

**NOTICE WARNING CONCERNING COPYRIGHT RESTRICTIONS:**  
The copyright law of the United States (title 17, U.S. Code) governs the making of photocopies or other reproductions of copyrighted material. Any copying of this document without permission of its author may be prohibited by law.

**Factory Model and Test Data Descriptions:  
OPIS Experiments**

Whay-Yu Chiang, Mark S. Fox, and Peng Si Ow<sup>1</sup>

CMU-RI-TR-90-05<sub>2</sub>

Center for Integrated Manufacturing and Decision Systems  
The Robotics Institute  
Carnegie Mellon University  
Pittsburgh, Pennsylvania 15213

March 1990

© 1989 Carnegie Mellon University

<sup>1</sup>IBM Entry Systems Divisions

# Contents

1	Introduction	1
2	Model Overview	1
3	Factory Model	2
3.1	Parts . . . . .	2
3.2	Process Plans . . . . .	4
3.2.1	Process plan for <i>Produce-Pblade1</i> : . . . . .	4
3.2.2	Process plan for <i>Produce-Pblade2</i> : . . . . .	5
3.2.3	Process plan for <i>Produce-Pblade3</i> : . . . . .	5
3.2.4	Process plan for <i>Produce-Pblade4</i> : . . . . .	6
3.2.5	Process plan for <i>Produce-Pblade5</i> : . . . . .	7
3.2.6	Process plan for <i>Produce-Pblade6</i> : . . . . .	7
3.3	Resource . . . . .	8
3.4	Constraint . . . . .	8
4	Experiments	9
4.1	Experiment Generation Parameters . . . . .	11
4.2	Experiments . . . . .	11
4.2.1	Test-series1 . . . . .	13
4.2.2	Test-series2 . . . . .	14
4.2.3	Test-series3 . . . . .	15
4.2.4	Test-series4 . . . . .	16
4.2.5	Test-series5 . . . . .	17
4.2.6	Test-series6 . . . . .	18
4.2.7	Test-series7 . . . . .	19
4.2.8	Test-series8 . . . . .	20
4.2.9	Test-series9 . . . . .	21
4.2.10	Test-series10 . . . . .	22
4.2.11	Test-series11 . . . . .	23
4.2.12	Test-series12 . . . . .	24
4.2.13	Test-series13 . . . . .	25
4.2.14	Test-series14 . . . . .	26
4.2.15	Test-series15 . . . . .	27
4.2.16	Test-series16 . . . . .	28
4.2.17	Test-series17 . . . . .	29
4.2.18	Test-series18 . . . . .	30
4.2.19	Test-series19 . . . . .	31
4.2.20	Test-series20 . . . . .	32
4.2.21	Test-series21 . . . . .	33
4.2.22	Test-series22 . . . . .	34

## List of Figures

1	A Turbine Blade . . . . .	1
2	Jobshop Model . . . . .	3

## List of Tables

1	Parts in OPIS Factory Model . . . . .	4
2	Process Plan For <i>Produce-Pblade1</i> . . . . .	4
3	Time Table for <i>Produce-Pblade1</i> . . . . .	5
4	Process Plan For <i>Produce-Pblade2</i> . . . . .	5
5	Time Table for <i>Produce-Pblade2</i> . . . . .	5
6	Process Plan for <i>Produce-Pblade3</i> . . . . .	6
7	Time table for <i>Produce-Blade3</i> . . . . .	6
8	Process Plan for <i>Produce-Pblade4</i> . . . . .	6
9	Time Table for <i>Produce-Pblade4</i> . . . . .	7
10	Process Plan for <i>Produce-Pblade5</i> . . . . .	7
11	Time Table for <i>Produce-Pblade5</i> . . . . .	7
12	Process Plan for <i>Produce-Pblade6</i> . . . . .	8
13	Time Table for <i>Produce-Pblade6</i> . . . . .	8
14	Machines in OPIS Factory Model . . . . .	9
15	Product Mix in OPIS Factory Model . . . . .	10
16	Order Priority Class in OPIS Factory Model . . . . .	10
17	Order Lead time in OPIS Factory Model . . . . .	10
18	Experiment Generator by Categories . . . . .	11
19	Test-Series In OPIS Experiment . . . . .	12

### **Abstract**

This report defines a factory model and a set of experiments that can be used to compare alternative scheduling methods. The factory model defines parts, process plans, resources, and constraints. Multiple sets of test data are defined to test the scheduling algorithms under varying factory loadings. The model and test data are based on the ISIS/OPIS projects.

# 1 Introduction

The goal of this report is to define a factory model and a set of experiments that can be used to compare alternative scheduling methods. The model was originally created to provide a comparative analysis of the OPIS [4] [5] and ISIS [3] constraint directed scheduling systems and the COVERT dispatch rule[1]. The model is a simplification of the model used originally to test ISIS [2].

This report defines a *Job Shop* in terms of:

- Parts, including physical characteristics.
- Process plans composed of operations, precedence relations, and resource requirements.
- Resource descriptions, including labor machine ratios.
- Constraints covering due dates, work in process, machine restrictions, etc.

Twenty-two experiments are defined each containing orders composed of release dates, due dates, parts, quantity, and priority. Orders were statistically generated based on the parameters described in the latter sections.

The data described in this report is available online by sending email to [Mark.Fox@cs.cmu.edu](mailto:Mark.Fox@cs.cmu.edu).

# 2 Model Overview

The factory being modeled is a Turbine Component Plant. A turbine blade is a complex three dimensional object composed of two parts: root and airfoil. The root is designed to clamp the blade into the turbine shaft and the airfoil is to transform the kinetic energy of hot stream or air traveling on it into the rotational motion of the turbine. A blade as in figure 1 is produced by a sequence of forging, milling, grinding and finishing operations to tolerances of a thousandth of an inch. There are three types of blades: t blade, cse blade, and sse blade. (Short for T-shape, Curved Side Entry, and Straight Side Entry blades.) They differ in the operations and materials required to produce them.

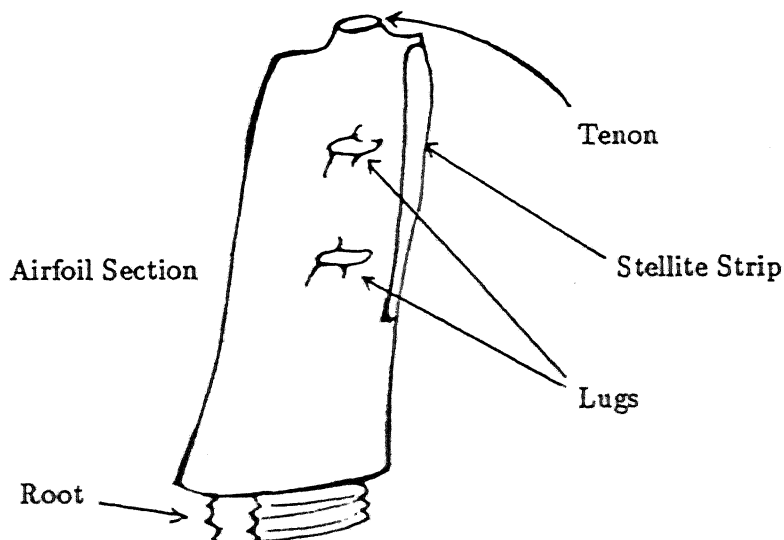


Figure 1: A Turbine Blade

The three product families are further divided into six different products, Figure 2 shows the jobshop used in the tests and the three routes an order for a product could follow through the shop. This environment and the three routes are simplifications of the actual jobshop. The simplifications were made by extracting three of the most popular families of products and omitting linear portions of the original routings for each family. For the operations in the remaining routings, the actual estimates of operation times and machine setup times were retained. This model jobshop was tested to make sure that the locations of bottlenecks corresponded to the actual jobshop experience.

The resources in the model are located in separate work-areas. Work-areas consist of one or more identical machines or work-stations. For example, WA1 in Figure 2 is made up of 12 work-stations. When an order arrives at WA1 for processing, any of these work-stations may be selected for the job. Machines or work-stations may only process one order at a time and no operation on an order may start until its preceding operation has ended.

The three product families are further divided into six different products, two products per family. Each family has its own set of alternative routes through the shop, as shown in Figure 2. Where a route forks, a choice has to be made as to which work-area the order should be routed to next. Notice that orders follow an acyclic path through the shop. The routes are represented as an operations graph for each product family. Additional information in the graphs includes processing time and setup time for each operation. Whenever a machine is assigned to perform a different operation from the one that it has most recently performed, or is scheduled to start for the first time, it must be appropriately setup with the right tools, fixtures, etc. The machine must remain idle for the duration of the setup.

The processing times required for each operation in producing each product may place different demands on the capacity of the work-areas. When these demands exceed the available capacity of a machine, that machine becomes a bottleneck. For the set of products and orders defined in our experiments, the bottleneck work-areas are WA2, WA3, WA4, WA5 and WA6.

The size of an order is the number of units to be produced, and this number is drawn from a uniform distribution,  $U(100, 150)$  units. An order may also be assigned to one of six priority classes with equal probability of being in each class:

- Forced outages (FO): Orders to replace blades which malfunctioned during operation. It is important to ship these orders as soon as possible, no matter what the cost.
- Critical replacement (CR) and Ship Direct (SD): Orders to replace blades during scheduled maintenance. Advance warning is provided, but the blades must arrive on time.
- Service and shop orders (SO, SH): Orders for new turbines. Lead times of up to three years may be known.
- Stock orders (ST): Order for blades to be placed in stock for future needs.

### 3 Factory Model

#### 3.1 Parts

Each part is a blade product defined by a blade type, process plan and length of its airfoil as in Table 1.



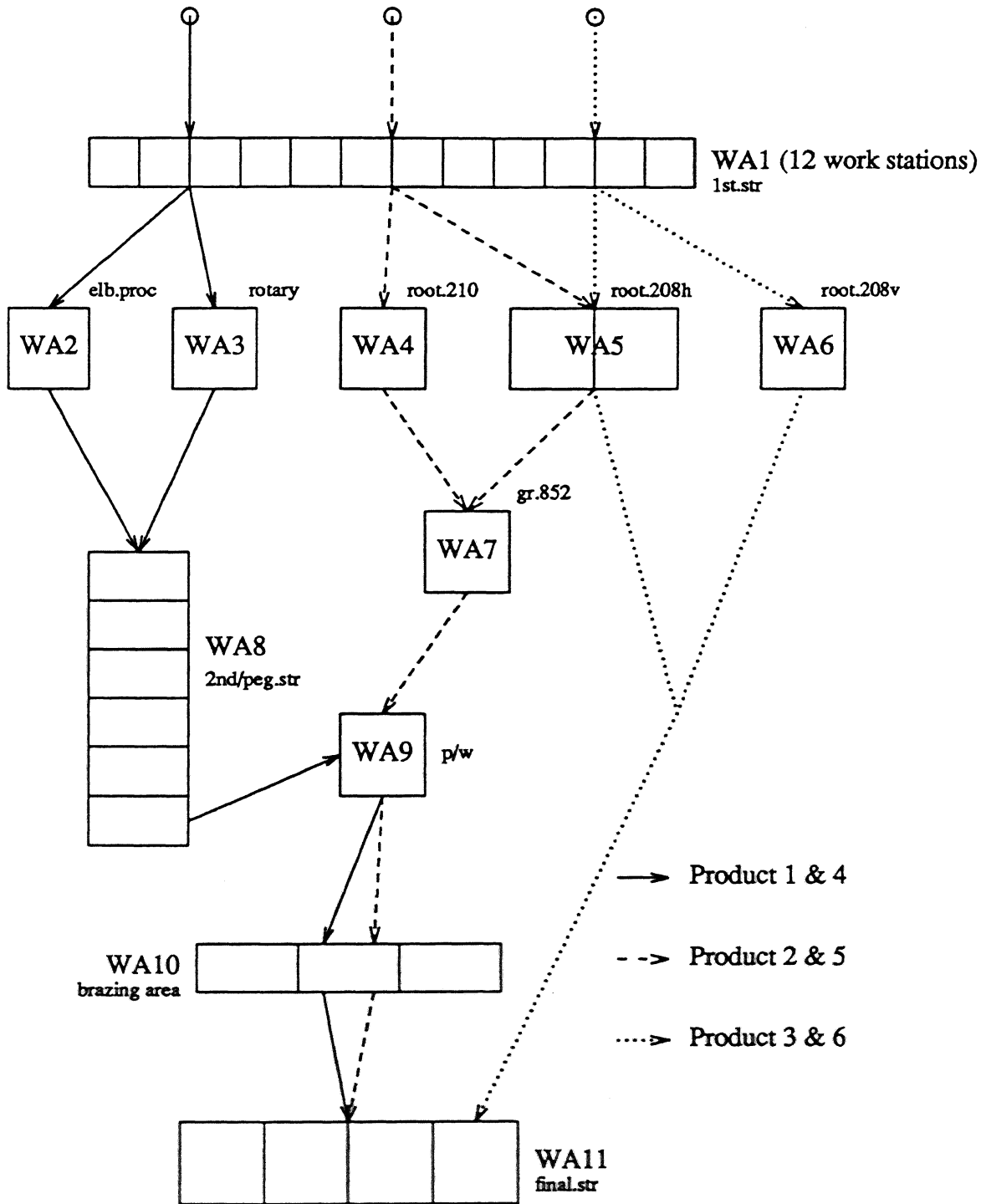


Figure 2: Jobshop Model

<i>part</i>	<i>blade type</i>	<i>process plan</i>	<i>air-foil length</i>
Pblade1	CSE blade	produce-Pblade1	26
Pblade2	SSE blade	produce-Pblade2	26
Pblade3	T blade	produce-Pblade3	26
Pblade4	CSE blade	produce-Pblade4	26
Pblade5	SSE blade	produce-Pblade5	26
Pblade6	T blade	produce-Pblade6	26

Table 1: Parts in OPIS Factory Model

### 3.2 Process Plans

There exists more than one way to produce a part in the factory. Consequently, a part's process plan is represented as a directed graph of operations. Nodes in the graph represent operations, and arcs represent precedence relations. Any path through the graph represents a "legal" process plan for the part. In the following operation schemata, the actual duration and resource needed for each operation are described for each part.

