi	nation: 8.49%]	[Proc
Imported dates						- 0	$\times$
Table name	Import				wkp_area	wkp_prefer	wkp_ ^
tWorkplace (5)	~	1 1			Manual	15	
	-	2 2		e_Remachining		14	
Generate dates	Clear table	3 3		Roughing	CNC	13	
	Export all tables	4.4		Finishing	CNC	12	
Vorkplace data		5 5	WED		CNC	11	
re-sprace on the		6.6		IT EDM_Die	EDM	10	
		77		HT EDM_Die	EDM	9	
		8 8		HT EDM_BR	EDM	8	
		9 9	Milin	g	Manual	7	
O Ma	chine edit				×	6	
						5	
	Name QC					4	
						3	
	Code name 15					2	
	Area name QUA	ALITY				1	
	Days DDD	000000					
	Preference 1.0						
	Capacity 1.0						
CSV fie	cupacity [11						
File name	- 0 C	6		Sav			
	- 0 0			587	e		
Sperator							
, ×							
Use field list from fi	rstline						
🗹 Ignore first line							
All table fields							
		1					
	Import	<					>
							1.1

Arrow keys can be used to toggle between the work places. + and - marks can be used to increase decrease values. The refresh key is used to refresh and go back to initial value.

The save button can be used to save the changes made.

## Jobs

J	VISUA Start	• 🕀 🕶	¢ €	⊳▼⊘	2	<b>+ +</b>	¥	₩ ₩	About	_		
	Imported dates	0	/ 17	8.19%		[Job: A	85-10	01 03	Domi	nation:	8.49%]	[Proc
	Imported dates	ort C	opr_id	opr_seq_id	01	or_wkp_id		opr_ix		opr_td		opr_ A
	ole name		15	opi_seq_id	3	or_wwp_id	12		1		240	
÷	peration (10)	~	16		3		13		2		240	
_	Generate dates Clear tabl	e	17		3		7		3		120	
L	🜻 Job edit											×
	Job name	Start and	stop date			Preference	e	Deadli	ne			
L	100D-101_44	20/04/10	) 🔲 🔻	20/04/13		100.00	-					
	Sequence name	Product n	ame			Quantity						
						1.00	-			0	0 3	<u>با</u>
	Operation name											
1	Workplace											~
L	Duration time	0	\$									
t	Duration and transport	0	\$									
	Setting time	0	\$	1								
	Status	free										
	Quantity	1.00	¢	1	~							
		1.00	• •									
	Capacity Realization index		•									
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	+ + 0 0 €	•								Save	:	
1	All table fields		30		5		3		2		270	
1	All Lable Tields		31		5		10		3		300	
	Import		32		5		11		4		240	$\checkmark$

Arrow keys can be used to toggle between the work places. + and - marks can be used to increase decrease values. The refresh key is used to refresh and go back to initial value.

The save button can be used to save the changes made.

## **Operation Property**

🌻 Job Shop Vi	sual ver. 5.	7.7.1
---------------	--------------	-------

F	ile	Edit	View	Jobs	Schedul	ing	Move operati	ions	Rescheduled	Statistics	Languag	e About
	1	Dh	Sha		() D	ŧ 🕀	tiri 🖈 😏	20	🕇 🕑 🗹	<b>≥ ++</b>	¥ ¥	¥ 🔑 😜 (
	9 in	at The	VISUA daction white	daltna	Start		0 / 17		8.19%	■ [loh: Al	35-101 0	3] [Domina
			12 22,10			000	0 / 1/		0.15%	1000. A	03-101 0	2020
	2020	Ö		on mod	ification						×	06:00
	00:3			Se	lected obje	ect j2	00120090133i3	3w6n1	0193016			
	Lathe			Durati	ion time [m	nin]	450		Operation _LC	W_DIE_Pre	HT EDM_Di	e
	Lathe	1	Duration	n with tra	ansport (m	iin]	470		Quantity	(PC)		1
	CNC				Capac	ity	1		Technology in	dex		3
_	CNC				Workpla	ace Pro	e HT EDM_Die					
5.	WEDI					Pre	e HT EDM_Die,	6 [6]				
6.	Pre H								Split	De	lete	
7.	Post											
	Post											
-	Millin			Setti	ng time [m	in] 3		com	ment			
	. HT 1	1		Durati	on time [m	nin] 4	50 🚖					
	+ Tem		Duration	n with tra	ansport (m	in] 4	70 🚖					
	. rem				Capac	ity 1	.00 🚖					H -
-	Asse				Workpla	ace Pr	re HT EDM_Die	[id:6]			~	
	Thic			Tech	nology ind	lex 3		]				
_	Fina											
и.	QC 1											
		H	₩						ОК	Ca	incel	]

Arrow keys can be used to toggle between the work places. + and – marks can be used to increase decrease values. The refresh key is used to refresh and go back to initial value.

The save button can be used to save the changes made.

## Job property

This Function is used to change the properties of the job.

```
Job Shop Visual ver. 5.7.7.1
File Edit View Jobs Scheduling Move operations Rescheduled Statistics Language
                                                                                  About
                       JobShop
                                                            [Job: ABS-101 03]
                                                                                  [Domina
                                    0 / 17
                                                   8.19%
  2020.02.12 22:10
2020.02.13 05:40
2020.02.13 06
00:30, 07:30 ,
                              2020.02.12
                                                         2020.02.13
                                                                                     2020.0
                         5
                                                                                    06:00
                                                                      | 18:00
              🜻 Job properties
                                                 _
                                                       Х
                                                                                      \gamma
              Job: ABS-101_03 (id:20012009)
1. Lathe_Roug
                     Info end date (db): 70/01/01
2. Lathe_Remaching
                                                                                    •
                                               3. CNC_Roughing
4. CNC_Finishing
                ○ From start date |--->
5. WEDM 5
6. Pre HT EDM_Die
                         Current start: 20/02/12
                                                . 11:00:00
7. Post HT EDM_D
                       New start date: 20/02/12
                                               11:00:00 🚔
8. Post HT EDM_B
9. Milling 9
                ○ From end date <---|
                                                                                       10. HT 10
                                               5:51:29 🖨
                         Current end: 16/08/03
11. +
                        New end date: 16/08/03
                                               5:51:29 🚔
12. Tempering 11
13. +
                Change job status
14. Assembly 12
15. Thickness Cutt
                    Scheduled from end
                                          16. Final Finishing
17. QC 15
                O Change job deadline type
                    Binding deadline job
                                               ОК
                                                          Cancel
```

The job start date, Job End date, job scheduling technique and the job dead line type can be modified using this option.

# View Menu

There are 8 functions coming under the view menu.

- 1. View Dependencies
- 2. Job Filter
- 3. Go to operation machine line
- 4. Go to previous operation
- 5. Go to next operation
- 6. Zoom
- 7. Refresh
- 8. View machine by preference only when they have scheduled activities.

🔅 Job Shop Visual ver. 5.7.7.1

File	Edit	View	Jobs	Scheduling	Move ope	erations	Rescheduled	Statistics	Langua	age	About
	ob	>	/iew de	pendencies					8	₿	🍋 😜
Qú	aut Prode	ΥJ	lob filte	r					ľ	03]	[Domi
202 202 00: 1. Lath 2. Lath 3. CNC	0.02.1 0.02.1 0.02.1 30,07: e_Roug e_Rema _Rough _Finish M 5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Go to pr Go to ne Zoom Refresh		tion	when th	ey have schedu	led activitie		00:00	202
	ht edn		wmaci	nnes by prei	erences only	when th	ey nave scheut	neu activitie			
	HT ED	-									
9. Milli		ILDIX 0						_			
10. HT	10					•					
11. +								<u> </u>			
12. I er 13 +	npering	11			_			_	_	-	
	embly 1	2									
15. Thi	ckness	Cutting	13								
	al Finisl	hing 14			_			_			
17. QC	15			F							

### **View Dependencies**

Using this function, the relationships between operation and networks can be identify. Once this function is activated, the software will show the relationships of selected operation. For different networks it use different colors.as an example in below image there are 3 networks.ABS-101 die network is shown in blue color and ABS-101 BR operation is shown in green color. The assembly operation of DIE and BR is shown in Red color.

Job Shop Visual ver. 5.7	771	
File Edit View Jobs	Scheduling Move operations Rescheduled Statistics Language About	
JobShop Visual Visual Tredection Votestating	U O ⊕ ⊕ ★ O ≥ ▼ O ≥ ★ L J F ¥ 5 7 2 2020.02.12 06:00 - 20 1 0 / 17 8.19% [Job: AB5-101 03] [Domination: 8.49%] [Product: AB5-101 03 DIE Finish] [Sequence: AB5-101 03 DIE] [PC	
2020.02.12 22:10 2020.02.13 05:40 2020.02.13 06:00	D         2020.02.12         2020.02.13         2020.02.14         2020.02.15         2020.02.16         2020.02.16           06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00         00:00         06:00         12:00         18:00	
00:30, 07:30 , 07:50		
1. Lathe_Roughing 1		
2. Lathe_Remachining 2		
3. CNC_Roughing 3		
4. CNC_Finishing 4		
5. WEDM 5		
6. Pre HT EDM_Die 6		
7. Post HT EDM_Die 7		<b>P</b>
8. Post HT EDM_BR 8		
9. Milling 9		
10. HT 10		
11. +		
12. Tempering 11		
13. +		
14. Assembly 12		
15. Thickness Cutting 13		
16. Final Finishing 14		
17. QC 15		

## Job Filter

This option can be used to filter workstation selected for each job.

