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ABSTRACT

This book is designed to help individuals be aware of how much mathematics is used at work. It is designed to help trainers decide what to do if workers need help to improve their mathematics skills. An introduction looks at mathematics as it is used at work by discussing how it is used on the job. The book discusses the problems for workers with poor mathematics skills and, in particular, for workers of a non-English-speaking background. The next section presents examples from Australia that show people using mathematics as they work. The samples are reproduced exactly as they are used on the job and include some workers' own methods of keeping track of numbers. The specific workplaces are as follows: boot manufacturer, clothing manufacturer, laundry, and shoe manufacturer. The next section focuses on two contexts in which math is commonly used: quality management and stock control. The section with trainers' notes lists some considerations for a trainer: possible effects of making assumptions, cultural groups, and methods of training. A resources section lists sources and titles of print materials and of research organizations for further information. (YLB)

AUSTRALIAN

Light Manufacturing

INDUSTRY TRAINING ADVISORY BOARD

maths

WELL

Work Maths

Maths in the Textile, Clothing, Footwear & Allied Industries

CENTRAL
LINEN

R.M. Williams
MADE IN AUSTRALIA

Clarks

The Australian Light Manufacturing Industry Training Advisory Board is the national organisation responsible for training development, policy and implementation in the furnishing, textile, clothing, footwear and allied industries.

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R.M. Williams, Salisbury, South Australia

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Contents

What you will find in this book

Introduction

This section looks at maths as it is used at work, discussing how it is used on the job. It talks about the problems for workers with poor maths skills, and in particular for workers of a non-English-speaking background.

Samples

This section looks at real examples that show people using maths as they work. It includes samples from Central Linen, Clark Shoes and R.M. Williams. Every workplace has its own examples.

The samples are reproduced exactly as they are used on the job, and include some workers' own methods of keeping track of numbers.

Focus

This section also focuses on two contexts in which maths is commonly used. They are:

- Quality Management
- Stock Control.

These affect many different types of companies, both large and small. Both require workers to carry out maths tasks at many stages of the production process.

Trainers' notes and Resources

These sections include some notes for trainers, and a list of useful resources. It also explains where to turn for help.

The purpose of this book

This book can help you to:

- be aware of just how much maths is used at work
- look at some strategies to make sure that everyone understands the maths involved
- think about some useful resources you could have on hand to help
- decide what to do if you think some workers need help to improve their maths skills.

'It is surprising how much maths is used at work when you really look into it.

We assume a lot about the workforce being able to cope with maths and if they have problems people can be embarassed to admit to such things at work.

However, at Central Linen we have found that acknowledging that we *all* must continue learning and improving our skills has enabled everybody to be willing to identify their specific development needs. Maths is used at all levels, not just by management and office staff.

Maths is an important part of communicating in the workplace and good communication is essential.

We are happy for materials from our company to be used if they help to show other companies about hidden maths tasks.'

David Slater

General Manager,
Central Linen

CENTRAL LINEN

Introduction

Maths, reading and writing, speaking and listening all work together as parts of a whole. They are all a part of the communication processes at work. Good communication is one of the essential ingredients of a successful company. Maths is one of these elements that is often ignored or underrated.

Maths is not just about adding up and taking away. Using numbers is an important way to communicate.

Maths is often used in place of words to convey ideas, concepts, messages and facts throughout a workplace.

It is not only the people doing the accounts and the people in the store who need to use mathematical skills. Maths is used on the shop-floor at many different stages in the work process.

Job redesign and changing work processes are bringing with them a higher level of worker control over their jobs. Everyone has to monitor their work more and report on it. There is a much higher level of worker responsibility now than before.

These changes bring with them the need to perform maths tasks that may not have been called for in the past.

Poor maths skills can have a serious effect.

With poor maths skills, there may be:

- inaccurate records
- machines incorrectly set
- expensive mistakes made
- incorrect deliveries
- stocklists incorrect.

But it's not just these visible things that can go wrong. Often poor maths skills affect very important things that **cannot** be easily measured. These factors can have an even larger effect on how well people function at work, such as:

- lack of confidence
- unwillingness to take on new tasks
- unwillingness to apply for promotion
- ineffective training
- inability to contribute to problem-solving and teamwork.

Maths is used in many ways at work

• In the work process

A lot of maths is used where it is part of the process of doing the job itself. Sometimes it is hidden in the job.

Maths may be used without it really being a conscious process, such as the pattern marker who runs the eye over skins and mentally assesses the percentage of leather that can be used.

At other times, maths is obvious and visible, when calculations are a necessary part of a job itself. An example is the storeperson who must collect, count and record the stock that is being issued to a customer.

• In training

Maths may be used in training – a part of training new employees, or re-training current employees on a new job.

For instance, graphs, charts and statistics are used to show to workers concepts relating to new work practices and job redesign.

Maths is also a part of industry vocational certificates.

• For productivity

Maths is quite often used to feed back on job performance and productivity.

One way of displaying information about work performance is by using graphs.

However, there are many reading and maths skills needed to be able to understand graphs, and they can be very difficult to interpret.

A lot is **assumed** about people's knowledge and understanding by the person putting the graph together.

• In broader contexts

Maths tasks are more than just doing a particular job.

Maths can be part of wider issues that cover a whole workplace, such as the management of quality standards and the control of stock numbers. These are looked at in more detail in the Focus Section.

• In day-to-day matters

In subtle ways the workforce is constantly using numbers without thinking about them—while looking at rosters, timetables and calendars; when filling in leave forms; and of course whenever they look at their payslips.