#### 3.2.1 Process plan for *Produce-Pblade1*:

Table 2 is the process plan for *Produce-Pblade1* with the operation name, operation type, machine working area, the previous operation and next operation in the process sequence. Op-1.blade1 is the first operation in the process plan for Pblade1, therefore it does not have any previous operation. Then, this operation is followed by either of the two alternative rooting operation: op-2a.blade1 or op-2b.blade2. The rest of the operations are op-3.blade1, op-4.blade1, op-5.blade1 and op-6.blade1. The last operation op-6.blade1 has no next operation.

<i>operation</i>	<i>type</i>	<i>area</i>	<i>prev-operation</i>	<i>next-operation</i>
op-1.blade1	ws-operation	1st.str	N/A	(or op-2a.blade1 op-2b.blade1)
op-2a.blade1	rooting	elb.a.proc	op-1.blade1	op-3.blade1
op-2b.blade1	rooting	rooting area	op-1.blade1	op-3.blade1
op-3.blade1	ws-operation	2nd/peg.str	(or op-2a.blade1 op-2b.blade1)	op-4.blade1
op-4.blade1	airfoil	airfoil-area	op-3.blade1	op-5.blade1
op-5.blade1	ws-operation	brazing area	op-4.blade1	op-6.blade1
op-6.blade1	ws-operation	final.str	op-5.blade1	N/A

Table 2: Process Plan For *Produce-Pblade1*

There is different time duration for each operation in the process plan. In Table 3, two kinds of duration information are listed for each operation: setup time and piece time. Setups are needed when two successive operations on any particular machine are not of the same product family. Piece time is the processing time per piece for the required operation. Setup time and piece time are measured in seconds.

Process plans for the other blade parts in the following subsections have same columns as the above tables.

operation	set-up	piece
op-1.blade1	25200	1238
op-2a.blade1	49500	471
op-2b.blade1	59400	759
op-3.blade1	9000	1123
op-4.blade1	5400	162
op-5.blade1	10800	860
op-6.blade1	14400	658

Table 3: Time Table for *Produce-Pblade1*

### 3.2.2 Process plan for *Produce-Pblade2*:

Table 4 and 5 are the process plan and its time table for producing *Produce-Pblade2*, respectively.

operation	type	area	prev-operation	next-operation
op-1.blade2	ws-operation	1st.str	N/A	(or op-2a.blade2 op-2b.blade2)
op-2a.blade2	rooting	root.210	op-1.blade2	op-3.blade2
op-2b.blade2	rooting	root.208h	op-1.blade2	op-3.blade2
op-3.blade2	ws-operation	tapered-blade- area	(or op-2a.blade2 op-2b.blade2)	op-4.blade2
op-4.blade2	airfoil	airfoil-area	op-3.blade2	op-5.blade2
op-5.blade2	ws-operation	brazing area	op-4.blade2	op-6.blade2
op-6.blade2	ws-operation	final.str	op-5.blade2	N/A

Table 4: Process Plan For *Produce-Pblade2*

operation	set-up	piece
op-1.blade2	25200	957
op-2a.blade2	55800	2995
op-2a.blade2	55800	2995
op-3.blade2	16019	396
op-4.blade2	5400	205
op-5.blade2	10800	619
op-6.blade2	14400	468

Table 5: Time Table for *Produce-Pblade2*

### 3.2.3 Process plan for *Produce-Pblade3*:

Table 6 and 7 are the process plan and its time table for producing *Produce-Pblade3*, respectively.

<i>operation</i>	<i>type</i>	<i>area</i>	<i>prev-operation</i>	<i>next-operation</i>
op-1.blade3	ws-operation	1st.str	N/A	(or op-2a.blade3 op-2b.blade3)
op-2a.blade3	rooting	root.208h	op-1.blade3	op-3.blade3
op-2b.blade3	rooting	root.208v	op-1.blade3	op-3.blade3
op-3.blade3	ws-operation	final.str	(or op-2a.blade3 op-2b.blade3)	N/A

Table 6: Process Plan for *Produce-Pblade3*

<i>operation</i>	<i>set-up</i>	<i>piece</i>
op-1.blade3	18000	356
op-2a.blade3	54000	2818
op-2b.blade3	54000	2818
op-3.blade3	25200	345

Table 7: Time table for *Produce-Blade3*

### 3.2.4 Process plan for *Produce-Pblade4*:

Table 8 and 9 are the process plan and its time table for producing *Produce-Pblade4*, respectively.

<i>operation</i>	<i>type</i>	<i>area</i>	<i>prev-operation</i>	<i>next-operation</i>
op-1.blade4	ws-operation	1st.str	N/A	(or op-2a.blade4 op-2b.blade4)
op-2a.blade4	rooting	elb.a.proc	op-1.blade4	op-3.blade4
op-2b.blade4	rooting	rooting.area	op-1.blade4	op-3.blade4
op-3.blade4	ws-operation	2nd/peg.str	(or op-2a.blade4 op-2b.blade4)	op-4.blade4
op-4.blade4	airfoil	airfoil-area	op-3.blade4	op-5.blade4
op-5.blade4	ws-operation	brazing area	op-4.blade4	op-6.blade4
op-6.blade4	ws-operation	final.str	op-5.blade4	N/A

Table 8: Process Plan for *Produce-Pblade4*

operation	set-up	piece
op-1.blade4	25200	1238
op-2a.blade4	49500	471
op-2b.blade4	59400	759
op-3.blade4	9000	1123
op-4.blade4	5400	162
op-5.blade4	10800	860
op-6.blade4	14400	658

Table 9: Time Table for *Produce-Pblade4*

### 3.2.5 Process plan for *Produce-Pblade5*:

Table 10 and 11 are the process plan and its time table for producing *Produce-Pblade5*, respectively.

<i>operation</i>	<i>type</i>	<i>area</i>	<i>prev-operation</i>	<i>next-operation</i>
op-1.blade5	ws-operation	1st.str	N/A	(or op-2a.blade5 op-2b.blade5)
op-2a.blade5	rooting	root.210	op-1.blade5	op-3.blade5
op-2b.blade5	rooting	root.208h	op-1.blade5	op-3.blade5
op-3.blade5	ws-operation	tapered-blade- area	(or op-2a.blade5 op-2b.blade5)	op-4.blade5
op-4.blade5	airfoil	p/w	op-3.blade5	op-5.blade5
op-5.blade5	ws-operation	brazing area	op-4.blade5	op-6.blade5
op-6.blade5	ws-operation	final.str	op-5.blade5	N/A

Table 10: Process Plan for *Produce-Pblade5*

operation	set-up	piece
op-1.blade5	25200	957
op-2a.blade5	55800	2995
op-2b.blade5	55800	2995
op-3.blade5	16019	396
op-4.blade5	5400	205
op-5.blade5	10800	619
op-6.blade5	14400	468

Table 11: Time Table for *Produce-Pblade5*

### 3.2.6 Process plan for *Produce-Pblade6*:

Table 12 and 13 are the process plan and its time table for producing *Produce-Pblade6*, respectively.

<i>operation</i>	<i>type</i>	<i>area</i>	<i>prev-operation</i>	<i>next-operation</i>
op-1.blade6	ws-operation	1st.str	N/A	(or op-2a.blade6 op-2b.blade6)
op-2a.blade6	rooting	root.208h	op-1.blade6	op-3.blade6
op-2b.blade6	rooting	root.208v	op-1.blade6	op-3.blade6
op-3.blade6	ws-operation	final.str	(or op-2a.blade6 op-2b.blade6)	N/A

Table 12: Process Plan for *Produce-Pblade6*

operation	set-up	piece
op-1.blade6	18000	356
op-2a.blade6	54000	2818
op-2b.blade6	54000	2818
op-3.blade6	25200	345

Table 13: Time Table for *Produce-Pblade6*

### 3.3 Resource

Following are the machines used in the scheduling task with detailed descriptions of which resource area it belongs to, and preference constraints<sup>1</sup> [See Table 14]. However, notice that there is an operation, *straightening*, that uses manual workstations only instead of automated machines.

### 3.4 Constraint

Constraints are generated automatically for different product type, and its priority class. Some are preferences which could be relaxed and some are hard constraints to be exactly satisfied.

One more point to mention here is that the two constraints we had here for the experiments are:

1. due-date-constraints: each priority class has its own due date constraint providing a utility which varied with how early or late an order was.
2. q-preference: it specifies preference for sequencing parts of similar type.

Also, there are several preferences attached with the machines [See Table 14]:

1. shift constraints: it is to confine the operation on the machine within a certain shift restriction.
2. length preference: a preference constraint with true utility 1.1 and false utility of 1.0. This is to differentiate the length of a turbine blade they would work on.
3. lug preference: preference constraint with true utility 1.1 and false utility of 1.0. This is to differentiate machines for the number of lugs on a turbine blade.

<sup>1</sup>/usr/isis/3/db/6.new/Winston-model/ws-instance/resources/ws-mach.l

machine	area	description	constraints
str-1a	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1b	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1c	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1d	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1e	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1f	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1g	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1h	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1i	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1j	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1k	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
str-1l	1st.str (WA1)	first straightening w/s	1st.str-shift-constraint
elb.a.proc	elb.a.proc (WA2)	elb form grinder A	elb-a-shift-constraint
rotary	rooting-area (WA3)	rotary 8 station mill	rotary-shift-constraint
r210a	root.210 (WA4)	XLO 210 A rooting machine	r210a-shift-constraint
r208c	root.208h (WA5)	XLO 208 C rooting machine	r208c-shift-constraint
r208h	root.208h (WA5)	XLO 208 H rooting machine	r208h-shift-constraint
r208-9	root.208v (WA6)	XLO 208 9 rooting machine	r208-9-shift-constraint
gr.852	tapered-blade-area (WA7)	XLO 852 root grinder	gr.852-shift-constraint
str-2a	2nd/peg.str (WA8)	second straightening w/s	2nd/peg.str-shift-constraint
str-2b	2nd/peg.str (WA8)	second straightening w/s	2nd/peg.str-shift-constraint
str-2c	2nd/peg.str (WA8)	second straightening w/s	2nd/peg.str-shift-constraint
str-2d	2nd/peg.str (WA8)	second straightening w/s	2nd/peg.str-shift-constraint
str-2e	2nd/peg.str (WA8)	second straightening w/s	2nd/peg.str-shift-constraint
str-2f	2nd/peg.str (WA8)	second straightening w/s	2nd/peg.str-shift-constraint
p/w	airfoil-area (WA9)	Pratt Whitney wolverine	p/w-shift-constraint
brazer-a	brazing-area (WA10)	induction brazer 1	brazer-a-shift-constraint
brazer-b	brazing-area (WA10)	induction brazer 2	brazer-b-shift-constraint
brazer-c	brazing-area (WA10)	induction brazer 3	brazer-c-shift-constraint
str-3a	final.str (WA11)	final straightening w/s	final-shift-constraint
str-3b	final.str (WA11)	final straightening w/s	final-shift-constraint
str-3c	final.str (WA11)	final straightening w/s	final-shift-constraint
str-3d	final.str (WA11)	final straightening w/s	final-shift-constraint

Table 14: Machines in OPIS Factory Model

## 4 Experiments

The experiments were designed, primarily, to focus on three scheduling objectives:

- Minimize total tardiness cost of all orders.
- Minimize the total number of setups to be performed at each machine.
- Minimize the work-in-process time (wip) of orders.

Tardiness cost is computed based on the relative tardy costs per day late. Work-in-process time refers to the length of time an order remains in the shop, assuming that it enters the shop only when it is scheduled to begin processing, not when it is first released to the shop.<sup>2</sup> Order release time refers to the earliest possible time an order may start.

The characteristics of the orders were varied by manipulating the following parameters.

*Product Mix.* The probability of an order being for a particular product type is a variable. Two probability distributions were used, PM1 and PM2, shown in the Table 15:

The probability distributions were designed so that the resulting loads on the bottleneck machines would be approximately equal. Products 1 and 4 take proportionately shorter time relative to available capacity than the other products, hence more of those orders would be processed in a fixed period of time.

*Priority class.* An order can be assigned to one of six priority classes with equal probability of being in each class, as in Table 16:

<sup>2</sup>This is generalizable to the case where the order has to enter the shop (say, in the form of raw materials) some constant period of time before processing starts.

<i>Prod. Mix</i>	<i>Prod. 1</i>	<i>Prod. 2</i>	<i>Prod. 3</i>	<i>Prod. 4</i>	<i>Prod. 5</i>	<i>Prod. 6</i>
PM1	0.34	0.08	0.08	0.34	0.08	0.08
PM2	0.5	0.04	0.12	0.18	0.12	0.04

Table 15: Product Mix in OPIS Factory Model

<i>Priority class</i>	<i>Relative cost</i>	<i>Description</i>
FO	20	Forced Out
CR	16	Critical Replacement
SD	12	Ship Direct
SO	8	Service Order
ST	4	Stock order
SH	1	Shop Order

Table 16: Order Priority Class in OPIS Factory Model

*Order Lead Time.* The length of time between the earliest time at which an order may start and its due date. Two main methods of generating order lead times were tested. The first was derived from policies in the actual jobshop. The shop charged a premium for "rush" orders which thus had a higher tardiness cost weighting. At the other extreme, orders that were fed to other sister shops were used in large construction projects with very long lead times and were more negotiable. These had lower tardiness cost weightings attached. Therefore, lead times were correlated with priority class and so we used a different lead time distribution for the test data depending on the priority class of the order where  $P$  is the average total processing time for an order. The uniform distributions used for determining orders lead times in each priority class are shown in Table 17. (including setup time). The second method of generating order lead times assumed that order lead times were independent of priority class. Hence, a single uniform distribution was used.