🔅 Job Shop Visual ver. 5.7.	77.1
File Edit View Jobs	Scheduling Move operations Rescheduled Statistics Language About
JobShop	U C ⊕ ⊕ ≠ C ≫ T ⊙ ≥ Z 06:00 - 2020.02.19 13:40 7.3days scheduled from start, d 3 0 / 17 17.18% [Job: CA-2005 65] [Domination: 6.45%] [Product: CA-2005 65 DIE Finish] [Sequence: CA-2005 65 DIE] [PC: 1.00 HOLLOW DIE Lathe Boughing]
2020.02.12 16:30 2020.02.12 18:00 2020.02.12 18:20 00:10, 01:30, 01:50	D         2020.02.12         2020.02.13         2020.02.14         2020.02.14         2020.02.14           c)         65.90         19.90         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20         19.20
00.10, 01.30, 01.30	
1. Lathe_Roughing 1	
2. Lathe_Remachining 2	
3. CNC_Roughing 3	
4. CNC_Finishing 4	
5. WEDM 5	
6. Pre HT EDM_Die 6	
7. Post HT EDM_Die 7	
8. Post HT EDM_BR 8	
9. Milling 9	
10. HT 10	
11. +	
12. Tempering 11	
13. +	
14. Assembly 12	
15. Thickness Cutting 13	
16. Final Finishing 14	
17. QC 15	

Without activating job filter option all the 17 workstations available in the work shop were shown in the above screen.

🔅 Job Shop Visual ver. 5.7	7.1
File Edit View Jobs	Scheduling Move operations Rescheduled Statistics Language About
Job <u>Sho</u> p	① ☆ ⊕ ☞ ★ G ≫ ▼ ♡ 코 후 노 글 또 걸 통 잘 을 될 할 수 요 수 급 를 四 % 수 ඕ ◆ ▲ ★ ⑦ 수 ⑤ 2028.02.12 06:00 - 2028.02.19 13:40 7.3days scheduled from start
Grand Frederitor Schoolattory	3 0 / 17 Workplace Filter pb: CA-2005 65] [Domination: 6.48%] [Product: CA-2005 65 DIE Finish] [Sequence: CA-2005 65 DIE] [PC: 1.00 HOLLOW DIE Lathe Roughing]
2020.02.12 16:30 2020.02.12 18:00 2020.02.12 18:20	2020.02.12         2020.02.14           165:00         165:00         152:00         152:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         152:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:00         165:
00:10, 01:30 , 01:50	
1. Lathe_Roughing 1	
2. Lathe_Remachining 2	
3. CNC_Roughing 3	
4. CNC_Finishing 4	
5. WEDM 5	
6. Pre HT EDM_Die 6	
7. HT 10	
8. +	
9. Tempering 11	
10. +	

After activation of job filter option only 8 work stations which has to be perform an operation related to the selected job is shown in the display.

## Go to operation Machine line

To get the selected machine lines to top row, this option can be used.

🔅 Job Shop Visual ver. 5.7	7.7.1			
File Edit View Jobs	Scheduling Move ope	rations Rescheduled	Statistics Language	About
JobShop	Start 🗘 🕀 🔂 🖈	G ≫ T ⊙ ≝ ≢	▙ <b>▕▖▎▙</b> ▓▊	
Visual Production Schedaling	2 0 / 17	16.61%	[Job: 100D-301 2	1] [Domination:
2020.02.13 05:40 2020.02.13 13:10	⇒ 2020.02.12	202	0.02.13	2020.02.14
2020.02.13 13:10	€ 06:00 12:00	18:00   00:00   06:00	12:00   18:00 00:0	00   06:00   12:00
00:30, 07:30 , 07:50				1113
6. Pre HT EDM_Die 6				
7. Post HT EDM_Die 7				
8. Post HT EDM_BR 8				
9. Milling 9				
10. HT 10		•		
11. +				
12. Tempering 11			• • • • • • • • • • • • • • • • • • •	
13. +				
14. Assembly 12				
15. Thickness Cutting 13				
16. Final Finishing 14				
17. QC 15				

When this option is activated, selected option will be scrolled up to top row. This option will be very helpful when analyzing a selected work station.

#### Go to previous operation

This feature can be used to toggle to the previous operation.

🜻 Job Shop Visual ver. 5.7	7.7.1										
File Edit View Jobs	Schedulin	ng Move operations	Reschedu	uled Statistics	Language	About					
JobShop		🕀 🕶 🖈 😏 🐎	▼ 🕑 🗉	≤ ≠ + →	¥¥¥	i i i i i i i i i i i i i i i i i i i	੍ਹੇ # ਦ ਦ	4 🗖 🛢	<b>E</b> % -/+ 23	O ▲ 1	ñ 0 🕫 🛇
Visual Production Ochedating	2	0 / 17	16.61%	[Job: 1	00D-301 2	L] [Domina	ation: 7.46%	] [Product	t: 100D-301 21	DIE Fi	nish] [Sequ
2020.02.12 21:50	5	2020.02.12		2020.02.13		2020.0	02.14	20	20.02.15		2020.02.16
2020.02.13 01:50 2020.02.13 02:10	e 10	6:00   12:00   18:00	00:00   0	06:00   12:00	18:00 00:0	0   06:00	12:00   18:00	00:00   06:0	0   12:00   18:00	00:00	06:00   12:00
00:15, 04:00 , 04:20										R	
6. Pre HT EDM_Die 6			2								
7. Post HT EDM_Die 7											
8. Post HT EDM_BR 8											
9. Milling 9						•					
10. HT 10							_				
11. +			_								
12. Tempering 11	· · · ·			-							
13. +				• ·	•						
14. Assembly 12											
15. Thickness Cutting 13											
16 Final Finishing 14	1										

When this feature is activated, the selection will be moved to previous operation from current selected operation.

## Go to next Operation

This feature can be used to toggle to the next operation.

🌻 Job Shop Visual ver. 5.7	7.7.1	
File Edit View Jobs	Scheduling Move operations	Rescheduled Statistics Language About
JobShop Visual Dianal Tradaction Verheadering	U → ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔	▼ 💮 🖻 苯 🖕 🛃 🍟 🍟 🗳 🍟 🕯
2020.02.13 16:00 2020.02.13 21:00 2020.02.13 21:20	<b>5</b> 2020.02.12 <b>6</b> 06:00 12:00 18:00	2020.02.13         2020.0           00:00           06:00           18:00         00:00           06:00
00:00, 05:00 , 05:20		
6. Pre HT EDM_Die 6	E	
7. Post HT EDM_Die 7		
8. Post HT EDM_BR 8		
9. Milling 9		
10. HT 10		
11. +		
12. Tempering 11		
13. +		
14. Assembly 12		
15. Thickness Cutting 13		
16. Final Finishing 14		
17. QC 15		

When this feature is activated, the selection will be moved to next operation from current selected operation.

#### Zoom

This feature is used to change the size of the day length and row heights.

Ö Jo	b Sho	p Visual	ver. 5.7	7.7.1													
File	Edit	View	Jobs	Schedu	ling N	Move op	erations	Resch	eduled	Statisti	cs Lang	guage	About				
J	ob	Shq	P		<b>} ⊕</b> t	600 🖈 1	€ %	۲Ø			• 🗳	₩ ₩	2	<b>₽</b> ₩	ŪΩ	et 6	3 2
Qú	aut Frod	action Skho	daling	2		0 / 17	7	16.63	L%	[Job:	100D-3	01 21]	[Dom:	ination	: 7.46%	] [Pr	roduo
202 202	0.02.1	3 16:00 3 21:00 3 21:20 00,05:	20	5 2	<b>2020</b> 06:00	).02.12   12:00	18:00	00:00	<b>202</b>   06:00	0.02.13   12:00	18:00	00:00	<b>202</b>   06:00	0.02.14	18:00	00:00	2   06:
00.	00, 05: Y	00,05:	20									_					
6. Pre l	HT EDN	I_Die 6					•		•								
7. Post 8. Post		Zoom													×		
9. Milli	n						The	e day len	gth in pi	kels							
10. HT	1																
11. +																	
12. Ter	n							177	-							_	
13. +				The	row hei	ght in pix	els									-	
14. Ass 15. Thi				17	-							~				_	
16. Fin												J	Refresh		Close	-	_
17. QC					-		_		_		_	_			_		
	10																

The length of the day can be adjusted by changing the cursor of the horizontal adjuster or by entering the numerical value. After changing the size click refresh button to confirm the change. Then the size of the day length will be changed accordingly.

The height of the row can be adjusted by changing the cursor of the vertical adjuster or by entering the numerical value. After changing the size click refresh button to confirm the change. Then the size of the day length will be changed accordingly.

# Jobs Menu

There are 2 options which are related to the job-related functions are coming under this menu.

- 1. Jobs List
- 2. Edit Job Property

🔅 Job Shop Visual	ver. 5	.7.7.1								
File Edit View	Jobs	Scheduling	Move ope	rations	Resch	eduled	Statistic	s Langi	Jage	About
JobSha	Ø	Jobs list		G 🌮	<b>T</b> 🕑	) 🗹 🚽		₩ ₹	i 145 ×	i 🗣 🖣
Winut Fredaction Okho	23	Edit job prope	rty 7		16.61	L%	[Job:	100D-30	1 21]	[Domina
2020.02.13 16:00 2020.02.13 21:00 2020.02.13 21:20	_	★ 20 ★ 20	<b>20.02.12</b> 0   12:00	18:00	00:00	<b>202</b>	0.02.13   12:00	18:00	00:00	<b>2020.0</b>
00:00, 05:00 , 05:2	20								_	11
6. Pre HT EDM_Die 6				•		•				
7. Post HT EDM_Die 7										
8. Post HT EDM_BR 8										
9. Milling 9										
10. HT 10						-				
11. +				<b>•</b> 1						
12. Tempering 11 13. +							• •			_
14. Assembly 12										
15. Thickness Cutting 1	3									
16. Final Finishing 14										
17 QC 15										

### Jobs List

This option can be used to get a list of added job.