<i>Priority class</i>	FO	CR	SD	SO SH ST
<i>distribution</i>	U(0,4P)	U(0,6P)	U(0,6.5P)	U(0,8P)

Table 17: Order Lead time in OPIS Factory Model

*Order Release Pattern.* Each order is associated with an earliest time at which that order is released for processing in the shop. Release times or start times are similar to arrival time of jobs in the shop, but in our experiments the release times are known at the start of scheduling. Just as the arrival pattern is typically manipulated in scheduling experiments to detect the effects on performance, we tested three different patterns of order release - (i) daily releases of orders; (ii) weekly releases; and (iii) exponentially distributed intervals between releases. In the last case, we tested mean intervals of 3 days, EXP(3), and 7 days, EXP(7), between releases.

*Batchsize.* Orders are released in batches. Batchsizes were drawn from uniform distributions and were coordinated with the order release patterns to obtain loads of approximately 70% and 105% on the bottleneck machines assuming no setup times. Two of the earlier tests involving daily releases of orders had bottleneck loads of 120% of lead times were sufficiently long to keep the number



of tardy orders low.

#### 4.1 Experiment Generation Parameters

This section summarizes the different parameter settings for generating the order sets. Each parameter setting creates an order set belonging to a particular order category, which is identified by a number in the *Category* column. 22 order sets were created covering 18 categories. Two order sets were created for certain categories. The load of the shop was affected by the product mix, order release pattern times and batchsize together. The order lead time distribution was the strongest influence over the *tardiness factor* of the schedule[6]. The tardiness factor is a coarse measure of the proportion of tardy jobs in a random schedule. The four variables were manipulated to examine how the three systems would perform under varying conditions of our model shop. Two of the tests are comprised of 85 orders. All others have 120 orders [See Table 18].

Category	Product mix	Batchsize	Release	Leadtime	Approx. Load
1	PM1	U(0,8)	Daily	U(0, 4P..20P)	120%
2	PM1	U(0,8)	Daily	U(0, 4P..8P)	120%
3	PM2	U(0,15)	Exp(3)	U(0,4P..8P)	105%
4	PM2	U(0,15)	Exp(3)	U(0.67P, 5P)	105%
5	PM1	U(0,29)	Weekly	U(0, 4P..8P)	90%
6	PM2	U(0,29)	Weekly	U(0, 4P..8P)	90%
7	PM2	U(0,29)	Weekly	U(0, 4P)	90%
8	PM1	U(0,29)	Weekly	U(0, 4P)	90%
9	PM1	U(0,29)	Exp(7)	U(0, 4P..8P)	90%
10	PM1	U(0,29)	Exp(7)	U(0.67P, 5P)	90%
11	PM2	U(0,11)	Exp(3)	U(0, 4P..8P)	77%
12	PM2	U(0,11)	Exp(3)	U(0.67P, 5P)	77%
13	PM1	U(0,22)	Weekly	U(0, 4P..8P)	70%
14	PM2	U(0,22)	Weekly	U(0, 4P..8P)	70%
15	PM1	U(0,22)	Weekly	U(0.67P, 5P)	70%
16	PM2	U(0,22)	Weekly	U(0.67P, 5P)	70%
17	PM1	U(0,22)	Exp(7)	U(0, 4P..8P)	70%
18	PM1	U(0,22)	Exp(7)	U(0.67P, 5P)	70%

Table 18: Experiment Generator by Categories

#### 4.2 Experiments

This section defines each experiment. The 22 experiments relate to each of the categories defined earlier as in Table 19:

The order generator would take input in the order.init file<sup>3</sup> as in the following program example:

```
(weekly-orders 120 ; total number of lots
  "2/18/85 8:00:00" ; start & Date of first batch, Mon& Day 8 a.m.
  '(FO CR SD SO SH ST) ; acceptable priority classes
  1 ; lead time factor
  29 ; max. batch size => mean size = 4 orders
  '(50 54 66 84 96 100) ; 50 : 4 : 12 : 18 : 12 : 4
)
```

<sup>3</sup>file /test-series6/orders-db/order.init under the directory /usr/isis/3/isis-test/pso-exps

The experiment files thus generated are listed in the sequence of test series in the following subsections. Each order has its associated lot number, lot name, priority class, manufacturing start quantity, requested schedule date and requested due date.

<i>Category</i>	<i>Test-series</i>
1	1
2	2, 3
3	9
4	17
5	6
6	5
7	13, 21
8	14, 22
9	10
10	18
11	8
12	16
13	7
14	4
15	15
16	20
17	11
18	19

Table 19: Test-Series In OPIS Experiment

4.2.1 Test-series1

###	Lot_PC	Product	MSQ	Rqst-SD	Rqst-DD	Lot_PC	Product	MSQ	Rqst-SD	Rqst-DD	
1	mo-00133	ST P_blade1	142	0:00 03-04-85	19:12 06-25-85	61	mo-00119	FO P_blade1	139	0:00 03-01-85	4:37 03-13-85
2	mo-00085	ST P_blade1	120	0:00 02-26-85	5:11 06-22-85	62	mo-00111	CR P_blade1	102	0:00 02-28-85	14:05 03-04-85
3	mo-00151	SH P_blade1	117	0:00 03-07-85	3:16 06-14-85	63	mo-00097	CR P_blade1	124	0:00 02-26-85	0:58 03-20-85
4	mo-00059	ST P_blade1	126	0:00 02-20-85	10:47 06-03-85	64	mo-00039	CR P_blade2	114	0:00 02-18-85	9:04 03-17-85
5	mo-00173	SH P_blade1	141	0:00 03-11-85	20:53 06-01-85	65	mo-00013	CR P_blade3	104	0:00 02-14-85	1:18 03-13-85
6	mo-00103	SH P_blade1	115	0:00 02-27-85	0:51 05-27-85	66	mo-00069	SO P_blade3	124	0:00 02-22-85	7:18 03-11-85
7	mo-00125	SH P_blade1	121	0:00 03-01-85	3:46 05-12-85	67	mo-00091	SO P_blade1	142	0:00 02-26-85	10:44 03-03-85
8	mo-00077	SH P_blade3	103	0:00 02-25-85	7:16 05-17-85	68	mo-00079	SD P_blade1	137	0:00 02-25-85	10:03 02-26-85
9	mo-00109	SO P_blade1	124	0:00 02-28-85	9:33 05-10-85	69	mo-00095	CR P_blade1	100	0:00 02-26-85	2:41 03-04-85
10	mo-00165	SO P_blade1	126	0:00 03-08-85	7:29 05-03-85	70	mo-00045	SD P_blade3	121	0:00 02-19-85	11:45 02-24-85
11	mo-00127	SO P_blade1	146	0:00 03-04-85	5:39 05-01-85	71	mo-00055	SO P_blade1	136	0:00 02-20-85	6:45 02-26-85
12	mo-00179	SD P_blade3	103	0:00 03-11-85	20:51 05-06-85	72	mo-00041	FO P_blade3	115	0:00 02-19-85	12:56 02-20-85
13	mo-00135	SD P_blade1	105	0:00 03-05-85	6:57 04-26-85	73	mo-00027	FO P_blade2	129	0:00 02-15-85	23:26 03-15-85
14	mo-00061	ST P_blade2	108	0:00 02-20-85	20:44 06-14-85	74	mo-00049	FO P_blade1	123	0:00 02-19-85	22:52 03-16-85
15	mo-00175	SD P_blade1	117	0:00 03-11-85	11:08 04-25-85	75	mo-00051	SD P_blade1	101	0:00 02-19-85	12:24 03-24-85
16	mo-00089	SO P_blade2	108	0:00 02-26-85	15:52 04-12-85	76	mo-00053	FO P_blade1	115	0:00 02-19-85	8:29 03-15-85
17	mo-00145	ST P_blade1	130	0:00 03-06-85	9:17 04-23-85	77	mo-00043	SD P_blade1	103	0:00 02-19-85	22:48 02-26-85
18	mo-00163	SO P_blade3	126	0:00 03-08-85	6:48 04-09-85	78	mo-00047	SD P_blade1	121	0:00 02-19-85	1:36 03-02-85
19	mo-00075	SO P_blade1	144	0:00 02-22-85	3:13 04-23-85	79	mo-00037	CR P_blade1	128	0:00 02-18-85	17:19 02-23-85
20	mo-00073	ST P_blade2	138	0:00 02-22-85	16:25 04-10-85	80	mo-00019	CR P_blade1	142	0:00 02-14-85	8:27 03-02-85
21	mo-00143	CR P_blade2	100	0:00 03-06-85	2:06 04-12-85	81	mo-00033	SD P_blade1	123	0:00 02-15-85	22:40 02-20-85
22	mo-00161	CR P_blade1	116	0:00 03-08-85	19:35 04-18-85	82	mo-00011	CR P_blade1	122	0:00 02-14-85	8:55 02-27-85
23	mo-00141	SO P_blade1	148	0:00 03-06-85	15:59 03-29-85	83	mo-00029	FO P_blade1	103	0:00 02-15-85	1:37 02-20-85
24	mo-00087	SO P_blade3	140	0:00 02-26-85	15:43 04-02-85	84	mo-00029	FO P_blade1	103	0:00 02-15-85	1:37 02-20-85
25	mo-00057	CR P_blade3	122	0:00 02-20-85	12:38 04-16-85	85	mo-00023	CR P_blade1	106	0:00 02-14-85	3:39 02-16-85
26	mo-00169	CR P_blade1	108	0:00 03-08-85	12:38 04-16-85						
27	mo-00147	SO P_blade1	138	0:00 03-06-85	3:37 04-12-85						
28	mo-00139	CR P_blade3	136	0:00 03-06-85	21:54 03-31-85						
29	mo-00155	CR P_blade2	116	0:00 03-08-85	6:40 03-28-85						
30	mo-00063	SD P_blade1	115	0:00 02-21-85	9:30 04-10-85						
31	mo-00083	CR P_blade1	144	0:00 02-26-85	8:02 04-10-85						
32	mo-00081	SH P_blade3	101	0:00 02-25-85	20:33 03-18-85						
33	mo-00015	CR P_blade3	138	0:00 02-14-85	3:44 03-25-85						
34	mo-00167	ST P_blade1	118	0:00 03-08-85	18:30 04-08-85						
35	mo-00017	SO P_blade1	132	0:00 02-14-85	19:30 04-07-85						
36	mo-00123	FO P_blade2	143	0:00 03-01-85	13:09 03-27-85						
37	mo-00117	FO P_blade3	147	0:00 03-01-85	6:12 03-21-85						
38	mo-00171	SD P_blade1	103	0:00 03-11-85	15:20 04-07-85						
39	mo-00025	SO P_blade3	146	0:00 02-14-85	19:54 03-13-85						
40	mo-00031	SD P_blade1	127	0:00 02-15-85	17:43 04-07-85						
41	mo-00107	SH P_blade1	101	0:00 02-27-85	6:28 04-03-85						
42	mo-00159	CR P_blade2	104	0:00 03-08-85	11:52 03-08-85						
43	mo-00105	SH P_blade1	109	0:00 02-27-85	21:03 04-02-85						
44	mo-00177	SD P_blade1	145	0:00 03-11-85	11:15 03-11-85						
45	mo-00067	SO P_blade1	106	0:00 02-22-85	4:49 04-02-85						
46	mo-00115	FO P_blade2	121	0:00 03-01-85	22:07 03-19-85						
47	mo-00071	ST P_blade1	104	0:00 02-22-85	1:21 04-01-85						
48	mo-00137	CR P_blade2	110	0:00 03-06-85	15:37 03-07-85						
49	mo-00021	SD P_blade3	100	0:00 02-14-85	5:34 03-08-85						
50	mo-00149	SO P_blade1	105	0:00 03-07-85	15:23 03-26-85						
51	mo-00157	CR P_blade1	114	0:00 03-08-85	1:13 03-10-85						
52	mo-00121	FO P_blade1	113	0:00 03-01-85	5:16 03-26-85						
53	mo-00153	FO P_blade1	119	0:00 03-07-85	3:19 03-17-85						
54	mo-00131	CR P_blade1	132	0:00 03-04-85	4:18 03-26-85						
55	mo-00101	FO P_blade3	133	0:00 02-27-85	16:59 03-08-85						
56	mo-00065	SO P_blade2	112	0:00 02-22-85	11:25 03-21-85						
57	mo-00099	SD P_blade1	105	0:00 02-27-85	22:42 03-25-85						
58	mo-00129	CR P_blade1	142	0:00 03-04-85	18:46 03-07-85						
59	mo-00093	CR P_blade2	124	0:00 02-26-85	9:39 03-04-85						
60	mo-00113	FO P_blade1	143	0:00 03-01-85	7:19 03-25-85						