020 02 13 21:00	020.02.12 00   12:00   18:00 00:0	2020.02.1 00   06:00   12:00	-	<b>2020.02.14</b>	2020.02.15 :00 00:00   06:00   12:00		0.02.16  12:00  18:00		020.02.	
Jobs Clear colors Auto. add colors	Set color Re	efresh	Preferenc	e 80.00	Job preference coef. : 0.4000	Recalculate	domination	Reload		×
job name	color	weight	preference	domination db start	db stop		oossible stop	nt cnt op	cnt	
12009 ABS-101 03		8.683		8.488 21/01/20	21/01/21	20/02/12 6:00:00 AM		3	20	
12016 70S-1601 4		9.315	80.000	8.212 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
12005 AL-507_2		7.294	100.000	7.655 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
12014 CA-2005_64		8.073	80.000	7.467 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
12003 100D-301_21	327	69 8.056	80.000	7.457 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
12004 CA-1008_47		7.973	80.000	7.407 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
12001 100D-101 44		7.469	80.000	7.104 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
2013 AL-491_1		7.874	60.000	6.692 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
12015 CA-2005_65		8.073	50.000	6.483 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
12012 AL-490_1		7.485	60.000	6.458 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/16 11:50:00 AM	( 3	20	
12002 100D-101_45		7.373	50.000	6.063 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/18 9:10:00 PM	3	20	
12008 SPR-205_10		2.577	80.000	4.169 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/16 5:40:00 AM	1	10	
2007 SPR-105_88		2.466	80.000	4.102 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/16 5:40:00 AM	1	10	
12010 SPR_105_8		2.466	80.000	4.102 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/16 5:40:00 AM	1	10	
12011 SPR-105_9		2.466	80.000	4.102 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/16 5:40:00 AM	1	10	
12006 DG-01_36		2.357	80.000	4.037 21/01/20	21/01/21	20/02/12 6:00:00 AM	20/02/16 5:40:00 AM	1	10	

In the job list Summery of following details can be seen.

- 1. Job id
- 2. Job name
- 3. Color assigned to the job.

This color can be changed according to the personal preference by using set color option. Generally, a unique color will be assigned to each job automatically.

- 4. Weight of the job
- It representable job demanding
- 5. Preference Preference given in the tJobs table is displayed here.
- 6. Domination -Need to explain this
- 7. Db start date

Scheduling started date will be displayed here.

- Db stop date The stop date of database is displayed here. This date set by default one year from db start date.
- 9. Possible start date

The earliest possible start date according to the data table is displayed here.

10. Possible stop date

The latest possible end date according to the data table is displayed here.

11. nt-cnt

Count of networks related to the job is displayed here.

12. op_cnt

Count of operations related to the job is displayed here.

### Edit Job Property

This Function is used to change the properties of the job. This function is same as the "job property" function in "Edit" menu.

Ø Job Shop Vis File Edit Vie				ing N	/love oper	ations	Resci	hedule	d Stat	istics	Lang	uage	Abou	t
Jobsh			Start	<b>} ⊕</b> €	m ★ ₹	€ %	<b>T</b> C		<b>≹</b> €	. 🛃				
Official Off-Medician           2020.02.13 16:           2020.02.13 21:           2020.02.13 21:           2020.02.13 21:           2020.02.13 21:           2020.02.13 21:           00:00, 05:00,           6. Pre HT EDM_DH           7. Post HT EDM_D           8. Post HT EDM_B           9. Milling 9           10. HT 10           11. +           12. Tempering 11           13. +	00 00 Job:	ob pro 100D-3 Inf From	start d	id:2001: ate (db) ate   nt start:	0 / 17 0.02.12 2003) : 70/01/0 > : 20/02/1 20/02/1	2	- 12: ▼ 12:		20.02 ×	.13	18:00	00:00	20	minat 20.02 0   12
13. + 14. Assembly 12 15. Thickness Cutt 16. Final Finishing 17. QC 15				ent end: nd date:		_	_	51:29 51:29	_					
		Sch Chanç	ge job : eduled fi ge job ( ding dead	rom end deadlin	e type									
	_		_			Oł	<	С	ancel					

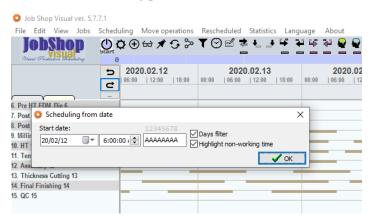
### Scheduling Menu

There are 4 major functions which are related to the scheduling process is coming under this menu.

- 1. Start
- 2. Scheduling Sequences
- 3. Save completed plan
- 4. Plan operation list

# Start

To start the scheduling process this function, need to be activated.



After clicking the function, above dialog box can be seen.

In this dialog box, the start date and start time and the working pattern can be given. In addition to that, There are 2 check boxes.

1. Days filter

If this check box is un ticked the non-working days will be displayed in the schedule. If this check box was ticked the non-working days will be removed from the schedule display.

2. Highlight non-working time

When this tick box is tike, non-working times will be shown as described in the no 18 in display introduction page.

#### Scheduling Sequences

Basic scheduling operation will be done using this feature. When this feature is clicked, below dialog box will be activated.

0	Jobs se	quences for sche	dulina		2020 02 13	2020 02 1/	2020 02 18			20.02	16	- 0	20.0
ix		schedul color		deadline job_name	sequence	product	job_id	network	count lev	el CP	duration	domination	g c(
	1.00	1 25	56 0	0 ABS-101_03	ABS-101_03_BR	ABS-101_03_BR_Finish	20012009	1020	6	1	2 117	8.4884	1 23
	2.00	0	0	0 70S-1601_4	70S-1601_4_DIE	70S-1601_4_DIE_Finish	20012016	1036	8	1	1 198	8.2119	29
	3.00	0	0	0 100D-301_21	100D-301_21_DI	E 100D-301_21_DIE_Finish	20012003	1007	8	1	1 213	7.4567	7 27
	4.00	0	0	0 CA-2005_64	CA-2005_64_DIE	CA-2005_64_DIE_Finish	20012014	1030	8	1	1 198	7.4667	7 26
	5.00	0	0	0 CA-1008_47	CA-1008_47_DIE	CA-1008_47_DIE_Finish	20012004	1010	8	1	1 192	7.4070	25
	6.00	0	0	0 100D-101_44	100D-101_44_DI	E 100D-101_44_DIE_Finish	20012001	1001	8	1	1 204	7.1044	1 25
	7.00	0	0	0 AL-507_2	AL-507_2_DIE	AL-507_2_DIE_Finish	20012005	1013	8	1	1 174	7.6552	2 25
	8.00	0	0	0 70S-1601_4	70S-1601_4_BR	70S-1601_4_BR_Finish	20012016	1037	6	1	2 153	8.2119	25
	9.00	1	0	0 ABS-101_03	ABS-101_03_DIE	ABS-101_03_DIE_Finish	20012009	1019	8	2	1 216	8.4884	ł 31
	10.00	0	0	0 70S-1601_4	70S-1601_4_ASS	EMBLY 70S-1601_4_ASSEMBLY_Fin	nish 20012016	1038	6	2	1 132	8.2119	23
	11.00	0	0	0 AL-491_1	AL-491_1_DIE	AL-491_1_DIE_Finish	20012013	1027	8	1	1 192	6.6919	23
	12.00	1	0	0 ABS-101_03	ABS-101_03_ASS	EMBLY ABS-101_03_ASSEMBLY_Fir	nish 20012009	1021	6	3	1 132	8.4884	1 24
	13.00	0	0	0 CA-2005_65	CA-2005_65_DIE	CA-2005_65_DIE_Finish	20012015	1033	8	1	1 198	6.4831	L 23
	14.00	0	0	0 AL-507_2	AL-507_2_BR	AL-507_2_BR_Finish	20012005	1014	6	1	2 117	7.6552	2 20
	15.00	0	0	0 100D-101_45	100D-101_45_DI	E 100D-101_45_DIE_Finish	20012002	1004	8	1	1 204	6.0634	1 21
•	16.00	0 42108	17 0	0 AL-490_1	AL-490_1_DIE	AL-490_1_DIE_Finish	20012012	1024	8	1	2 180	6.4583	3 21
	17.00	0	0	0 CA-2005_64	CA-2005_64_BR	CA-2005_64_BR_Finish	20012014	1031	6	1	2 117	7.4667	7 20
	18.00	0	0	0 100D-301_21	100D-301_21_BR	100D-301_21_BR_Finish	20012003	1008	6	1	2 132	7.4567	7 21
<													
ix		schedul color	fixed	deadline job_name	sequence	product	job_id	network	count lev	el CP	duration	domination	g_c
•	1.00	1	0	0 ABS-101_03	ABS-101_03_BR	ABS-101_03_BR_Finish	20012009	1020	6	1	2 117	8,4884	1 23
	9.00	1	0	0 ABS-101_03	ABS-101_03_DIE	ABS-101_03_DIE_Finish	20012009	1019	8	2	1 216	8.4884	
	12.00	1	0	0 ABS-101_03	ABS-101_03_ASS	EMBLY ABS-101_03_ASSEMBLY_Fir	nish 20012009	1021	6	3	1 132	8.4884	1 24

In the upper part of the dialog box all the networks related to give job will be displayed.

In the lower part networks, which are selected for the scheduling will be displayed.

There are 2 major types of scheduling process.

1. Job by Job Scheduling.

In this technique you can select the relevant networks for a specific job and then schedule. This can be done for every job in step by step process.

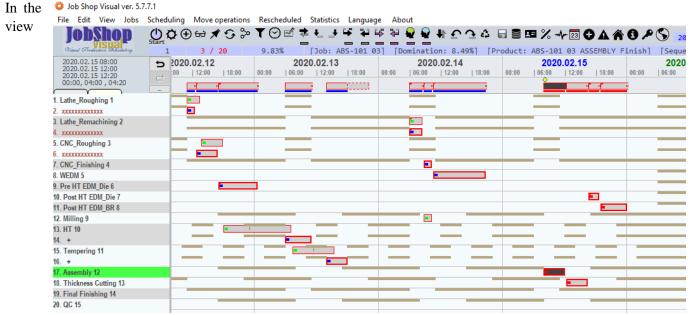
For scheduling using this technique relevant networks should be added to the lower part. For that the relevant networks can be selected from the upper part using Ctrl + Left mouse click und can be added to lower part using the "ADD Selected Rows "command.

2. Batch scheduling.

In this techniques you can select all the networks in one time and schedule as a batch very easily.to add all the operations to schedule area you can scroll down to the last raw of upper part and select it an then click the "add all rows above" command.

"Remove all rows above" and "Remove all selected rows" operations can be used to remove necessary operations when scheduling.

"OK-View " command can be used to view selected operations under relevant workstations as below.



process capacity constraints will not be considered.

"OK-Schedule" command can be used to schedule selected operation. During the scheduling capacity constrains will be considered as will be resolved as much as possible. See the difference of above result od view command and below result of schedule command for same operation.

**For more details on Utilization of these options please see the video of <u>https://youtu.be/R31MIGTRniU</u>

Job Shop Visual ver. 5.7 File Edit View Jobs		ng Move op	erations	Reschedu	led Sta	tistics	anguage	About									
JobShop		🕀 🕁 🖈	G ‰ .	<b>⊺</b> ⊘ ⊭	1≠+	. <b>. + 1</b>	**	₩ 💡	_						<b>≜ ^ (</b>		-
Ninut Production Achedaling	1	0 / 1		8.19%			-101 03]	[Domi		8.49%]	[Prod	uct: AB			MBLY Fin	ish]	[Sequ
2020.02.17 08:00 2020.02.17 12:00 2020.02.17 12:20 00:00, 04:00 , 04:20	<b>c</b>	<b>2020.02.12</b> 6:00   12:00	18:00	00:00	<b>202</b>   06:00	0.02.13   12:00	18:00	00:00	<b>2020</b>   06:00	0.02.14	18:00	00:00	<b>202</b>   06:00	0.02.15   12:00	18:00	00:00	<b>2</b>   06:0
1. Lathe_Roughing 1																	
2. Lathe_Remachining 2									•••								
3. CNC_Roughing 3		-	•														
4. CNC_Finishing 4																	
5. WEDM 5													-				
6. Pre HT EDM_Die 6					]												
7. Post HT EDM_Die 7																	
8. Post HT EDM_BR 8																	
9. Milling 9	_																
10. HT 10			•	1													
11. +					-	, <u> </u>							-			-	
12. Tempering 11		_	_	_		1		_			_	_					
13. +				_		-						_				_	
14. Assembly 12																	
15. Thickness Cutting 13	_					_											
16. Final Finishing 14				-	-								-				
17. QC 15		-								-							

### Save Completed Plan

This function is used to save the schedule. After scheduling always, it is recommended to save the schedule.

When clicking this operation below dialog box will be displayed.

🌼 🤹 Job Shop Visual ver. 5	.7.7.1				
File Edit View Jobs	Scheduling	Move operations	Rescheduled	Statistics Lang	uage About
Jobshop	Ů ¢ ⊕	₩ <b>* 5</b> ≫	=		
	1	3 / 20	9.83%	[Job: ABS-10:	
2020.02.15 08:00 2020.02.15 12:00	<b>5</b> 202	0.02.12	00:00   06:00	0.02.13	<b>2020.02</b> . 00:00   06:00   12:
2020.02.15 12:20 00:00, 04:00 , 04:20	< 100.00	12.00   10.00	00.00   00.00	12.00   10.00	00.00   00.00   12.
00.00, 01.00, 01.20			3	3	
6. XXXXXXXXXXXXXX					
7. CNC_Finishing 4	Confirmation		×		
8. WEDM 5					
9. Pre HT EDM_Die 6					
10. Post HT EDM_Die 7	2 Save	e Scheduled jobs?	_		
11. Post HT EDM_BR 8		,,			
12. Milling 9					
13. HT 10					
14. +	Yes	No			
15. Tempering 11					
16. +	_			_	
17. Assembly 12					
18. Thickness Cutting 13					
19. Final Finishing 14					
20. QC 15					

By clicking the "yes" command d in dialog box the schedule can be saved.

🌻 Job Shop Visual ver. 5	.7.7.1					
File Edit View Jobs	Schedulin	g Move operations	Rescheduled	Statistics I	Language	About
JobShop Visual		€ 🕁 🖈 😏 🐎	=		***	** * *
	1	3 / 20	9.83%	[Job: ABS	-101 031	[Domination
2020.02.15 08:00 2020.02.15 12:00 2020.02.15 12:20		<b>020.02.12</b> :00   12:00   18:00	202 00:00   06:00	0.02.13	:00 00:00	2020.02.14   06:00   12:00
00:00, 04:00 , 04:20				3		
6. XXXXXXXXXXXXXXX		-				
7. CNC_Finishing 4	Information		X			•
8. WEDM 5						
9. Pre HT EDM_Die 6						
10. Post HT EDM_Die 7		Save Scheduled jobs,	or			
11. Post HT EDM_BR 8		save scheduled jobs,				
12. Milling 9						
13. HT 10						_
14. +		OK				
15. Tempering 11				1		
16. +				•		
17. Assembly 12						
18. Thickness Cutting 13						
19. Final Finishing 14						
20. QC 15	-					

After clicking "OK" Command you can get the below dialog box.

🔅 Job Shop Visual ver. 5.7.7.1			
	heduling Move operations		Language About
	🖞 🗘 🕀 🗁 🖈 🗲 🐎 `		¥¥¥ <b>₽</b> ₽
Visual Production Achedaling	1 3/20	9.83% [Job: Al	3S-101 03] [Domination
2020.02.15 12:00	►         2020.02.12           □         □6:00         □12:00         □18:00	2020.02.13 00:00   06:00   12:00	2020.02. 18:00 00:00   06:00   12:
6. XXXXXXXXXXXXXXX			
7. CNC_Finishing 4 8. WEDM 5. Confirm.	ation.	~	
0. WEDIN 5	ation	× _	
9. Pre HT EDM_Die 6			
10. Post HT EDM_Die 7 11. Post HT EDM BR 8	Show form "Scheduled data	factored allocate 2	
12. Milling 9	Show form Scheduled data	Tor workplaces ?	
13. HT 10			
14 +			
15. Tempering 11	Yes	No	
16. +			
17. Assembly 12	_		
18. Thickness Cutting 13			
19. Final Finishing 14			
20. QC 15			

If "yes" command box is selected, the workplace operation plan will be displayed.