4.2.2 Test-series2

###	Lot_PC	Product	MSQ	Rqst-SD	Rqst-DD	Lot_PC	Product	MSQ	Rqst-SD	Rqst-DD	
1	mo-00097	SH P_blade2	135	0:00 02-27-85	13:38 04-19-85	61	mo-00123	FO P_blade4	115	0:00 03-01-85	9:36 03-02-85
2	mo-00041	SO P_blade5	146	0:00 02-18-85	21:07 04-12-85	62	mo-00091	CR P_blade1	134	0:00 02-26-85	11:40 03-18-85
3	mo-00163	CR P_blade6	122	0:00 03-08-85	11:08 04-09-85	63	mo-00087	ST P_blade4	142	0:00 02-26-85	10:09 03-14-85
4	mo-00039	ST P_blade3	110	0:00 02-18-85	23:23 04-15-85	64	mo-00093	CR P_blade1	140	0:00 02-26-85	16:46 03-14-85
5	mo-00175	ST P_blade4	110	0:00 03-12-85	13:55 05-07-85	65	mo-00083	CR P_blade4	136	0:00 02-26-85	17:23 03-21-85
6	mo-00105	ST P_blade4	102	0:00 02-28-85	18:20 04-28-85	66	mo-00077	ST P_blade2	110	0:00 02-22-85	1:53 02-24-85
7	mo-00107	SO P_blade2	142	0:00 02-28-85	1:58 04-10-85	67	mo-00095	SD P_blade4	107	0:00 02-27-85	23:50 03-01-85
8	mo-00099	SH P_blade4	117	0:00 02-27-85	19:29 04-24-85	68	mo-00037	SO P_blade1	126	0:00 02-18-85	16:27 03-11-85
9	mo-00119	SD P_blade5	139	0:00 03-01-85	6:34 04-05-85	69	mo-00081	FO P_blade4	149	0:00 02-25-85	12:03 02-28-85
10	mo-00043	ST P_blade6	136	0:00 02-18-85	13:49 04-08-85	70	mo-00063	SD P_blade1	143	0:00 02-21-85	21:53 02-26-85
11	mo-00179	ST P_blade3	148	0:00 03-12-85	8:33 03-27-85	71	mo-00045	SD P_blade5	129	0:00 02-19-85	8:02 02-27-85
12	mo-00169	SH P_blade4	139	0:00 03-11-85	18:28 04-08-85	72	mo-00057	ST P_blade5	106	0:00 02-20-85	18:59 03-08-85
13	mo-00073	ST P_blade4	142	0:00 02-22-85	6:35 04-09-85	73	mo-00025	SD P_blade4	121	0:00 02-15-85	15:18 03-18-85
14	mo-00015	ST P_blade4	124	0:00 03-06-85	13:12 04-07-85	74	mo-00079	CR P_blade1	102	0:00 02-22-85	5:03 02-23-85
15	mo-00145	SO P_blade4	124	0:00 03-06-85	23:15 04-05-85	75	mo-00065	FO P_blade4	103	0:00 02-21-85	11:20 03-19-85
16	mo-00151	CR P_blade6	106	0:00 03-06-85	12:07 03-27-85	76	mo-00067	SD P_blade4	137	0:00 02-21-85	1:12 03-08-85
17	mo-00155	SO P_blade1	144	0:00 03-08-85	11:15 04-30-85	77	mo-00029	SO P_blade1	110	0:00 02-18-85	11:48 03-08-85
18	mo-00125	SH P_blade6	115	0:00 03-01-85	0:45 03-24-85	78	mo-00055	SO P_blade4	138	0:00 02-20-85	9:30 03-03-85
19	mo-00135	SD P_blade4	137	0:00 03-05-85	6:06 04-04-85	79	mo-00051	FO P_blade1	117	0:00 02-19-85	2:18 02-19-85
20	mo-00089	ST P_blade5	118	0:00 02-26-85	7:09 04-01-85	80	mo-00049	FO P_blade4	105	0:00 02-19-85	8:43 03-10-85
21	mo-00033	ST P_blade3	138	0:00 02-18-85	4:14 03-24-85	81	mo-00013	CR P_blade4	134	0:00 02-14-85	11:12 03-04-85
22	mo-00173	SO P_blade1	102	0:00 03-12-85	18:37 04-21-85	82	mo-00017	SO P_blade4	134	0:00 02-14-85	10:41 03-07-85
23	mo-00143	FO P_blade4	107	0:00 03-05-85	22:28 04-03-85	83	mo-00027	FO P_blade4	125	0:00 02-15-85	8:45 02-15-85
24	mo-00161	ST P_blade1	144	0:00 03-08-85	7:48 04-20-85	84	mo-00021	SO P_blade4	110	0:00 02-14-85	6:37 02-21-85
25	mo-00137	SH P_blade1	115	0:00 03-05-85	0:36 04-20-85	85	mo-00011	CR P_blade1	128	0:00 02-14-85	8:46 02-15-85
26	mo-00141	FO P_blade4	129	0:00 03-05-85	8:14 04-03-85						
27	mo-00101	SO P_blade1	148	0:00 02-28-85	19:29 04-13-85						
28	mo-00071	SH P_blade4	105	0:00 02-21-85	5:09 04-03-85						
29	mo-00153	FO P_blade6	101	0:00 03-07-85	4:34 03-17-85						
30	mo-00147	CR P_blade1	112	0:00 03-06-85	17:34 04-11-85						
31	mo-00129	CR P_blade1	108	0:00 03-04-85	4:19 04-05-85						
32	mo-00149	SO P_blade4	114	0:00 03-06-85	16:17 03-30-85						
33	mo-00177	SO P_blade5	116	0:00 03-12-85	8:12 03-12-85						
34	mo-00023	SD P_blade1	141	0:00 02-15-85	19:15 04-01-85						
35	mo-00157	CR P_blade2	134	0:00 03-08-85	21:30 03-25-85						
36	mo-00139	SH P_blade6	135	0:00 03-05-85	17:10 03-14-85						
37	mo-00069	SH P_blade1	125	0:00 02-21-85	13:19 03-25-85						
38	mo-00085	SO P_blade1	138	0:00 02-26-85	18:15 03-28-85						
39	mo-00171	SH P_blade1	143	0:00 03-11-85	13:22 03-15-85						
40	mo-00131	FO P_blade1	115	0:00 03-05-85	18:18 03-31-85						
41	mo-00115	SO P_blade3	120	0:00 02-28-85	13:01 03-14-85						
42	mo-00167	FO P_blade4	141	0:00 03-11-85	16:07 03-12-85						
43	mo-00165	SO P_blade1	106	0:00 03-08-85	17:35 03-27-85						
44	mo-00113	ST P_blade4	126	0:00 02-28-85	8:35 03-25-85						
45	mo-00031	ST P_blade1	144	0:00 02-18-85	22:57 03-24-85						
46	mo-00159	ST P_blade4	108	0:00 03-08-85	4:11 03-12-85						
47	mo-00035	CR P_blade6	110	0:00 02-18-85	19:07 03-09-85						
48	mo-00047	FO P_blade5	149	0:00 02-19-85	8:11 03-14-85						
49	mo-00111	SO P_blade1	116	0:00 02-28-85	23:12 03-16-85						
50	mo-00019	ST P_blade4	142	0:00 02-14-85	15:04 03-22-85						
51	mo-00053	SH P_blade4	101	0:00 02-19-85	15:35 02-21-85						
52	mo-00133	FO P_blade1	129	0:00 03-05-85	12:40 03-10-85						
53	mo-00109	ST P_blade5	130	0:00 02-28-85	9:18 03-06-85						
54	mo-00075	SO P_blade4	132	0:00 02-22-85	8:18 03-22-85						
55	mo-00103	SO P_blade6	146	0:00 02-28-85	19:49 03-03-85						
56	mo-00127	CR P_blade4	146	0:00 03-04-85	6:57 03-16-85						
57	mo-00061	SD P_blade1	109	0:00 02-21-85	6:09 03-17-85						
58	mo-00121	FO P_blade1	125	0:00 03-01-85	22:49 03-13-85						
59	mo-00059	FO P_blade6	123	0:00 02-21-85	11:20 03-10-85						
60	mo-00117	FO P_blade4	111	0:00 03-01-85	22:10 03-13-85						



## 4.2.4 Test-series4

###	Lot PC	Product	Rqst-SD	Rqst-DD	MSQ	Lot PC	Product	Rqst-SD	Rqst-DD
1	mo-00243	ST P Blade5	9:00 04-29-85	22:56 06-10-85	112	61	mo-00149	CR P blade1	14:21 05-02-85
2	mo-00175	ST P blade5	8:00 04-01-85	15:15 05-27-85	145	62	mo-00109	ST P blade5	23:03 04-18-85
3	mo-00223	SH P blade3	8:00 04-22-85	16:27 06-11-85	146	63	mo-00177	CR P blade1	5:09 04-19-85
4	mo-00169	SO P blade5	8:00 04-01-85	6:37 06-28-85	146	64	mo-00095	CR P blade4	23:59 04-29-85
5	mo-00251	CR P blade5	9:00 04-29-85	0:14 05-27-85	116	65	mo-00161	CR P blade4	1:58 04-11-85
6	mo-00205	CR P blade5	8:00 04-15-85	7:45 05-15-85	114	66	mo-00147	CR P blade1	6:33 04-14-85
7	mo-00137	SO P blade3	8:00 04-01-85	9:24 03-23-85	120	67	mo-00121	SO P blade1	11:37 04-24-85
8	mo-00165	ST P blade4	8:00 04-01-85	4:10 05-28-85	124	68	mo-00115	SO P blade1	3:35 04-16-85
9	mo-00237	CR P blade5	9:00 04-29-85	5:47 05-14-85	134	69	mo-00075	ST P blade6	11:51 04-12-85
10	mo-00241	CR P blade4	9:00 04-29-85	22:43 03-27-85	148	70	mo-00133	CR P blade1	2:25 04-30-85
11	mo-00225	SH P blade1	8:00 04-22-85	3:07 06-16-85	103	71	mo-00127	CR P blade3	21:22 03-31-85
12	mo-00247	CR P blade2	9:00 04-29-85	23:58 05-18-85	114	72	mo-00113	CR P blade1	5:54 04-13-85
13	mo-00253	ST P blade1	9:00 04-29-85	16:50 06-14-85	104	73	mo-00129	CR P blade2	12:51 03-20-85
14	mo-00139	SO P blade4	8:00 04-01-85	15:29 05-27-85	126	74	mo-00097	CR P blade1	19:40 04-12-85
15	mo-00203	SO P blade1	8:00 04-15-85	4:27 06-07-85	122	75	mo-00103	ST P blade1	14:02 04-03-85
16	mo-00239	ST P blade3	9:00 04-29-85	6:22 03-02-85	132	76	mo-00101	ST P blade1	4:28 03-31-85
17	mo-00195	SO P blade3	8:00 04-15-85	11:44 05-20-85	130	77	mo-00107	CR P blade1	11:40 04-15-85
18	mo-00231	SD P blade1	8:00 04-22-85	6:56 06-06-85	135	78	mo-00123	ST P blade3	6:45 03-29-85
19	mo-00211	SO P blade1	8:00 04-15-85	6:36 06-01-85	126	79	mo-00099	SO P blade4	0:06 04-20-85
20	mo-00201	ST P blade1	8:00 04-15-85	16:12 03-25-85	140	80	mo-00091	SO P blade1	13:31 03-27-85
21	mo-00145	ST P blade1	8:00 04-01-85	14:23 05-30-85	148	81	mo-00111	CR P blade3	23:37 03-19-85
22	mo-00249	ST P blade1	9:00 04-29-85	22:32 05-15-85	106	82	mo-00105	CR P blade4	3:33 04-19-85
23	mo-00245	CR P blade1	9:00 04-29-85	6:22 05-05-85	114	83	mo-00125	CR P blade4	22:11 03-26-85
24	mo-00197	ST P blade1	8:00 04-15-85	16:26 03-14-85	138	84	mo-00131	CR P blade4	0:20 03-30-85
25	mo-00137	SO P blade3	8:00 04-01-85	15:48 05-18-85	126	85	mo-00087	SD P blade5	13:55 03-24-85
26	mo-00227	FO P blade1	8:00 04-22-85	6:51 05-21-85	107	86	mo-00089	SH P blade1	3:07 04-05-85
27	mo-00221	FO P blade3	8:00 04-22-85	23:53 03-03-85	131	87	mo-00049	SH P blade1	14:16 04-07-85
28	mo-00233	SD P blade1	8:00 04-22-85	22:22 05-15-85	137	88	mo-00071	ST P blade1	19:39 04-16-85
29	mo-00233	SD P blade1	8:00 04-22-85	21:07 04-30-85	147	89	mo-00081	ST P blade1	0:17 03-30-85
30	mo-00235	SH P blade1	8:00 04-22-85	9:06 03-15-85	115	90	mo-00057	SH P blade1	1:44 03-24-85
31	mo-00229	FO P blade1	8:00 04-15-85	2:55 04-24-85	143	91	mo-00083	SO P blade3	4:06 03-27-85
32	mo-00209	ST P blade1	8:00 04-15-85	16:20 05-06-85	102	92	mo-00067	CR P blade1	0:11 03-15-85
33	mo-00155	ST P blade1	8:00 04-01-85	8:00 04-23-85	138	93	mo-00063	SO P blade1	10:41 03-10-85
34	mo-00181	SH P blade3	8:00 04-08-85	13:56 05-03-85	145	94	mo-00061	SO P blade1	23:52 03-19-85
35	mo-00143	CR P blade1	8:00 04-01-85	21:38 05-10-85	108	95	mo-00033	SO P blade3	13:00 03-23-85
36	mo-00211	ST P blade4	8:00 04-15-85	8:27 04-20-85	124	96	mo-00069	CR P blade1	8:58 03-26-85
37	mo-00167	ST P blade1	8:00 04-01-85	18:14 04-19-85	102	97	mo-00063	SO P blade1	18:44 03-09-85
38	mo-00179	SO P blade1	8:00 04-01-85	22:08 05-01-85	106	98	mo-00079	CR P blade1	18:54 03-26-85
39	mo-00217	CR P blade4	8:00 04-15-85	21:40 04-30-85	106	99	mo-00065	CR P blade1	17:39 03-17-85
40	mo-00199	CR P blade1	8:00 04-01-85	15:56 05-08-85	138	100	mo-00077	CR P blade4	19:19 03-09-85
41	mo-00159	CR P blade1	8:00 04-01-85	13:23 04-19-85	100	101	mo-00055	SH P blade4	15:56 03-06-85
42	mo-00215	ST P blade1	8:00 04-15-85	16:08 05-04-85	133	102	mo-00045	SH P blade1	19:33 03-17-85
43	mo-00191	FO P blade1	8:00 04-15-85	9:13 04-15-85	100	103	mo-00043	FO P blade6	0:24 02-27-85
44	mo-00207	ST P blade1	8:00 04-15-85	9:37 04-26-85	133	104	mo-00051	SD P blade4	15:18 04-06-85
45	mo-00187	SD P blade3	8:00 04-08-85	11:25 05-02-85	119	105	mo-00035	SO P blade1	18:03 03-18-85
46	mo-00199	CR P blade1	8:00 04-15-85	10:07 04-18-85	124	106	mo-00035	SO P blade1	17:19 04-06-85
47	mo-00189	FO P blade4	8:00 04-08-85	11:25 05-02-85	123	107	mo-00033	SH P blade1	4:33 02-27-85
48	mo-00193	SD P blade6	8:00 04-08-85	10:06 04-24-85	149	108	mo-00039	FO P blade4	16:12 02-26-85
49	mo-00183	FO P blade4	8:00 04-08-85	15:59 04-24-85	117	109	mo-00047	FO P blade1	21:43 03-26-85
50	mo-00117	CR P blade1	8:00 03-18-85	10:06 04-24-85	100	110	mo-00015	SO P blade1	14:46 03-08-85
51	mo-00171	SO P blade1	8:00 03-11-85	8:59 04-23-85	102	111	mo-00023	ST P blade1	16:12 02-16-85
52	mo-00085	SD P blade2	8:00 04-08-85	9:44 04-21-85	109	112	mo-00027	SO P blade5	18:43 03-01-85
53	mo-00185	CR P blade1	8:00 04-01-85	21:01 04-29-85	130	113	mo-00039	SO P blade5	12:49 03-29-85
54	mo-00151	FO P blade1	8:00 03-25-85	22:53 04-14-85	133	114	mo-00031	SO P blade1	8:57 03-21-85
55	mo-00135	SH P blade1	8:00 03-25-85	9:55 04-17-85	112	115	mo-00037	SO P blade6	13:25 03-17-85
56	mo-00163	SO P blade3	8:00 04-01-85	9:42 04-22-85	116	116	mo-00019	CR P blade1	15:15 03-25-85
57	mo-00173	CR P blade1	8:00 04-01-85	17:17 04-05-85	130	117	mo-00019	ST P blade1	12:12 03-03-85
58	mo-00119	ST P blade1	8:00 04-01-85	11:30 04-03-85	148	118	mo-00021	SO P blade1	3:06 03-12-85
59	mo-00153	SO P blade3	8:00 04-01-85	2:30 04-03-85	148	119	mo-00025	SO P blade4	19:35 03-19-85
60	mo-00141	ST P blade1	8:00 04-01-85	2:30 04-03-85	118	120	mo-00029	CR P blade1	2:13 02-21-85

4.2.5 Test-series\$

###	Lot PC	Product	Rqst-SD	Rqst-DD	MSQ	Lot PC	Product	Rqst-SD	Rqst-DD
1	mo-00219	SO P_blade5	8:00 04-08-85	9:50 06-01-85	148	61	mo-00183	SO P_blade1	8:00 03-25-85
2	mo-00249	CR P_blade3	8:00 04-22-85	12:33 06-07-85	134	62	mo-00163	SO P_blade3	8:00 03-25-85
3	mo-00235	SO P_blade4	8:00 04-22-85	1:43 06-01-85	136	63	mo-00081	SO P_blade1	8:00 03-11-85
4	mo-00227	SH P_blade4	8:00 04-15-85	20:16 05-23-85	118	64	mo-00091	SO P_blade2	8:00 03-11-85
5	mo-00251	CR P_blade4	8:00 04-22-85	2:23 05-16-85	120	65	mo-00049	SD P_blade5	8:00 03-04-85
6	mo-00157	SO P_blade3	8:00 03-25-85	10:50 05-01-85	105	66	mo-00179	CR P_blade1	8:00 03-25-85
7	mo-00253	FO P_blade3	9:00 04-29-85	18:37 05-03-85	134	67	mo-00103	ST P_blade1	8:00 03-11-85
8	mo-00133	SH P_blade4	8:00 03-18-85	23:05 05-11-85	106	68	mo-00173	ST P_blade1	8:00 03-25-85
9	mo-00243	SO P_blade4	8:00 04-22-85	4:36 05-14-85	142	69	mo-00165	SO P_blade1	8:00 03-25-85
10	mo-00169	SO P_blade2	8:00 04-22-85	19:54 04-27-85	126	70	mo-00141	SD P_blade3	8:00 03-18-85
11	mo-00247	ST P_blade1	8:00 04-22-85	6:23 05-12-85	139	71	mo-00153	ST P_blade4	8:00 03-25-85
12	mo-00229	SH P_blade1	8:00 04-15-85	19:10 05-25-85	108	72	mo-00187	CR P_blade1	8:00 03-25-85
13	mo-00245	SO P_blade1	8:00 04-22-85	5:43 05-13-85	128	73	mo-00177	CR P_blade4	8:00 03-25-85
14	mo-00219	ST P_blade1	8:00 04-22-85	9:31 05-23-85	106	74	mo-00079	SO P_blade1	8:00 03-11-85
15	mo-00207	SD P_blade6	8:00 04-01-85	14:35 04-28-85	127	75	mo-00083	ST P_blade5	8:00 03-11-85
16	mo-00211	SH P_blade3	8:00 04-01-85	18:44 04-22-85	127	76	mo-00127	SD P_blade2	8:00 03-18-85
17	mo-00189	SD P_blade1	8:00 04-01-85	4:15 05-17-85	103	77	mo-00135	FO P_blade6	8:00 03-11-85
18	mo-00241	ST P_blade1	8:00 04-22-85	22:12 05-16-85	103	78	mo-00115	SO P_blade4	8:00 03-18-85
19	mo-00181	ST P_blade1	8:00 03-25-85	18:49 04-26-85	127	79	mo-00125	FO P_blade1	8:00 03-18-85
20	mo-00233	SH P_blade2	8:00 04-15-85	14:57 05-10-85	106	80	mo-00125	FO P_blade1	8:00 03-11-85
21	mo-00223	SH P_blade1	8:00 04-15-85	22:12 05-16-85	103	81	mo-00097	SO P_blade4	8:00 03-11-85
22	mo-00225	SH P_blade1	8:00 03-25-85	9:55 05-15-85	118	82	mo-00097	SO P_blade3	8:00 03-18-85
23	mo-00145	SH P_blade1	8:00 03-25-85	5:58 05-03-85	101	83	mo-00137	SD P_blade3	8:00 03-18-85
24	mo-00057	SH P_blade1	8:00 03-04-85	12:06 04-30-85	133	84	mo-00149	SD P_blade4	8:00 03-18-85
25	mo-00231	FO P_blade5	8:00 04-15-85	14:07 04-22-85	133	85	mo-00143	SD P_blade1	8:00 03-18-85
26	mo-00237	SO P_blade4	8:00 04-22-85	18:10 04-22-85	113	86	mo-00123	SH P_blade4	8:00 03-11-85
27	mo-00185	ST P_blade1	8:00 03-25-85	0:04 05-01-85	120	87	mo-00139	FO P_blade1	8:00 03-18-85
28	mo-00161	SD P_blade3	8:00 03-25-85	12:14 04-22-85	144	88	mo-00085	CR P_blade2	8:00 03-11-85
29	mo-00131	SD P_blade3	8:00 03-18-85	17:47 04-26-85	105	89	mo-00121	FO P_blade1	8:00 03-11-85
30	mo-00151	CR P_blade1	8:00 03-25-85	2:28 05-06-85	128	90	mo-00111	SO P_blade2	8:00 03-18-85
31	mo-00191	SD P_blade1	8:00 04-01-85	0:18 05-03-85	146	91	mo-00113	ST P_blade1	8:00 03-11-85
32	mo-00093	SO P_blade5	8:00 03-11-85	7:38 04-22-85	119	92	mo-00053	SD P_blade5	8:00 03-04-85
33	mo-00197	SH P_blade1	8:00 04-01-85	8:38 04-27-85	128	93	mo-00089	CR P_blade1	8:00 03-11-85
34	mo-00167	SO P_blade3	8:00 03-25-85	12:29 04-30-85	102	94	mo-00101	ST P_blade1	8:00 03-11-85
35	mo-00075	SH P_blade3	8:00 03-04-85	2:15 04-26-85	128	95	mo-00077	CR P_blade1	8:00 03-11-85
36	mo-00215	FO P_blade6	8:00 04-01-85	2:26 04-19-85	109	96	mo-00069	SD P_blade3	8:00 03-04-85
37	mo-00225	SD P_blade4	8:00 04-15-85	10:42 05-20-85	136	97	mo-00105	SO P_blade4	8:00 03-11-85
38	mo-00109	ST P_blade1	8:00 03-11-85	13:04 04-27-85	104	98	mo-00095	SO P_blade1	8:00 03-11-85
39	mo-00147	SD P_blade1	8:00 03-18-85	17:17 04-27-85	147	99	mo-00041	FO P_blade2	8:00 03-04-85
40	mo-00217	SH P_blade3	8:00 04-01-85	9:06 04-02-85	141	100	mo-00071	SD P_blade2	8:00 03-04-85
41	mo-00171	SO P_blade1	8:00 03-25-85	7:10 04-29-85	125	101	mo-00045	FO P_blade5	8:00 03-04-85
42	mo-00201	SD P_blade2	8:00 04-01-85	22:55 04-21-85	123	102	mo-00047	SD P_blade1	8:00 03-04-85
43	mo-00067	SH P_blade1	8:00 03-04-85	13:18 04-26-85	101	103	mo-00065	SD P_blade1	8:00 03-04-85
44	mo-00107	ST P_blade3	8:00 03-11-85	6:37 04-10-85	129	104	mo-00059	SD P_blade3	8:00 03-04-85
45	mo-00037	ST P_blade6	8:00 02-25-85	6:59 04-15-85	141	105	mo-00055	SH P_blade1	8:00 03-04-85
46	mo-00221	SO P_blade1	8:00 04-08-85	13:19 04-20-85	137	106	mo-00051	FO P_blade4	8:00 03-04-85
47	mo-00117	SH P_blade4	8:00 03-18-85	23:27 05-10-85	149	107	mo-00061	FO P_blade4	8:00 03-04-85
48	mo-00159	ST P_blade4	8:00 03-25-85	4:12 05-04-85	121	108	mo-00043	SD P_blade1	8:00 03-04-85
49	mo-00199	SH P_blade4	8:00 04-01-85	15:32 04-22-85	121	109	mo-00023	SH P_blade1	8:00 02-18-85
50	mo-00063	SH P_blade4	8:00 03-04-85	4:57 04-19-85	110	110	mo-00035	SO P_blade3	8:00 02-25-85
51	mo-00129	SD P_blade3	8:00 03-18-85	18:25 04-10-85	122	111	mo-00033	CR P_blade1	8:00 02-25-85
52	mo-00213	SD P_blade4	8:00 04-01-85	12:08 04-11-85	118	112	mo-00039	ST P_blade1	8:00 02-25-85
53	mo-00209	FO P_blade1	8:00 04-01-85	13:11 04-16-85	106	113	mo-00031	CR P_blade4	8:00 02-25-85
54	mo-00073	SH P_blade1	8:00 03-04-85	18:14 04-20-85	117	114	mo-00015	SH P_blade2	8:00 02-18-85
55	mo-00155	SO P_blade3	8:00 03-25-85	9:09 04-11-85	147	115	mo-00027	SD P_blade1	8:00 02-18-85
56	mo-00205	FO P_blade4	8:00 04-01-85	14:11 04-12-85	123	116	mo-00021	SD P_blade3	8:00 02-18-85
57	mo-00099	ST P_blade5	8:00 03-11-85	0:11 04-11-85	133	117	mo-00025	SD P_blade1	8:00 02-18-85
58	mo-00195	FO P_blade1	8:00 04-01-85	5:33 04-14-85	133	118	mo-00029	SH P_blade4	8:00 02-18-85
59	mo-00203	FO P_blade1	8:00 04-01-85	2:13 04-11-85	107	119	mo-00019	SD P_blade1	8:00 02-18-85
60	mo-00193	FO P_blade1	8:00 04-01-85	16:45 04-01-85	111	120	mo-00017	FO P_blade1	8:00 02-18-85