	U i	uling Move o 🏚 🕀 🔂 🖈			uled Sta	itistics Lan	guage A	lbout 🖣 🗣 🗣 👫 🕤 🔁	4 🖬 🛢 🖽 %	≁ 23 € ▲ ♠ (	<b>9 / (S)</b> 2020.0	2.12 06:00 - 2
inul Production (Rehedaling	1	3/:		9.83%		ob: ABS-10	01 03]	[Domination: 8.49%]				ABS-101 03 AS
20.02.15 08:00	-	2020 02 1	2		2020.05	13		2020 02 14	2020 02 1	5 20	020 02 16	2020.0
Workplace operatio	n plar	1									_	- 🗆 X
/orkPlace	*	Start		Stop		_						
	$\sim$	12/01/01				0	к					
ssembly /12		1			Start		-	e StopWorkplace	Stop	Product	Job Name	Sequence
NC_Finishing /4				1	20/02/15	3:00:00 AM		0 20/02/15 12:00:00 PM	20/02/15 12:20:00 PM	ABS-101_03_ASSEMBLY	ABS-101_03	ABS-101_03_AS
NC_Roughing /3 inal Finishing /14						3:50:00 AM		15 20/02/14 10:20:00 AM	20/02/14 10:40:00 AM	ABS-101_03_DIE_Finish	ABS-101_03	ABS-101_03_DI
inai Finishing /14 IT /10						12:50:00 PM		15 20/02/12 4:50:00 PM	20/02/12 5:10:00 PM	ABS-101_03_DIE_Finish	-	ABS-101_03_DI
athe_Remachining /2						1:50:00 PM		15 20/02/12 5:50:00 PM	20/02/12 6:10:00 PM	ABS-101_03_BR_Finish	-	ABS-101_03_BR
athe_Roughing /1 illing /9				1	20/02/17	5:00:00 AM		0 20/02/17 8:00:00 AM	20/02/17 8:20:00 AM	ABS-101_03_ASSEMBLY		ABS-101_03_AS
ost HT EDM BR /8				3	20/02/12	5:10:00 PM		0 20/02/13 7:10:00 AM	20/02/13 7:30:00 AM	ABS-101_03_BR_Finish	ABS-101_03	ABS-101_03_BR
ost HT EDM_Die /7				3	20/02/13	5:00:00 AM		0 20/02/13 11:00:00 AM	20/02/13 11:20:00 AM	ABS-101_03_DIE_Finish	ABS-101_03	ABS-101_03_DII
re HT EDM_Die /6 IC /15				1	20/02/14	5:00:00 AM	3	30 20/02/14 8:30:00 AM	20/02/14 8:50:00 AM	ABS-101_03_BR_Finish	-	ABS-101_03_BR
empering /11				1	20/02/14	5:00:00 AM	2	30 20/02/14 8:30:00 AM	20/02/14 8:50:00 AM	ABS-101_03_DIE_Finish	ABS-101_03	ABS-101_03_DII
hickness Cutting /13 VEDM /5				1	20/02/12	11:00:00 AM	1	10 20/02/12 12:30:00 PM	20/02/12 12:50:00 PM	ABS-101_03_DIE_Finish	ABS-101_03	ABS-101_03_DI
CDM /S	ng			1	20/02/12	11:00:00 AM	1	10 20/02/12 1:30:00 PM	20/02/12 1:50:00 PM	ABS-101_03_BR_Finish	ABS-101_03	ABS-101_03_BR
9 Milling				1	20/02/14	3:50:00 AM	1	10 20/02/14 10:20:00 AM	20/02/14 10:40:00 AM	ABS-101_03_BR_Finish	ABS-101_03	ABS-101_03_BR
8 Post HT EDM	BR			1	20/02/15	7:00:00 PM	3	30 20/02/16	20/02/16 12:20:00 AM	ABS-101_03_ASSEMBLY	ABS-101_03	ABS-101_03_AS
7 Post HT EDM	Die			1	20/02/15	1:40:00 PM	3	30 20/02/15 6:40:00 PM	20/02/15 7:00:00 PM	ABS-101_03_ASSEMBLY	ABS-101_03	ABS-101_03_AS
6 Pre HT EDM_0	Die			1	20/02/12	5:10:00 PM	3	30 20/02/13 12:40:00 AM	20/02/13 1:00:00 AM	ABS-101_03_DIE_Finish	ABS-101_03	ABS-101_03_DII
15 QC				1	20/02/17	3:20:00 AM		0 20/02/17 1:20:00 PM	20/02/17 1:40:00 PM	ABS-101_03_ASSEMBLY	ABS-101_03	ABS-101_03_AS
11 Tempering				3	20/02/13	7:30:00 AM		0 20/02/13 3:30:00 PM	20/02/13 3:50:00 PM	ABS-101_03_BR_Finish	ABS-101_03	ABS-101_03_BR
11 Tempering				3	20/02/13	2:00:00 PM		0 20/02/13 6:00:00 PM	20/02/13 10:20:00 PM	ABS-101_03_DIE_Finish	ABS-101_03	ABS-101_03_DII
13 Thickness Cut	ting			1	20/02/15	12:20:00 PM		0 20/02/15 4:20:00 PM	20/02/15 4:40:00 PM	ABS-101_03_ASSEMBLY	ABS-101_03	ABS-101_03_AS
5 WEDM				1	20/02/14	10:40:00 AM	1	15 20/02/14 8:40:00 PM	20/02/14 9:00:00 PM	ABS-101_03_DIE_Finish	ABS-101_03	ABS-101_03_DII

In this operation plan filters can be applied according to the operation and get the start times and end times as well as other information of relevant operations.

This function is similar to the function discussed in above. To get the saved operation plan in one time this operation can be used.

eut Production Schedaling	start 1	3 / 2	20	9.83%	- <b>-</b> [	Job: ABS-1	.01 03] [[	Domination:	8.49%]	[Product: ABS-1	01 03 ASSEME	SLY Finish] [	- Sequence: ABS-101 0	33 AS
0.02.15 08:00	-	2020 02 12	)		2020	02 13		2020 02 14		2020 02 1	5	2020.02	16 20	20.0
🔅 Workplace operatio	n plan												- 🗆	$\times$
orkPlace	*	Start		Stop										
		12/01/01		22/02/10		]- (	DK							
				Capacity	Start		SettingTime	StopWorkplace		Stop	Product	Job Name	e Sequence	,
ssembly /12						5 8:00:00 AM		20/02/15 12:0		20/02/15 12:20:00 PM		SSEMBLY ABS-101		_
NC_Finishing /4 NC Roughing /3						4 8:50:00 AM		20/02/14 10:2		20/02/14 10:40:00 AM		IE Finish ABS-101		-
nal Finishing /14						2 12:50:00 PM		20/02/12 4:50		20/02/12 5:10:00 PM		IE Finish ABS-101		-
T /10 athe Remachining /2						2 1:50:00 PM		20/02/12 5:50		20/02/12 6: 10:00 PM		R Finish ABS-101		-
athe_Roughing /1				1	20/02/1	7 6:00:00 AM	0	20/02/17 8:00	:00 AM	20/02/17 8:20:00 AM	ABS-101 03 A	SSEMBLY ABS-101		-
illing /9 ost HT EDM BR /8				3	20/02/1	2 6:10:00 PM	0	20/02/13 7:10		20/02/13 7:30:00 AM		R_Finish ABS-101		-
ost HT EDM_DR /8				3	20/02/1	3 6:00:00 AM	0	20/02/13 11:0	0:00 AM	20/02/13 11:20:00 AM	ABS-101_03_D	IE_Finish ABS-101	03 ABS-101_03	3_DII
e HT EDM_Die /6				1	20/02/1	4 6:00:00 AM	30	20/02/14 8:30	:00 AM	20/02/14 8:50:00 AM	ABS-101_03_BF	R_Finish ABS-101	03 ABS-101_03	3_BR
C /15 empering /11				1	20/02/1	4 6:00:00 AM	30	20/02/14 8:30	:00 AM	20/02/14 8:50:00 AM	ABS-101_03_D	IE_Finish ABS-101	_03 ABS-101_03	3_DII
nickness Cutting /13				1	20/02/1	2 11:00:00 AM	10	20/02/12 12:3	0:00 PM	20/02/12 12:50:00 PM	ABS-101_03_D	IE_Finish ABS-101	_03 ABS-101_03	3_DII
EDM /5				1	20/02/1	2 11:00:00 AM	10	20/02/12 1:30	:00 PM	20/02/12 1:50:00 PM	ABS-101_03_BF	R_Finish ABS-101	_03 ABS-101_03	3_BR
9 Milling				1	20/02/1	4 8:50:00 AM	10	20/02/14 10:2	0:00 AM	20/02/14 10:40:00 AM	ABS-101_03_BF	R_Finish ABS-101	_03 ABS-101_03	3_BR
8 Post HT EDM	BR			1	20/02/1	5 7:00:00 PM	30	20/02/16		20/02/16 12:20:00 AM	ABS-101_03_A	SSEMBLY_ABS-101	_03 ABS-101_03	3_AS
7 Post HT EDM	Die			1	20/02/1	5 4:40:00 PM	30	20/02/15 6:40	:00 PM	20/02/15 7:00:00 PM	ABS-101_03_A	SSEMBLY_ABS-101	_03 ABS-101_03	3_AS
6 Pre HT EDM_	Die			1	20/02/1	2 5:10:00 PM	30	20/02/13 12:4	Ю:00 AM	20/02/13 1:00:00 AM	ABS-101_03_D	IE_Finish ABS-101	_03 ABS-101_03	3_DII
15 QC				1	20/02/1	7 8:20:00 AM	0	20/02/17 1:20	:00 PM	20/02/17 1:40:00 PM	ABS-101_03_A	SSEMBLY ABS-101	_03 ABS-101_03	3_AS
11 Tempering				3	20/02/1	3 7:30:00 AM	C	20/02/13 3:30	:00 PM	20/02/13 3:50:00 PM	ABS-101_03_BP	R_Finish ABS-101	_03 ABS-101_03	3_BR
11 Tempering				3	20/02/1	3 2:00:00 PM	C	20/02/13 6:00	:00 PM	20/02/13 10:20:00 PM	ABS-101_03_D	IE_Finish ABS-101	_03 ABS-101_03	3_DII
13 Thickness Cu	tting			1	20/02/1	5 12:20:00 PM	C	20/02/15 4:20	:00 PM	20/02/15 4:40:00 PM	ABS-101_03_A	SSEMBLY ABS-101	_03 ABS-101_03	3_AS
5 WEDM				1	20/02/1	4 10:40:00 AM	15	20/02/14 8:40	:00 PM	20/02/14 9:00:00 PM	ABS-101_03_D	IE_Finish ABS-101	_03 ABS-101_03	3_DII

## Move Operation Menu

There are 8 operations coming under this operation. these "move operation" options are very important for the schedule optimization.