## 4.2.6 Test-series6

###	Lot PC	Product	MSQ	Rqst-SD	Rqst-DD	Lot PC	Product	MSQ	Rqst-SD	Rqst-DD	
1	mo-00253	SH P_blade1	113	8:00 04-01-85	16:01 05-23-85	61	mo-00069	CR P_blade4	138	8:00 02-25-85	11:44 04-05-85
2	mo-00203	ST P_blade1	136	8:00 03-25-85	2:31 03-22-85	62	mo-00143	FO P_blade2	121	8:00 03-04-85	21:44 03-22-85
3	mo-00231	ST P_blade2	148	8:00 03-25-85	14:23 05-23-85	63	mo-00147	SH P_blade1	125	8:00 03-04-85	20:36 03-05-85
4	mo-00201	ST P_blade1	144	8:00 03-25-85	4:58 05-16-85	64	mo-00129	SH P_blade5	115	8:00 03-04-85	22:01 03-17-85
5	mo-00235	ST P_blade1	117	8:00 04-01-85	20:08 05-06-85	65	mo-00171	CR P_blade1	140	8:00 03-11-85	18:01 04-08-85
6	mo-00209	ST P_blade2	132	8:00 03-25-85	18:09 05-03-85	66	mo-00153	ST P_blade4	140	8:00 03-11-85	15:36 03-15-85
7	mo-00189	SH P_blade1	121	8:00 03-18-85	6:39 05-06-85	67	mo-00091	SO P_blade1	146	8:00 02-25-85	6:40 04-02-85
8	mo-00229	SH P_blade1	108	8:00 03-25-85	21:38 05-03-85	68	mo-00079	SO P_blade1	146	8:00 02-25-85	3:54 03-25-85
9	mo-00237	SD P_blade2	145	8:00 04-01-85	19:15 04-21-85	69	mo-00137	FO P_blade2	119	8:00 03-04-85	21:30 03-18-85
10	mo-00243	SH P_blade1	109	8:00 04-01-85	3:33 05-03-85	70	mo-00127	FO P_blade1	149	8:00 03-04-85	8:03 04-01-85
11	mo-00249	FO P_blade2	119	8:00 04-01-85	16:01 04-28-85	71	mo-00173	ST P_blade4	112	8:00 03-11-85	21:22 03-15-85
12	mo-00225	SO P_blade4	126	8:00 03-25-85	15:29 03-20-85	72	mo-00177	SO P_blade3	126	8:00 03-11-85	13:31 03-20-85
13	mo-00239	SD P_blade4	103	8:00 04-01-85	4:51 05-18-85	73	mo-00169	CR P_blade2	102	8:00 03-11-85	22:05 03-15-85
14	mo-00245	SD P_blade1	125	8:00 04-01-85	21:16 04-27-85	74	mo-00139	FO P_blade1	121	8:00 03-04-85	3:27 03-27-85
15	mo-00195	SH P_blade4	121	8:00 03-18-85	6:39 05-17-85	75	mo-00095	CR P_blade4	118	8:00 02-25-85	5:03 03-29-85
16	mo-00197	SO P_blade4	122	8:00 03-25-85	20:24 05-16-85	76	mo-00151	FO P_blade2	117	8:00 03-04-85	3:49 03-16-85
17	mo-00207	CR P_blade5	104	8:00 03-25-85	13:56 04-21-85	77	mo-00057	SD P_blade4	121	8:00 02-18-85	5:07 03-27-85
18	mo-00179	CR P_blade4	138	8:00 03-11-85	7:46 04-25-85	78	mo-00175	SO P_blade4	144	8:00 03-11-85	7:03 03-19-85
19	mo-00167	SO P_blade3	124	8:00 03-11-85	17:33 05-06-85	79	mo-00067	CR P_blade4	104	8:00 02-25-85	9:18 03-24-85
20	mo-00223	SO P_blade4	126	8:00 03-25-85	15:48 05-11-85	80	mo-00105	ST P_blade4	130	8:00 02-25-85	0:58 03-21-85
21	mo-00221	CR P_blade4	148	8:00 03-25-85	7:27 05-06-85	81	mo-00145	FO P_blade4	145	8:00 03-04-85	6:58 03-25-85
22	mo-00181	CR P_blade4	110	8:00 03-11-85	22:59 04-22-85	82	mo-00149	SH P_blade3	143	8:00 03-04-85	13:50 03-06-85
23	mo-00241	SH P_blade2	123	8:00 04-01-85	17:36 04-17-85	83	mo-00117	FO P_blade2	141	8:00 03-04-85	3:16 03-08-85
24	mo-00193	SO P_blade4	101	8:00 03-18-85	0:34 05-03-85	84	mo-00071	SO P_blade1	132	8:00 02-25-85	3:30 03-20-85
25	mo-00199	CR P_blade2	114	8:00 03-25-85	17:04 04-18-85	85	mo-00075	SO P_blade4	140	8:00 02-25-85	13:34 03-19-85
26	mo-00141	SH P_blade4	131	8:00 03-04-85	7:00 04-17-85	86	mo-00059	CR P_blade1	142	8:00 02-25-85	2:25 03-21-85
27	mo-00161	CR P_blade4	130	8:00 03-11-85	11:49 04-22-85	87	mo-00121	FO P_blade4	111	8:00 03-04-85	5:05 03-25-85
28	mo-00051	SH P_blade1	105	8:00 02-18-85	4:05 04-11-85	88	mo-00123	SH P_blade1	105	8:00 03-04-85	8:39 03-06-85
29	mo-00251	FO P_blade1	127	8:00 04-01-85	8:09 04-20-85	89	mo-00065	CR P_blade5	122	8:00 02-25-85	16:55 03-10-85
30	mo-00211	SO P_blade2	112	8:00 03-25-85	15:49 04-17-85	90	mo-00083	SO P_blade4	102	8:00 02-18-85	15:01 03-18-85
31	mo-00247	SO P_blade3	133	8:00 04-01-85	16:59 04-13-85	91	mo-00015	SH P_blade6	124	8:00 02-25-85	23:03 02-26-85
32	mo-00131	SH P_blade4	147	8:00 03-04-85	23:57 04-09-85	92	mo-00125	FO P_blade4	143	8:00 03-04-85	15:37 03-07-85
33	mo-00213	CR P_blade1	100	8:00 03-25-85	8:39 04-17-85	93	mo-00019	FO P_blade4	139	8:00 02-18-85	8:50 03-15-85
34	mo-00155	ST P_blade4	132	8:00 03-11-85	5:20 04-13-85	94	mo-00097	ST P_blade1	120	8:00 02-25-85	4:21 03-12-85
35	mo-00215	CR P_blade2	116	8:00 03-25-85	14:40 04-14-85	95	mo-00073	CR P_blade4	142	8:00 02-25-85	16:27 03-13-85
36	mo-00041	SH P_blade4	145	8:00 02-18-85	13:24 04-06-85	96	mo-00089	ST P_blade1	118	8:00 02-25-85	19:56 02-26-85
37	mo-00185	FO P_blade5	117	8:00 03-18-85	10:24 04-13-85	97	mo-00103	SO P_blade6	124	8:00 02-25-85	23:03 02-26-85
38	mo-00205	SO P_blade4	122	8:00 03-25-85	14:17 04-12-85	98	mo-00085	ST P_blade1	104	8:00 02-25-85	9:57 02-26-85
39	mo-00023	SH P_blade4	143	8:00 02-18-85	6:03 03-19-85	99	mo-00099	CR P_blade4	102	8:00 02-25-85	17:26 03-13-85
40	mo-00115	ST P_blade4	126	8:00 02-25-85	17:47 04-09-85	100	mo-00081	ST P_blade5	102	8:00 02-25-85	19:39 03-06-85
41	mo-00165	ST P_blade4	112	8:00 03-11-85	5:09 04-07-85	101	mo-00101	ST P_blade4	106	8:00 02-25-85	18:30 02-27-85
42	mo-00183	CR P_blade3	128	8:00 03-11-85	19:40 04-05-85	102	mo-00109	SO P_blade3	128	8:00 02-25-85	13:04 02-26-85
43	mo-00163	CR P_blade4	112	8:00 03-11-85	16:06 04-10-85	104	mo-00017	SD P_blade4	125	8:00 02-18-85	21:07 03-04-85
44	mo-00159	ST P_blade1	146	8:00 03-11-85	21:51 04-06-85	105	mo-00035	SO P_blade4	133	8:00 02-18-85	4:25 03-08-85
45	mo-00087	CR P_blade6	132	8:00 02-25-85	7:03 04-03-85	106	mo-00111	SD P_blade1	136	8:00 02-25-85	14:45 03-03-85
46	mo-00227	ST P_blade1	118	8:00 03-25-85	2:30 03-27-85	107	mo-00077	CR P_blade4	106	8:00 02-25-85	11:39 02-27-85
47	mo-00107	CR P_blade2	146	8:00 02-25-85	6:33 04-07-85	108	mo-00093	CR P_blade2	137	8:00 02-18-85	14:17 03-09-85
48	mo-00233	CR P_blade1	112	8:00 03-25-85	23:24 04-09-85	109	mo-00053	SH P_blade1	118	8:00 02-18-85	12:27 03-22-85
49	mo-00063	SO P_blade4	140	8:00 02-25-85	2:46 04-06-85	110	mo-00039	SD P_blade5	129	8:00 02-18-85	7:43 03-17-85
50	mo-00157	SO P_blade6	110	8:00 03-11-85	20:12 03-28-85	111	mo-00049	SD P_blade4	131	8:00 02-18-85	4:42 03-03-85
51	mo-00217	CR P_blade4	114	8:00 03-25-85	9:13 03-27-85	112	mo-00047	SH P_blade1	105	8:00 02-18-85	0:50 03-06-85
52	mo-00219	CR P_blade4	104	8:00 03-25-85	19:52 03-25-85	113	mo-00043	SD P_blade3	141	8:00 02-18-85	2:16 03-26-85
53	mo-00135	SH P_blade4	125	8:00 03-04-85	2:01 03-28-85	114	mo-00029	SD P_blade1	143	8:00 02-18-85	5:52 02-23-85
54	mo-00187	SD P_blade4	143	8:00 03-18-85	14:04 04-07-85	115	mo-00033	FO P_blade4	101	8:00 02-18-85	20:30 03-06-85
55	mo-00191	FO P_blade5	121	8:00 03-18-85	11:34 03-29-85	116	mo-00021	FO P_blade1	147	8:00 02-18-85	21:04 02-26-85
56	mo-00031	SH P_blade1	141	8:00 02-18-85	4:47 03-22-85	117	mo-00055	SD P_blade4	125	8:00 02-18-85	15:21 02-27-85
57	mo-00133	SH P_blade6	147	8:00 03-04-85	14:08 03-23-85	118	mo-00025	SD P_blade4	143	8:00 02-18-85	7:50 02-25-85
58	mo-00113	CR P_blade4	122	8:00 02-25-85	23:43 04-07-85	119	mo-00047	FO P_blade1	135	8:00 02-18-85	13:03 02-20-85
59	mo-00027	SH P_blade1	123	8:00 02-18-85	0:40 03-30-85	120	mo-00045	FO P_blade4	109	8:00 02-18-85	9:54 03-04-85
60	mo-00119	SD P_blade1	115	8:00 03-04-85	17:30 04-11-85						