- 1. Move this task to date
- 2. Move this task to start date
- 3. Move this task in front of marked task
- 4. Move this task behind the marked task
- 5. Move only one task from right to as close to the selected task one as possible
- 6. Move all tasks from right to as close to the selected task one as possible
- 7. Move only one task from right to as close to the selected task one as possible
- 8. Move all tasks from right to as close to the selected task one as possible

#### 🜻 Job Shop Visual ver. 5.7.7.1

File Edit View Jobs Sched	uling Move	e operations Rescheduled	Statistics Language	About
IobShop 🕛	¢€‡	Move this task to date		2
Olived Troduction Okhedaling	M	love this task to start date		35
2020.02.12 17:10 2020.02.13 00:40	20: +	Move this task in front of th	e marked task	)2
2020.02.13 00:40 2020.02.13 01:00 00:30, 07:30 , 07:50 ⊂	06:00	Move this task behind the m	narked task	12
	- H	Move only one task from rid	ht to as close to the sele	cted task one as possible
6. xxxxxxxxxxxx 7. CNC Finishing 4		Move all tasks from right to	as close to the selected t	ask one as possible
8. WEDM 5	H	Move only one tasks from ri	ght to as close to the sele	ected task one as possible
9. Pre HT EDM_Die 6	<b>₩</b>	Move all tasks from right to	as close to the selected t	ask one as possible
10. Post HT EDM_Die 7				
11. Post HT EDM_BR 8 12. Milling 9				sk one as possible, without conflict
13. HT 10	<b>₩</b>	Move all tasks from right to	as close to the selected t	ask one as possible, without conflict
14. +				
15. Tempering 11				
16. + 17. Assembly 12	-			
18. Thickness Cutting 13	<u> </u>			E
19. Final Finishing 14				
20. QC 15				

Move this task to date

This function can be used to move a certain operation to certain date.

Move this task to start date

This function can be used to move a certain operation to a certain date.

Move this task in front of marked task

This option can be used to move a selected task to Infront of a marked task.

Move this task behind the marked task

This option can be used to move a selected task to Infront of a marked task

Move only one task from right to as close to the selected task one as possible

This option can be used to move a selected task from right to as close to the selected task one as possible

Move all tasks from left to as close to the selected task one as possible

This option can be used to move all tasks in relevant workstation from left to as close to the selected task one as possible

Move only one task from right to as close to the selected task one as possible

This option can be used to move a selected task from right to as close to the selected task one as possible

Move all tasks from right to as close to the selected task one as possible

This option can be used to move all tasks in relevant workstation from left to as close to the selected task one as possible

# Rescheduled Menu

🔅 Job Shop Visual ver. 5.7.7.1

File Edit View Jobs	Scheduling Move operations	Rescheduled Statistics Language About
Jobshop Visual Visual Fordaction Verheadating	U → ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔	<ul> <li>1. Simple resolve selected conflicts</li> <li>2. Simple resolve only selected conflict</li> </ul>
2020.02.12 17:10	⇒ 2020.02.12	3. Resolve conflicts by tasks start
2020.02.13 00:40 2020.02.13 01:00	06:00   12:00   18:00	4. Resolve only selected conflict by tasks start
00:30, 07:30 , 07:50		
6. xxxxxxxxxxxx		
7. CNC_Finishing 4		
8. WEDM 5		
9. Pre HT EDM_Die 6	a constant	
10. Post HT EDM_Die 7		
11. Post HT EDM_BR 8		
12. Milling 9		
13. HT 10		
14. +		
15. Tempering 11		
16. +		
17. Assembly 12		
18. Thickness Cutting 13		
19. Final Finishing 14		
20. QC 15		

Simple resolve selected conflict

If there are some conflicts in the schedule, those conflicts can be resolved using this function easily. For the simple schedules with small networks this function is very effective.

Simple resolve only selected conflict

To resolve a selected conflict, this function can be used. To resolve the conflicts of complex schedules with large networks this feature is recommended.

Resolve conflicts by task start

This function will resolve conflicts by changing the task start. This feature will try to resolve all the conflicts.

Resolve only selected conflict by tasks start

This function will resolve only the selected conflicts by changing the task start.

**For more details on Utilization of these options please see the video of http://www.jobshop.72.sk/?m=0EN

## Statistics

There are 3 sub menus are coming under this main menu. The results of scheduling and optimizing process can be obtained using the sub menus coming under this main menu.

- 1. Work Place Usage
- 2. Job Dead Line
- 3. Capacity Chart
- Job Shop Visual ver. 5.7.7.1

File Edit View Jobs	Scheduling Move operations	Rescheduled S	tatistics Langu	uage About
JobShop Visual Visual Fordaction Whitedating		_	Workplace u Job deadline	-
2020.02.12 17:10 2020.02.13 00:40 2020.02.13 01:00 00:30, 07:30 , 07:50	►       2020.02.12         06:00       12:00       18:00	202( -	4 Capacity ch	
6. xxxxxxxxxxxxx				
7. CNC_Finishing 4				
8. WEDM 5				<b>E</b>
9. Pre HT EDM_Die 6				
10. Post HT EDM_Die 7				
11. Post HT EDM_BR 8				
12. Milling 9				
13. HT 10	• • • • •			
14. +		-		
15. Tempering 11		•		
16. +				
17. Assembly 12				
18. Thickness Cutting 13			_	
19. Final Finishing 14				_
20. QC 15				

# Workplace Usage

The Utilization of work place in terms of Dates and In terms of work places were analyzed in this sub menu. On the top left corner there are 3 tabs.

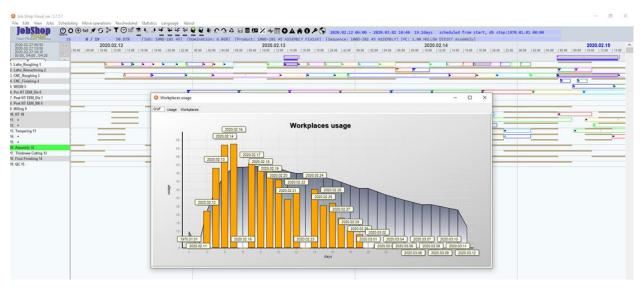
1.Graph

2.Usage Table

3.Workplace utilization table.

### Graph

This is the graphical representation of Work place utilization. Yellow columns show the actual utilization and the gray char is showing the Hypothetical utilization of machines.



### Usage

This is the data table representation of utilization of machines.

There are 3 columns in the data table.

1.Days - Planned dates

2.Utilization -Actual Utilization of total machines (Yellow columns in the graph)

3. Global Utilization - Hypothetical utilization (Grey area of the graph)

day	usage	global_usage
20/02/12	22.29%	22.29%
20/02/13	48.02%	35.16%
20/02/14	62.11%	44.14%
20/02/15	62.65%	48.77%
20/02/17	50.89%	49.20%
20/02/18	48.83%	49.13%
20/02/19	49.44%	49.18%
20/02/20	41.13%	48.17%
20/02/21	29.33%	46.08%
20/02/22	35.75%	45.05%
20/02/24	35.43%	44.17%
20/02/25	25.48%	42.61%
20/02/26	26.99%	41.41%
20/02/27	18.02%	39.74%
20/02/28	10.32%	37.78%
20/02/29	8.01%	35.92%
20/03/02	2.08%	33.93%

### Work Places Utilization

In this table the workplace utilization and global work place utilization is analysed under vast range of fileds. There are 11 columns coming under this table.

- 1. Work Place -The Work Place in the machine shop which need to be analyzed.
- 2. Code The code given to machine shop
- 3. Area The area where the work place belongs to
- 4. Capacity The capacity of work station.
- 5. Preference The preference given for the work station
- 6. Day Days in the schedule
- 7. Usage Usage as a percentage of work time
- 8. Globle usage Hypothetical Usage
- 9. Domination of job
- 10. Work Time Total Available time of work station
- 11. Used Time Utilized time for operation.

7 09:50 7 13:50 7 14:10	16 0 / 19 50.83% [3c 2020.02.12 06.00 [08.00 ]18.00 [12.00 [14.00 ]16.00	b: 1000-101 45] [Dom			2020.02.13					202	0.02.14		0   20.00   22.00	00.00 1.02.00 1.0	2020.02.1
:00,04:20															-
phing 1														-	
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ing 3		<b>B B</b>								1					
ng 4															
Die 6						7							-		
Die 7		O Workplaces usage									-		<		
BRS															
		Graf Usage Workplace	5												
		workplace	code	area	capacity p	reference day	usage	1.4	xbal usage d	fomination wo	rk time used	- AV.2			
		Lathe Roughing	cooe	Manual	L00	15.00% 20/02/12	usage	100.00%	100.00%	5.66%	1140	_ome 1140	â -		
		CNC_Roughing		CNC	1.00	13.00% 20/02/12		85.09%	85.09%	13.35%	1140	970			
1		Pre HT EDM Die	3	EDM	1.00	13.00% 20/02/12		28.47%	28.47%	13.35%	1140	410			-
		HT HI ELM_DIE	10	Manual	3.00	6.00% 20/02/12		31.94%	31.94%	5.34%	720	230			
		Lathe_Roughing	30	Manual	1.00	15.00% 20/02/12		100.00%	100.00%	5.66%	1140	1140	10.0		
			1										_		
utting 13		CNC_Roughing	3	CNC	1.00	13.00% 20/02/13		100.00%	92.54%	13.35%	1140	1140			
ng 14		Pre HT EDM_Die	0	EDM	1.00	10.00% 20/02/13		100.00%	64.24%	12.50%	1440	1440			
			10	Manual	3.00	6.00% 20/02/13		93.06%	62.50%	5.34%	720	670			
		Tempering	11	Manual	3.00	5.00% 20/02/13		100.00%	50.00%	11.54%	720	720			
		Lathe_Roughing	1	Manual	1.00	15.00% 20/02/14		78.95%	92.98%	5.66%	1140	900			
		Lathe_Remachining	2	Manual	1.00	14.00% 20/02/14		100.00%	33.33%	5.88%	300	300			
		CNC_Roughing	3	CNC	1.00	13.00% 20/02/14		100.00%	95.03%	13.35%	1140	1140			
		Pre HT EDM_Die	0	EDM	1.00	10.00% 20/02/14		100.00%	76.16%	12.50%	1440	1440			
		Miling	9	Manual	1.00	7.00% 20/02/14		16.67%	5.56%	1.76%	540	90			
		нт	10	Manual	3.00	6.00% 20/02/14		191.67%	105.56%	5.34%	720	1380			
		Tempering	11	Manual	3.00	5.00% 20/02/14		133.33%	77.78%	11.54%	720	960			
		Lathe_Remachining	2	Manual	1.00	14.00% 20/02/15		100.00%	50.00%	5.88%	300	300			
		CNC_Roughing	3	CNC	1.00	13.00% 20/02/15		100.00%	96.27%	13.35%	1140	1140			
		CNC_Finishing	4	ONC	1.00	12.00% 20/02/15		60.00%	15.00%	2.56%	300	180			
		WEDM	5	CNC	1.00	11.00% 20/02/15		64.58%	16.15%	13.41%	1440	930			
		Pre HT EDM_Die	6	EDM	1.00	10.00% 20/02/15		100.00%	82.12%	12.50%	1440	1440			
		нт	10	Manual	3.00	6.00% 20/02/15		100.00%	104.17%	5.34%	720	720			
		Tempering	11	Manual	3.00	5.00% 20/02/15		133.33%	91.67%	11.54%	720	960			
		Lathe Remachining	2	Manual	1.00	14.00% 20/02/17		100.00%	60.00%	5.88%	300	300			