4.2.12 Test-seriale12

###	Lot_PC	Product	MSQ	Rqst-SD	Rqst-DD	Lot_PC	Product	MSQ	Rqst-SD	Rqst-DD
1	mo-00244	SO P_blade2	148	9:00 05-27-85	6:13 06-26-85	61	mo-00140	ST P_blade1	110	8:00 04-15-85
2	mo-00238	SO P_blade3	120	9:00 05-27-85	1:11 06-30-85	62	mo-00142	CR P_blade1	124	8:00 04-15-85
3	mo-00240	CR P_blade5	114	9:00 05-27-85	2:16 06-15-85	63	mo-00102	FO P_blade1	101	8:00 04-08-85
4	mo-00224	SO P_blade3	106	9:00 05-13-85	12:19 06-15-85	64	mo-00130	SH P_blade5	135	8:00 04-08-85
5	mo-00252	SO P_blade1	102	9:00 05-27-85	2:29 07-01-85	65	mo-00118	CR P_blade1	118	8:00 04-15-85
6	mo-00248	ST P_blade3	112	9:00 05-27-85	23:08 06-02-85	66	mo-00160	CR P_blade3	146	8:00 04-15-85
7	mo-00246	SO P_blade1	118	9:00 05-27-85	3:38 06-29-85	67	mo-00162	CR P_blade1	108	8:00 04-15-85
8	mo-00242	CR P_blade1	112	9:00 05-27-85	6:20 06-24-85	68	mo-00146	CR P_blade1	126	8:00 04-15-85
9	mo-00250	SO P_blade4	126	9:00 05-27-85	20:33 06-20-85	69	mo-00158	ST P_blade1	104	8:00 04-15-85
10	mo-00254	CR P_blade1	130	9:00 05-27-85	23:39 06-20-85	70	mo-00152	SO P_blade4	142	8:00 04-15-85
11	mo-00226	CR P_blade5	144	9:00 05-13-85	2:44 06-15-85	71	mo-00136	SO P_blade1	146	8:00 04-15-85
12	mo-00218	SO P_blade3	102	9:00 05-13-85	21:05 06-08-85	72	mo-00098	SH P_blade1	149	8:00 04-08-85
13	mo-00236	SH P_blade3	141	9:00 05-20-85	4:50 06-07-85	73	mo-00096	SH P_blade2	127	8:00 04-08-85
14	mo-00214	SO P_blade6	108	9:00 05-13-85	8:03 06-03-85	74	mo-00110	SH P_blade1	127	8:00 04-08-85
15	mo-00216	CR P_blade1	134	9:00 05-13-85	15:18 06-10-85	75	mo-00094	FO P_blade5	131	8:00 04-08-85
16	mo-00220	ST P_blade5	132	9:00 05-13-85	9:36 05-22-85	76	mo-00122	SH P_blade1	117	8:00 04-08-85
17	mo-00210	ST P_blade1	126	9:00 05-13-85	8:26 06-07-85	77	mo-00126	FO P_blade3	141	8:00 04-08-85
18	mo-00230	CR P_blade1	114	9:00 05-13-85	15:35 06-05-85	78	mo-00104	SD P_blade1	111	8:00 04-08-85
19	mo-00234	ST P_blade1	142	9:00 05-13-85	17:21 06-01-85	79	mo-00124	SD P_blade1	115	8:00 04-08-85
20	mo-00222	SO P_blade1	106	9:00 05-13-85	10:37 06-01-85	80	mo-00112	FO P_blade1	149	8:00 04-08-85
21	mo-00212	CR P_blade4	136	9:00 05-13-85	15:27 06-10-85	81	mo-00114	FO P_blade1	137	8:00 04-08-85
22	mo-00232	CR P_blade1	128	9:00 05-13-85	4:12 05-29-85	82	mo-00030	ST P_blade5	134	8:00 03-04-85
23	mo-00200	CR P_blade3	126	9:00 04-29-85	5:32 05-29-85	83	mo-00090	SO P_blade3	110	8:00 04-01-85
24	mo-00182	SO P_blade1	114	9:00 04-29-85	1:17 05-29-85	84	mo-00092	SO P_blade4	148	8:00 04-01-85
25	mo-00228	CR P_blade4	112	9:00 05-13-85	6:28 06-02-85	85	mo-00052	ST P_blade5	114	8:00 03-18-85
26	mo-00208	CR P_blade1	102	9:00 05-13-85	5:21 05-22-85	86	mo-00062	ST P_blade5	110	8:00 03-18-85
27	mo-00190	CR P_blade1	130	9:00 04-29-85	2:22 05-30-85	87	mo-00082	SH P_blade4	147	8:00 03-25-85
28	mo-00206	FO P_blade5	113	9:00 04-29-85	13:00 05-25-85	88	mo-00084	FO P_blade2	113	8:00 03-25-85
29	mo-00196	CR P_blade1	146	9:00 04-29-85	4:09 05-25-85	89	mo-00080	SH P_blade3	149	8:00 03-25-85
30	mo-00180	CR P_blade1	135	9:00 04-29-85	2:34 05-26-85	90	mo-00076	SO P_blade4	102	8:00 03-18-85
31	mo-00118	SH P_blade3	135	8:00 04-08-85	13:16 05-11-85	91	mo-00074	CR P_blade5	148	8:00 03-18-85
32	mo-00184	CR P_blade1	106	9:00 04-29-85	21:07 05-25-85	92	mo-00034	SD P_blade5	147	8:00 03-11-85
33	mo-00174	FO P_blade1	129	8:00 04-22-85	17:14 05-26-85	93	mo-00088	SH P_blade1	127	8:00 03-25-85
34	mo-00202	CR P_blade1	120	9:00 04-29-85	5:06 05-23-85	94	mo-00086	FO P_blade1	105	8:00 03-25-85
35	mo-00192	SO P_blade5	148	9:00 04-29-85	13:35 05-21-85	95	mo-00058	ST P_blade1	116	8:00 03-18-85
36	mo-00186	ST P_blade1	116	9:00 04-29-85	18:35 05-20-85	96	mo-00066	SO P_blade1	146	8:00 03-18-85
37	mo-00194	SO P_blade1	104	9:00 04-29-85	17:05 05-20-85	97	mo-00048	ST P_blade1	142	8:00 03-18-85
38	mo-00138	ST P_blade1	140	8:00 04-15-85	11:14 05-15-85	98	mo-00060	CR P_blade1	140	8:00 03-18-85
39	mo-00188	ST P_blade5	106	9:00 04-29-85	2:19 05-09-85	99	mo-00032	ST P_blade3	100	8:00 03-04-85
40	mo-00170	SH P_blade1	115	8:00 04-22-85	9:36 05-13-85	100	mo-00054	ST P_blade1	124	8:00 03-18-85
41	mo-00120	SH P_blade4	109	8:00 04-08-85	0:37 05-11-85	101	mo-00056	ST P_blade1	112	8:00 03-18-85
42	mo-00130	SH P_blade1	133	8:00 04-08-85	15:20 04-25-85	102	mo-00050	SO P_blade1	110	8:00 03-18-85
43	mo-00134	CR P_blade6	114	8:00 04-15-85	14:20 05-11-85	103	mo-00064	ST P_blade1	144	8:00 03-18-85
44	mo-00144	SO P_blade4	138	8:00 04-15-85	21:30 05-16-85	104	mo-00068	CR P_blade1	128	8:00 03-18-85
45	mo-00204	SO P_blade1	130	9:00 04-29-85	11:01 05-08-85	105	mo-00072	SO P_blade1	136	8:00 03-18-85
46	mo-00178	SO P_blade1	124	9:00 04-29-85	8:15 05-05-85	106	mo-00078	CR P_blade1	108	8:00 03-18-85
47	mo-00198	ST P_blade4	104	9:00 04-29-85	12:30 05-09-85	107	mo-00070	CR P_blade1	118	8:00 03-18-85
48	mo-00106	SH P_blade1	133	8:00 04-08-85	8:10 04-24-85	108	mo-00038	SH P_blade1	135	8:00 03-11-85
49	mo-00156	ST P_blade1	146	8:00 04-15-85	23:39 05-15-85	109	mo-00036	SH P_blade1	113	8:00 03-11-85
50	mo-00148	ST P_blade4	104	8:00 04-15-85	7:01 05-15-85	110	mo-00040	SD P_blade1	103	8:00 03-11-85
51	mo-00166	FO P_blade5	129	8:00 04-22-85	21:40 05-02-85	111	mo-00042	SD P_blade1	147	8:00 03-11-85
52	mo-00116	SH P_blade1	109	8:00 04-08-85	18:19 04-30-85	112	mo-00046	FO P_blade1	123	8:00 03-11-85
53	mo-00132	CR P_blade4	128	8:00 04-15-85	5:51 05-16-85	113	mo-00044	FO P_blade4	103	8:00 03-11-85
54	mo-00176	FO P_blade1	107	8:00 04-22-85	7:28 05-27-85	114	mo-00024	SD P_blade3	149	8:00 02-25-85
55	mo-00128	SD P_blade3	127	8:00 04-08-85	8:17 05-04-85	115	mo-00020	SD P_blade4	104	8:00 02-18-85
56	mo-00164	FO P_blade1	115	8:00 04-22-85	3:18 05-24-85	116	mo-00028	SD P_blade4	109	8:00 02-25-85
57	mo-00108	SD P_blade4	140	8:00 04-08-85	22:49 05-09-85	117	mo-00026	SH P_blade1	107	8:00 02-25-85
58	mo-00150	SO P_blade1	147	8:00 04-15-85	21:31 05-11-85	118	mo-00022	CR P_blade1	142	8:00 02-18-85
59	mo-00172	SO P_blade4	135	8:00 04-22-85	2:10 05-07-85	119	mo-00016	CR P_blade1	142	8:00 02-18-85
60	mo-00168	SD P_blade1	137	8:00 04-22-85	15:06 05-07-85	120	mo-00018	ST P_blade4	108	8:00 02-18-85

4.2.13 Test-series13

###	Lot PC	Product	MSQ	Rqst-SD	Rqst-DD	Lot PC	Product	MSQ	Rqst-SD	Rqst-DD
1	mo-00184	SH P Blade3	129	8:00 03-25-85	4:00 04-18-85	61	mo-00060	ST P Blade1	134	8:00 03-04-85
2	mo-00150	SH P Blade3	123	8:00 03-25-85	20:06 03-30-85	62	mo-00128	CR P Blade1	146	8:00 03-18-85
3	mo-00118	SH P Blade3	107	8:00 03-11-85	15:17 04-02-85	63	mo-00144	SO P Blade3	110	8:00 03-18-85
4	mo-00250	ST P Blade1	118	8:00 04-15-85	3:41 05-08-85	64	mo-00138	SO P Blade5	106	8:00 03-18-85
5	mo-00106	SH P Blade1	147	8:00 03-11-85	20:38 03-11-85	65	mo-00102	SO P Blade3	100	8:00 03-04-85
6	mo-00124	SH P Blade3	107	8:00 03-11-85	5:11 03-12-85	66	mo-00054	ST P Blade1	124	8:00 02-18-85
7	mo-00242	SH P Blade1	143	8:00 04-08-85	13:34 04-29-85	67	mo-00066	CR P Blade3	140	8:00 03-04-85
8	mo-00208	SH P Blade3	142	8:00 04-01-85	13:20 04-28-85	68	mo-00136	SO P Blade4	108	8:00 03-18-85
9	mo-00248	ST P Blade6	114	8:00 04-15-85	7:59 05-04-85	69	mo-00146	SO P Blade1	104	8:00 03-18-85
10	mo-00176	SH P Blade1	141	8:00 03-25-85	16:02 04-20-85	70	mo-00142	SO P Blade1	106	8:00 03-18-85
11	mo-00168	SH P Blade1	137	8:00 03-25-85	1:44 04-21-85	71	mo-00122	SD P Blade3	139	8:00 03-11-85
12	mo-00182	SH P Blade1	129	8:00 03-25-85	0:21 04-10-85	72	mo-00130	ST P Blade4	106	8:00 03-18-85
13	mo-00152	SH P Blade1	129	8:00 03-25-85	16:13 03-28-85	73	mo-00140	CR P Blade1	102	8:00 03-18-85
14	mo-00180	SH P Blade1	111	8:00 03-25-85	14:26 04-07-85	74	mo-00126	SH P Blade2	125	8:00 03-11-85
15	mo-00196	SH P Blade1	103	8:00 03-25-85	18:43 04-23-85	75	mo-00108	FO P Blade2	129	8:00 03-11-85
16	mo-00156	SH P Blade1	103	8:00 03-25-85	19:39 04-14-85	76	mo-00068	SO P Blade1	132	8:00 03-04-85
17	mo-00246	SO P Blade3	110	8:00 04-15-85	19:57 04-24-85	77	mo-00098	SO P Blade1	132	8:00 03-04-85
18	mo-00230	ST P Blade1	138	8:00 04-01-85	2:31 04-29-85	78	mo-00076	SO P Blade1	120	8:00 03-04-85
19	mo-00254	CR P Blade1	128	8:00 04-15-85	19:42 04-26-85	79	mo-00120	FO P Blade3	127	8:00 03-11-85
20	mo-00160	SH P Blade1	103	8:00 03-25-85	14:16 04-05-85	80	mo-00112	SD P Blade1	127	8:00 03-11-85
21	mo-00252	ST P Blade1	132	8:00 04-15-85	1:53 04-21-85	81	mo-00078	SO P Blade1	142	8:00 03-04-85
22	mo-00222	ST P Blade3	104	8:00 04-01-85	19:05 04-25-85	82	mo-00104	CR P Blade3	106	8:00 03-04-85
23	mo-00224	SO P Blade3	122	8:00 04-01-85	19:24 04-23-85	83	mo-00116	SD P Blade4	137	8:00 03-11-85
24	mo-00212	SO P Blade1	146	8:00 04-01-85	13:39 04-29-85	84	mo-00114	SD P Blade1	123	8:00 03-11-85
25	mo-00228	ST P Blade1	144	8:00 04-01-85	3:58 04-25-85	85	mo-00110	FO P Blade1	103	8:00 03-11-85
26	mo-00164	SH P Blade1	101	8:00 03-25-85	4:33 03-27-85	86	mo-00074	ST P Blade5	138	8:00 03-04-85
27	mo-00218	ST P Blade1	142	8:00 04-01-85	2:12 04-25-85	87	mo-00072	CR P Blade4	148	8:00 03-04-85
28	mo-00216	CR P Blade3	132	8:00 04-01-85	12:18 04-23-85	88	mo-00086	CR P Blade1	142	8:00 03-04-85
29	mo-00240	SH P Blade4	133	8:00 04-08-85	23:42 04-14-85	89	mo-00058	SO P Blade1	146	8:00 03-04-85
30	mo-00186	SD P Blade4	127	8:00 03-25-85	1:37 04-23-85	90	mo-00100	CR P Blade3	142	8:00 03-04-85
31	mo-00174	SD P Blade4	149	8:00 03-25-85	19:57 04-22-85	91	mo-00092	CR P Blade3	122	8:00 03-04-85
32	mo-00214	CR P Blade3	142	8:00 04-01-85	2:46 04-20-85	92	mo-00088	SO P Blade4	126	8:00 03-04-85
33	mo-00172	SD P Blade5	105	8:00 03-25-85	7:05 04-24-85	93	mo-00082	SO P Blade1	128	8:00 03-04-85
34	mo-00244	SD P Blade1	123	8:00 04-08-85	17:52 04-11-85	94	mo-00070	CR P Blade3	116	8:00 03-04-85
35	mo-00210	SO P Blade1	128	8:00 04-01-85	14:16 04-28-85	95	mo-00096	CR P Blade4	138	8:00 03-04-85
36	mo-00232	SO P Blade4	122	8:00 04-01-85	14:17 04-19-85	96	mo-00080	SO P Blade1	126	8:00 03-04-85
37	mo-00166	SH P Blade4	127	8:00 03-25-85	15:56 04-03-85	97	mo-00062	SO P Blade1	134	8:00 03-04-85
38	mo-00238	SO P Blade1	112	8:00 04-01-85	15:49 04-21-85	98	mo-00094	CR P Blade4	104	8:00 03-04-85
39	mo-00220	CR P Blade3	144	8:00 04-01-85	3:07 04-03-85	99	mo-00084	CR P Blade1	126	8:00 03-04-85
40	mo-00234	CR P Blade5	104	8:00 04-01-85	13:56 04-13-85	100	mo-00064	CR P Blade1	110	8:00 03-04-85
41	mo-00170	FO P Blade4	131	8:00 03-25-85	3:01 04-19-85	101	mo-00032	ST P Blade1	112	8:00 02-18-85
42	mo-00226	CR P Blade1	114	8:00 04-01-85	0:04 04-25-85	102	mo-00046	ST P Blade1	134	8:00 02-18-85
43	mo-00148	SO P Blade6	112	8:00 03-18-85	19:25 04-14-85	103	mo-00044	SO P Blade1	126	8:00 02-18-85
44	mo-00206	FO P Blade1	113	8:00 03-25-85	13:16 04-19-85	104	mo-00026	ST P Blade1	136	8:00 02-18-85
45	mo-00190	SD P Blade3	147	8:00 03-25-85	1:47 04-19-85	105	mo-00052	SO P Blade1	102	8:00 02-18-85
46	mo-00134	ST P Blade1	148	8:00 03-18-85	16:12 03-26-85	106	mo-00036	CR P Blade1	136	8:00 02-18-85
47	mo-00236	ST P Blade1	132	8:00 04-01-85	17:09 04-10-85	107	mo-00042	ST P Blade1	142	8:00 02-18-85
48	mo-00188	SD P Blade1	127	8:00 03-25-85	7:07 04-13-85	108	mo-00056	SD P Blade1	143	8:00 02-25-85
49	mo-00200	FO P Blade1	121	8:00 03-25-85	6:07 04-13-85	109	mo-00030	SO P Blade1	134	8:00 02-18-85
50	mo-00202	FO P Blade4	147	8:00 03-25-85	14:12 04-14-85	110	mo-00016	SO P Blade4	144	8:00 02-18-85
51	mo-00132	SD P Blade1	136	8:00 03-18-85	3:06 04-09-85	111	mo-00040	SO P Blade5	140	8:00 02-18-85
52	mo-00192	SD P Blade2	119	8:00 03-25-85	12:29 03-26-85	112	mo-00028	ST P Blade5	134	8:00 02-18-85
53	mo-00198	FO P Blade3	143	8:00 03-25-85	15:19 04-18-85	113	mo-00034	CR P Blade4	112	8:00 02-18-85
54	mo-00194	SD P Blade4	139	8:00 03-25-85	4:50 04-06-85	114	mo-00050	ST P Blade4	104	8:00 02-18-85
55	mo-00154	FO P Blade6	135	8:00 03-25-85	0:24 03-27-85	115	mo-00022	CR P Blade1	104	8:00 02-18-85
56	mo-00162	SD P Blade4	137	8:00 03-25-85	16:03 03-26-85	116	mo-00038	ST P Blade1	148	8:00 02-18-85
57	mo-00204	FO P Blade4	139	8:00 03-25-85	12:37 04-06-85	117	mo-00020	SO P Blade1	136	8:00 02-18-85
58	mo-00090	SO P Blade3	147	8:00 03-04-85	2:46 03-14-85	118	mo-00024	CR P Blade1	146	8:00 02-18-85
59	mo-00158	FO P Blade1	140	8:00 03-25-85	11:46 04-05-85	119	mo-00048	CR P Blade1	116	8:00 02-18-85
60	mo-00178	FO P Blade4	145	8:00 03-25-85	17:24 03-31-85	120	mo-00018	CR P Blade4	104	8:00 02-18-85