Above table can be exported to an Excel file and this can be used for further analysis. Most important feature in this table is sorting menu. When left click the Heading row, it will give the sorting menu.

In the left side of sorting menu sorting fields can be found. In a sorting fields, sorting requirement can be selected using a drop-down menu. In the drop-down menu, all the columns are available.

In the right side there is a blue arrow. By using this arrow, the ascending or descending nature of selected field can be changed.

The sorting menu feature can be seen in below image.

Graf Usage	Workplaces										
workplace	code	area	capacity	preference	day	usage	global_usage	domination	work_time	used_time	
Lathe_Roug	ning 1	Manual	1.00	15.00%	20/02/12	36.84%	36.84%	4.88%	1140	420	
CNC_Rough	ng 3	CNC	1.00	13.00%	20/02/12	85.09%	85.09%	12.54%	1140	970	
Pre HT EDM	Die 6	EDM	1.00	10.00%	20/02/12	32.64%	32.64%	15.68%	1440	470	
HT	10	Manual	3.00	6.00%	20/02/12	31.94%	31.94%	13.94%	720	230	
CNC_Rough	ng 3	CNC	1.00	13.00%	20/02/13	9.65%	47.37%	12.54%	1140	110	
Pre HT EDM	Die 6	EDM	Sorti	ng		×	46.88%	15.68%	1440	880	
HT	10	Manual	Sort	-			66.67%	13.94%	720	730	
Tempering	11	Manual					50.00%	11.15%	720	720	
Lathe_Rema	chining 2	Manual	da	у	~ 🛃		33.33%	6.97%	300	300	
Milling	9	Manual	pre	eference	~ 🖸		5.56%	1.05%	540	90	
HT	10	Manual	do	mination	~ 🖸		55.56%	13.94%	720	240	
Tempering	11	Manual					44.44%	11.15%	720	240	
Lathe_Rema	chining 2	Manual	wo	rkplace	~ 🛃		50.00%	6.97%	300	300	
CNC_Finishi	ng 4	CNC			~ 🛃		15.00%	3.14%	300	180	1
WEDM	5	CNC			~ 💌	ОК	16.67%	15.33%	1440	960	1
CNC_Finishi	ng 4	CNC				OK	18.00%	3.14%	300	90	1
WEDM	5	CNC	1.00	11.00%	20/02/17	25.00%	18.33%	15.33%	1440	360	i -
Post HT EDN	_Die 7	EDM	1.00	9.00%	20/02/17	8.33%	1.67%	1.39%	1440	120	i -
Post HT EDN	_BR 8	EDM	1.00	8.00%	20/02/17	20.83%	4.17%	3.48%	1440	300	i -
Assembly	12	Manual	1.00	4.00%	20/02/17	44.44%	8.89%	2.79%	540	240	i -
Thickness C	itting 13	Manual	1.00	3.00%	20/02/17	36.36%	7.27%	2.79%	660	240	i -
Final Finishin	g 14	Manual	1.00	2.00%	20/02/18	40.00%	6.67%	1.39%	300	120	<i>i</i>
QC	15	OUALITY	1.00	1.00%	20/02/18	55.56%	9.26%	3.48%	540	300	

By right clicking the mouse you can go to the sub menu mentioned below.

af Usage Workplaces										
workplace	code	area	capacity	preference	d		usage	domination	work_time	used_time
Lathe_Roughing	1	Manual	1.00	15.00%	2 Sorting		36.84%	4.88%	1140	420
CNC_Roughing	3	CNC	1.00	13.00%	2 Filtering	)	85.09%	12.54%	1140	970
Pre HT EDM_Die	6	EDM	1.00	10.00%	· · · ·		32.64%	15.68%	1440	470
нт	10	Manual	3.00	6.00%	Export	to HTML/Excel	31.94%	13.94%	720	230
CNC_Roughing	3	CNC	1.00	13.00%	Record	count	47.37%	12.54%	1140	110
Pre HT EDM_Die	6	EDM	1.00	10.00%	2 View SC	N .	46.88%	15.68%	1440	880
нт	10	Manual	3.00	6.00%		<i>c</i> _	66.67%	13.94%	720	730
Tempering	11	Manual	3.00	5.00%	2 Refresh		50.00%	11.15%	720	720
Lathe_Remachining	2	Manual	1.00	14.00%	20/02/14	100.00%	33.33%	6.97%	300	300
Milling	9	Manual	1.00	7.00%	20/02/14	16.67%	5.56%	1.05%	540	90
нт	10	Manual	3.00	6.00%	20/02/14	33.33%	55.56%	13.94%	720	240
Tempering	11	Manual	3.00	5.00%	20/02/14	33.33%	44.44%	11.15%	720	240
Lathe_Remachining	2	Manual	1.00	14.00%	20/02/15	100.00%	50.00%	6.97%	300	300
CNC_Finishing	4	CNC	1.00	12.00%	20/02/15	60.00%	15.00%	3.14%	300	180
WEDM	5	CNC	1.00	11.00%	20/02/15	66.67%	16.67%	15.33%	1440	960
CNC_Finishing	4	CNC	1.00	12.00%	20/02/17	30.00%	18.00%	3.14%	300	90
WEDM	5	CNC	1.00	11.00%	20/02/17	25.00%	18.33%	15.33%	1440	360
Post HT EDM_Die	7	EDM	1.00	9.00%	20/02/17	8.33%	1.67%	1.39%	1440	120
Post HT EDM_BR	8	EDM	1.00	8.00%	20/02/17	20.83%	4.17%	3.48%	1440	300
Assembly	12	Manual	1.00	4.00%	20/02/17	44.44%	8.89%	2.79%	540	240
Thickness Cutting	13	Manual	1.00	3.00%	20/02/17	36.36%	7.27%	2.79%	660	240
Final Finishing	14	Manual	1.00	2.00%	20/02/18	40.00%	6.67%	1.39%	300	120
QC	15	OUALITY	1.00	1.00%	20/02/18	55.56%	9.26%	3.48%	540	300

In this sub menu, there are 5 tasks displayed.

1.Sorting function -The function explains in above paragraph.

2.Export to HTML/Excel -By clicking this sub menu the data table will be saved to an excel fine in the location where the software is installed. the excel file name is "table-html.xls"

3.Record count -The number of records in the data table can be count using this operation.

4. View SQL -This operation will show the SQL code for this table.

5.Refresh -the data table can be refreshed using this function.

# Job Dead Lines

This function will give the table of job dead lines, There are 12 columns in this table.

- 1. Job -The Job number is represented in this column.
- 2. Dead line This parameter defines the importance of the job dead line. Here integer 1/0 is used to provide the information.
- 3. Reserve Days This column indicates the additional dates taken for the completion of job.
- 4. Preference This parameter defines the preference of the job. Here the default value is 100% and consider every job has the same preference. If you need to change the preference of the job it can be done by reducing the preference value of non-urgent jobs.
- 5. Domination -
- 6. Scheduled This parameter defines whether the job is in active stage or inactive stage.
- 7. Start This column shows the start date of the job.
- 8. Stop -This column shows the completion date of the job.
- 9. DB Stop -This column shows the stop date of the data base.
- 10. Non-Scheduled NT -This column shows whether there are any operations not scheduled to the current scheduled or not.
- 11. Operations -This column shows the number of operations attached to the relevant job.