4.2.16 Test-series16

II	Lot_PC	Product	MSQ	Rqst-SD	Rqst-DD	Lot_PC	Product	MSQ	Rqst-SD	Rqst-DD
1	mo-00222	SH P_blade3	143	8:00 04-23-85	22:35 05-22-85	61	mo-00134	SH P_blade2	113	8:00 04-11-85
2	mo-00172	SH P_blade5	135	8:00 04-17-85	11:56 05-19-85	62	mo-00144	FO P_blade1	137	8:00 04-15-85
3	mo-00204	SH P_blade3	113	8:00 04-21-85	1:25 05-22-85	63	mo-00162	FO P_blade1	119	8:00 04-15-85
4	mo-00200	SH P_blade5	111	8:00 04-21-85	11:18 05-24-85	64	mo-00130	SH P_blade6	125	8:00 04-11-85
5	mo-00252	SD P_blade1	105	9:00 05-04-85	6:31 06-02-85	65	mo-00154	SD P_blade1	115	8:00 04-15-85
6	mo-00242	SH P_blade1	145	8:00 04-26-85	7:07 05-30-85	66	mo-00136	FO P_blade1	129	8:00 04-11-85
7	mo-00230	SH P_blade1	139	8:00 04-23-85	3:28 05-27-85	67	mo-00112	SD P_blade1	103	8:00 04-11-85
8	mo-00148	SH P_blade3	135	8:00 04-15-85	13:16 05-19-85	68	mo-00138	FO P_blade4	127	8:00 04-11-85
9	mo-00250	SH P_blade4	145	8:00 04-26-85	9:44 05-19-85	69	mo-00122	SH P_blade4	143	8:00 04-09-85
10	mo-00218	SH P_blade4	145	8:00 04-23-85	12:58 05-14-85	70	mo-00120	SD P_blade4	139	8:00 04-09-85
11	mo-00190	SH P_blade2	139	8:00 04-21-85	1:31 04-28-85	71	mo-00082	SH P_blade4	149	8:00 03-19-85
12	mo-00150	SH P_blade4	109	8:00 04-15-85	0:17 05-18-85	72	mo-00112	SH P_blade3	149	8:00 03-28-85
13	mo-00254	SD P_blade2	133	9:00 05-04-85	18:52 05-18-85	73	mo-00106	SH P_blade3	125	8:00 03-28-85
14	mo-00224	SH P_blade4	121	8:00 04-23-85	8:10 05-10-85	74	mo-00094	SD P_blade1	129	8:00 03-25-85
15	mo-00248	SH P_blade4	103	8:00 04-26-85	8:00 05-14-85	75	mo-00110	FO P_blade6	125	8:00 03-28-85
16	mo-00208	SD P_blade1	117	8:00 04-21-85	0:54 05-25-85	76	mo-00090	FO P_blade1	107	8:00 03-25-85
17	mo-00212	FO P_blade4	149	8:00 04-23-85	20:16 05-23-85	77	mo-00096	FO P_blade1	101	8:00 03-25-85
18	mo-00160	SH P_blade1	117	8:00 04-15-85	4:29 05-17-85	78	mo-00104	FO P_blade1	129	8:00 03-28-85
19	mo-00188	SH P_blade1	129	8:00 04-20-85	22:35 04-25-85	79	mo-00116	FO P_blade2	113	8:00 03-28-85
20	mo-00216	SH P_blade3	137	8:00 04-23-85	18:13 05-08-85	80	mo-00034	SD P_blade1	147	8:00 03-11-85
21	mo-00118	SH P_blade1	127	8:00 04-09-85	23:04 05-07-85	81	mo-00102	SD P_blade6	105	8:00 03-28-85
22	mo-00174	SH P_blade1	105	8:00 04-17-85	23:52 05-17-85	82	mo-00088	SD P_blade1	121	8:00 03-19-85
23	mo-00140	SH P_blade1	127	8:00 04-15-85	9:16 04-20-85	83	mo-00108	SD P_blade4	113	8:00 03-28-85
24	mo-00186	SH P_blade1	119	8:00 04-20-85	21:37 05-02-85	84	mo-00098	FO P_blade1	137	8:00 03-28-85
25	mo-00234	SD P_blade2	113	8:00 04-26-85	0:45 05-29-85	85	mo-00050	SH P_blade4	109	8:00 03-11-85
26	mo-00212	SH P_blade1	117	8:00 04-15-85	4:29 04-27-85	86	mo-00092	FO P_blade5	123	8:00 03-25-85
27	mo-00246	SD P_blade5	127	8:00 04-26-85	10:09 05-28-85	87	mo-00100	FO P_blade4	129	8:00 03-28-85
28	mo-00146	SH P_blade1	109	8:00 04-15-85	18:19 05-07-85	88	mo-00086	SD P_blade1	141	8:00 03-19-85
29	mo-00214	SD P_blade2	145	8:00 04-23-85	17:38 05-26-85	89	mo-00040	SD P_blade3	115	8:00 03-11-85
30	mo-00196	SD P_blade1	127	8:00 04-21-85	4:19 05-18-85	90	mo-00066	SD P_blade4	107	8:00 03-11-85
31	mo-00124	SH P_blade1	109	8:00 04-09-85	18:10 04-24-85	91	mo-00054	FO P_blade4	139	8:00 03-11-85
32	mo-00206	SD P_blade1	119	8:00 04-21-85	23:59 05-13-85	92	mo-00036	SH P_blade1	115	8:00 03-11-85
33	mo-00244	SD P_blade1	137	8:00 04-26-85	19:33 05-11-85	93	mo-00084	SH P_blade1	145	8:00 03-19-85
34	mo-00168	SD P_blade3	149	8:00 04-15-85	17:05 05-18-85	94	mo-00042	SD P_blade1	117	8:00 03-11-85
35	mo-00238	FO P_blade4	133	8:00 04-26-85	18:08 05-13-85	95	mo-00072	SH P_blade3	109	8:00 03-11-85
36	mo-00182	SH P_blade4	123	8:00 04-20-85	7:05 05-13-85	96	mo-00080	SH P_blade1	109	8:00 03-19-85
37	mo-00240	FO P_blade1	147	8:00 04-26-85	11:16 05-02-85	97	mo-00076	SD P_blade1	147	8:00 03-18-85
38	mo-00232	FO P_blade5	113	8:00 04-24-85	13:00 05-13-85	98	mo-00074	SD P_blade1	125	8:00 03-11-85
39	mo-00236	SD P_blade1	131	8:00 04-26-85	12:14 05-05-85	99	mo-00064	SD P_blade1	123	8:00 03-11-85
40	mo-00192	SD P_blade3	145	8:00 04-21-85	22:29 05-11-85	100	mo-00078	FO P_blade2	103	8:00 03-18-85
41	mo-00114	SH P_blade4	147	8:00 03-28-85	9:47 05-11-85	101	mo-00068	SH P_blade2	139	8:00 03-11-85
42	mo-00220	SD P_blade1	105	8:00 04-23-85	13:09 04-27-85	102	mo-00052	SH P_blade5	149	8:00 03-11-85
43	mo-00132	SH P_blade4	105	8:00 04-11-85	9:47 05-11-85	103	mo-00060	SD P_blade1	103	8:00 03-11-85
44	mo-00184	FO P_blade4	149	8:00 04-20-85	22:25 05-09-85	104	mo-00058	FO P_blade1	113	8:00 03-11-85
45	mo-00158	SD P_blade3	127	8:00 04-15-85	8:17 05-11-85	105	mo-00056	SH P_blade6	135	8:00 03-11-85
46	mo-00228	FO P_blade4	141	8:00 04-23-85	1:07 04-30-85	106	mo-00038	SD P_blade2	105	8:00 03-11-85
47	mo-00226	SD P_blade1	149	8:00 04-23-85	6:13 05-01-85	107	mo-00044	SD P_blade4	141	8:00 03-11-85
48	mo-00198	SD P_blade3	117	8:00 04-21-85	9:06 05-01-85	108	mo-00048	SD P_blade4	131	8:00 03-11-85
49	mo-00210	FO P_blade1	109	8:00 04-17-85	17:28 05-04-85	109	mo-00046	SH P_blade4	137	8:00 03-11-85
50	mo-00176	SD P_blade5	119	8:00 04-23-85	0:00 05-10-85	110	mo-00062	SD P_blade4	109	8:00 03-11-85
51	mo-00202	SD P_blade1	131	8:00 04-21-85	5:31 05-05-85	111	mo-00070	SD P_blade1	113	8:00 03-11-85
52	mo-00194	FO P_blade1	107	8:00 04-21-85	15:15 05-05-85	112	mo-00032	SD P_blade6	131	8:00 02-18-85
53	mo-00178	SH P_blade3	111	8:00 04-17-85	7:10 05-05-85	113	mo-00018	SH P_blade5	147	8:00 02-24-85
54	mo-00180	SD P_blade4	139	8:00 04-17-85	15:34 05-07-85	114	mo-00028	SD P_blade2	127	8:00 02-24-85
55	mo-00128	SD P_blade1	137	8:00 04-11-85	10:12 05-11-85	115	mo-00030	SD P_blade3	143	8:00 02-24-85
56	mo-00166	SD P_blade5	101	8:00 04-15-85	15:43 04-29-85	116	mo-00024	SH P_blade4	113	8:00 02-24-85
57	mo-00156	FO P_blade3	141	8:00 04-15-85	18:24 04-30-85	117	mo-00026	FO P_blade1	103	8:00 02-24-85
58	mo-00142	FO P_blade1	149	8:00 04-15-85	20:03 04-23-85	118	mo-00022	FO P_blade1	137	8:00 02-18-85
59	mo-00170	FO P_blade1	123	8:00 04-17-85	5:10 05-03-85	119	mo-00016	SH P_blade4	117	8:00 02-18-85
60	mo-00164	SD P_blade1	107	8:00 04-15-85	19:20 05-11-85	120	mo-00020	FO P_blade1	117	8:00 02-18-85









4.2.21 Test-series21

Table with 9 columns: #, Lot PC, Product, MSQ, Rqst-SD, Rqst-DD, Lot PC, Product, MSQ, Rqst-SD, Rqst-DD. It contains detailed test results for various product models (e.g., 1 mo-00244, 2 mo-00096) across different lot numbers and request types.





## References

- [1] E.S. Buffa and J.G. Miller. *Production Inventory Systems: Planning and Control*. Richard Irwin Inc., Homewood Ill., 1979.
- [2] M. Fox. *Constraint-Directed Search: A Case Study of Job-Shop Scheduling*. PhD thesis, Department of Computer Science, Carnegie-Mellon University, Pittsburgh Pennsylvania, U.S.A., 1983.
- [3] M. Fox and S. F. Smith. Isis: A knowledge-based system for factory scheduling. In *Expert Systems*, pages 1(1):25-49, July 1984.
- [4] Peng-Si Ow. Experiements in knowledge-based scheduling. Technical report, Robotics Institute, Carnegie Mellon University, Pittsburgh, Pennsylvania, April 1986.
- [5] S. Smith, P. S. Ow, and et al. Integrating multiple scheduling perspectives to generate detailed production plans. In *Proceedings of the ULTRATECH Conference*, pages 2/123-2/137, Long Beach, California, U.S.A, 1986. Society of Manufacturing Engineers.
- [6] V. Srinivasan. A hybrid algorithm for the one machine sequencing problem to minimize total tardiness. *Naval Research Logistics Quarterly*, 18:317-327, 1971.