12. Job ID -This column shows the job id which is used in job_id used in tJobs table.

02.27 09:50 02.27 13:50 02.27 14:10 , 04:30 , 04:20	196.00 [88.08   10.00	[12:00 [54:00 ]10:00 ]10:00 [20:00	122.00 88.90	18230 194	10 10.00	00.00 110.00	11208 11438 11638	110.98 (20.86 (22.8	8 80.06 182.0	N. [84:00   96:00   80:	88 1 18 88	12.00   54.00	116:00   12:00	120.08 122:08	89.98 1.02.90 1.0	HANK ( BESE   BESE   10.00 ( 12.00
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inlahing 4		Job reserve, start- stop									-	D X				
5		200	Deadlos De	anarum davar D	adarance of	omination Sche	A dard Chart	Stop	DB stop	Non-scheduled NT	Onerstone 1	white a				-
EDM_Die 6	1	1000-101 44		0.0000	80.0000	7,1044	1 20/02/12 6:00:00 AP					20012001				
EDM_Die 7		1000-101_45		0.0000	50.0000	6.0634	1 20/02/12 6:00:00 AP					20012002				
EDM_BR I	10 million (10 mil	1000-301_21		0.0000	80.0000	7.4567	1 20/02/12 6:00:00 AM			0		20012003				
1		205-1601.4	0	0.0000	80.0000	8,2119	1 20/02/12 6:00:00 AF			0		20012016				
		A85-101 03	0	0.0000	100.0000	8,4854	1 20/02/12 6:00:00 AM			0		20012009				
			0	0.0000	60.0000	6.4583	1 20/02/12 6:00:00 AM			0		20012012			1	
10-170	-	AL-491 1	0	0.0000	60.0000	6.6919	1 20/02/12 6:00:00 AF			0		20012013	P-	_	100	
ring 11	-	41-507.2	0	0.0000	100.0000	7.6552	1 20/02/12 6:00:00 AF	4 20/02/22 1:40:00 Pf	4 21/01/21	0		20012005	_			
	-	CA-1008_47	0	0.0000	80.0000	7.4070	1 20/02/12 6:00:00 AF	4 20/02/25 1:40:00 Pt	4 21/01/21	0	20	20012004	-		_	
bly Q		CA-2005_64	0	0.0000	80,0000	7.4667	1 20/02/12 6:00:00 AF	4 20/02/24 1:40:00 Pt	4 21/01/21	0	20	20012014	_		-	
rea Cutting 13		CA-2005_65	0	0.0000	50.0000	6.4831	1 20/02/12 6:00:00 AM	4 20/02/28 10:40:00	4-21/01/21	0	20	20012015				
inishing 14	-	DG-01_36	0	0.0000	80.0000	4.0369	1 20/02/12 6:00:00 AM	4 20/02/29 2:40:00 Pf	4 21/01/21	0	10	20012005				
		SPR-105_88	0	0.0000	90.0000	4.1023	1 20/02/12 6:00:00 AM	4 20/02/26 8:40:00 A	4 21/01/21	0	10	20012007				
		SPR-105_9	0	0.0000	80.0000	4.1023	1 20/02/12 6:00:00 AM	4 20/02/25 8:40:00 A	4 21/01/21	0	10	20012011				
		SPR-205_10	0	0.0000	80.0000	4.1692	1 20/02/12 6:00:00 AM	4 20/02/24 8:40:00 A	4 21/01/21	0	10	20012008				
		SPR_105_8	0	0.0000	80.0000	4.1023	1 20/02/12 6:00:00 AP	4 20/02/29 10:40:00	0-21/01/21	0	10	20012010				
												100000000000000000000000000000000000000				
												×				

In the left side of sorting menu sorting fields can be found. In a sorting fields, sorting requirement can be selected using a drop-down menu. In the drop-down menu, all the columns are available.

In the right side there is a blue arrow. By using this arrow, the ascending or descending nature of selected field can be changed.

By right clicking the on the table next sub menu can be obtained, there are 5 tasks displayed in this sub menu.

1. Sorting function -The function explains in above paragraph.

2. Export to HTML/Excel -By clicking this sub menu the data table will be saved to an excel fine in the location where the software is installed. the excel file name is "table-html.xls"

3. Record count -The number of records in the data table can be count using this operation.

4. View SQL -This operation will show the SQL code for this table.

5. Refresh -the data table can be refreshed using this function

# Machine groups for human capacity

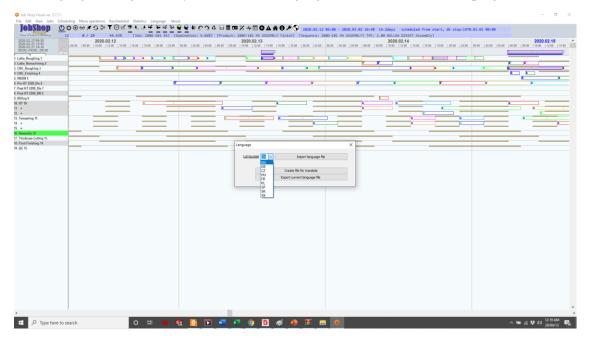
Here you can enter human resources. Usually, some machines can only be set up by a few people.

C 105:00   08:00   1	10:00   12:00   14:00   16:00   18:0	0   20:00   22:00	00:00   02:00   04:00   06:00   08:00   10:00   1	12:00   14:00   16:00	18:00   21	1:00   22:00	00:00   02:00	04:00   06:00	08:00   10:00	12:00   14:00	16:00   18:00   28:00   22	:00 00:00   02:00   04	1.00   05:00   06:00
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		E.	-									-	
			Groups for capacity chart						- o >				
			_			_							
			-	Group na	me edit 🛐				✓ ✓ Setting tim	-			-
			CNC_Finishing [4:4]		La	the_Roughing	[1:1]				_	-	
			WEDM [5:5] Pre HT EDM. Die [6:6]		u 0	sthe_Remachinit NC_Roughing [3	ng [2:2] ⊨3]				•		
			Post HT EDM_Die [6:6] Post HT EDM_Die [7:7] Post HT EDM_BR [8:8]							-			-
			HT [10:10]										
			Tempering [11:11] Assembly [12:12]								-		
			Thickness Cutting [13:13] Final Finishing [14:14]										
			QC [15:15]										
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Giand Frederica School of	16 0 / 19 50.83% [Job: 1000-101 45] [Domination: 6.06%] [Product: 1000-101 45 ASSEMBLY Finish] [Sequence: 1000-101 45 ASSEMBLY] [PC: 1.00 HOLLOW DIESET Assembly]	
2020.02.27 09:50 2020.02.27 13:50 2020.02.27 14:10 00:00, 04:00 , 04:20	2 2020.02.12 5 2020.02.12 5 2020.02.14 5 2 1 4 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 2 1 4 5 1 5 1 4 5 1 5 1 4 5 1 5 1 4 5 1 5 1	^
00:00, 04:00 , 04:20		
1. Lathe_Roughing 1		
2. Lathe_Remachining 2		<u> </u>
3. CNC_Roughing Capaci	art - Machines group: [alfa], Human capacity: [3]	-
4. CNC_Finishing 5. WEDM 5 refresh		-
6. Pre HT EDM_D 1.00		=
7. Post HT EDM 2.00		
8. Post HT EDM_0 3.00		
9. Milling 9 4.00		
10. HT 10 5.00		
11. + 6.00 1 12. +		-
13. Tempering 11		-
14. +		=
15. +		
16. Assembly 12		
17. Thickness Cutting 13		_
18. Final Finishing 14 19. QC 15		
19. 400 10		

# Language Menu

The language setting can only be used if the language files are attached to the program.



# About Menu

There are 3 sub menus are coming under the About menu.

- 1. Program Version This will show the program version of the soft ware
- 2. Help Menu
- 3. Registration
- 🜻 Job Shop Visual ver. 5.7.7.1

File Edit View Jobs	Scheduling Move operations Rescheduled Statistics Language About
Jobshop Visua Visua Fredestin	$ \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \checkmark \bigcirc $
2020.02.27 09:50	→ 2020.02.12
2020.02.27 13:50 2020.02.27 14:10	
00:00, 04:00 , 04:20	
1. Lathe_Roughing 1	
2. Lathe_Remachining 2	
3. CNC_Roughing 3	
4. CNC_Finishing 4	
5. WEDM 5	
6. Pre HT EDM_Die 6	
7. Post HT EDM_Die 7	
8. Post HT EDM_BR 8	
9. Milling 9	
10. HT 10	
11. +	
12. +	
13. Tempering 11	
14. +	
15. +	
16. Assembly 12	
17. Thickness Cutting 13	
18. Final Finishing 14	
19. QC 15	

# Registration

In registration menu, there are 3 labels to be filled as below.

- 1. Name
- 2. Name of company
- 3. Town

After completion of this form there is a "OK" Command button to press.

After pressing "OK" Button, A program code will be generated. You need to send this code to software developer and then the developer will send the Registration code.

To register the software, the registration code needs to be passed and press the Second "OK" Command button.

After completion of registration, below registration tab it will show the license remaining dates for the software.

istration - JobShop			
Your first and last name	Name of company	Location of compa	ny - Town
User	Firm	Town	
You need to fill	in information about you and your c	ompany for registration	OK
Program code	721541127:USER =FJRM=TOWN94	30	
		se, send this program code to ema 2.sk , mobil: +421 918 326 320	als.
	1972		
Registration code	I		
Registration code	Program Job Shop Visual is register	ed, 3898 days	
Registration code	Program Job Shop Visual is register	ed, 3898 days	
Registration code	Program Job Shop Visual is register	ed, 3898 days	

### Help

When You click the Help Tab you will be redirected to the web site: <u>http://www.jobshop.72.sk/?m=2EN</u>.

Prepared By

K.D.H.D.Praveen Chathuranga Sri Lanka