Maths and workers from a Non-English Speaking Background (NESBs)

One of the most striking discoveries about the use of mathematics on the job is that mathematical ability cuts across ethnic boundaries and language barriers.

A common comment is, 'They can't speak English—but they have no difficulty understanding their payslips!'

Poor English language skills do **not** necessarily mean poor maths skills. It may be difficult to **communicate** with some NESB workers who have recently arrived in the country, but that doesn't mean they have poor maths skills.

Poor English doesn't necessarily mean poor maths.

A recent Polish immigrant, 38 years old, said in amazement in his broken English, 'The Australians must ... um ... calculator! But I ...!' and pointed to his head. He had worked it out without paper or calculator, and obviously thought the Australians should have been able to also.

Often a low level of success at school leads to poor maths skills.

This is the same for English-Speaking Background workers (ESBs) as well as NESBs.

A simple maths audit was conducted at a large laundry. The purpose was to assess the ability of workers to cope with the level

of maths that was going to be needed in a Lean Manufacturing type of processing.

A total of 63 workers in three sections were asked if they would be able to do addition, subtraction, multiplication, division, and work out percentages and averages, or if they would need some assistance first.

Out of the 63 people, two asked for help with addition, four with subtraction, multiplication and division and 24 felt unsure about percentages and averages.

These results cut across language lines. In all of these maths skills three times as many ESBs as NESBs said they needed help.

It is unwise to make assumptions about people's maths ability just because their English is poor.

- **Some cultural problems with maths**

The cultural background of workers will have an influence on their maths skills and perceptions.

For instance, Australians do not use the 24-hour clock frequently and so may find the concept difficult. Workers from other cultures may have been taught a different way to perform a calculation. Being shown an unfamiliar method can lead to confusion on their part. This confusion can be misinterpreted as a lack of understanding of the maths task itself.

• The decimal point

People from many other ethnic backgrounds use a decimal point and a thousands comma the opposite way to the way in which they are used in Australia.

So, when we would write 5,207.63
others write it 5.207,63

There are clear problems in this for NESB workers who are asked to read or write decimal figures at work.

• The language of maths

For people struggling with English, the specialised vocabulary of maths may be difficult to understand.

Reasonably common words like ***amount***, ***difference*** and ***rate*** can be difficult to understand when talking about a maths task.
'What is the difference between these two?', when ***difference*** means subtracting is needed.
'What amount of that do we have?, when ***amount*** means a number or quantity.
'The rate of this is ...', when **rate** can mean speed or ratio.

Specialised words like ***determine, evaluate, simplify, plot*** and others are maths words that can be even harder to understand, even to someone with good English.

It is even more difficult if they had little or no schooling. This could mean that they do not have the concepts or words in their first language to be able to translate into another language.

• Some difficult sounds in English

The worker learning English as a second language has to hear new sounds, and say new sounds.

Every language has its own system of sounds. People learning English will tend to hear, and to say, the closest equivalent sound from their own mother-tongue. Speakers of Vietnamese, for instance, often fail to hear the ending of a word. Clusters of consonants are particularly difficult for speakers of several Asian languages and for Arabic speakers.

When speaking to workers of different backgrounds about performing maths tasks on the job, these are some words that are hard to say and hear and likely to be confused:

six, sixth, sixths
ten, tens, tenth, tenths
hundred, hundreds, hundredth, hundredths
equal, equals, equally
place, base, pace
divide, divided
then, than
multiple,
different, difference.

Reference

McGregor and Moore 1991, *Teaching Mathematics in the Multicultural Classroom,* Institute of Education, University of Melbourne.

Footwear Manufacture: Boots

Packing list and Goods inwards notice

who uses it? where?

As leather skins arrive in Stores, the storeperson counts the skins and checks them against this packing list.

If no packing list arrives with the shipment, the storeperson gives the skins to the *pattern marker in the *Clicking section, who counts them and measures their area. To do this, they are fed into an area scanning machine.

The storeperson adds up the total area of different grades of skins and transfers the figures to a goods inward notice.

They are recorded on the notice according to their grade. The different grades are then added together to get a total. Quality A: 259.98 sq m + Quality B: 3.57 sq m = 263.55 sq m.

These quantities are entered into the computer daily, to keep a running stock total. The Purchasing Department will use this data to check that orders have been filled correctly.

why is it used?

- To check that goods in the delivery match this list
- To check that orders have been filled correctly
- Stock control

what maths skills are used?

Number recognition
Counting
Addition

useful extras

- Area scanning machine
- Calculator

*Pattern marker: The person who marks out the patterns on the skins ready to be cut
*Clicking: Where the patterns are cut

PACKING LIST

Number: 29040

Page: 1

R M WILLIAMS PTY LTD
121 FROST RD
SALISBURY
S.A 5082
AUSTRALIA

PRODUCT: SHOE WILLOW BLACK 2.0-2.2

22/08/95

LOAD NUMBER: 5052

	QUALITY	PACK NO.	BUNDLE	LEATHERS	AREA m2
	B	716	52	2	3.57
TOTAL				2	3.57
TOTAL B				2	3.57
	A	691	1	3	5.16
	A	691	2	3	5.16
TOTAL				6	10.32
	A	692	3	3	5.56
	A	692	4	3	5.71
TOTAL				6	11.27
	A	693	5	3	5.10
	A	693	6	3	5.90
TOTAL				6	11.00
	A	694	7	3	4.96
	A	694	8	3	5.61
TOTAL				6	10.57
	A	695	9	3	5.07
	A	695	10	3	4.73
TOTAL				6	9.80
	A	696	11		5.34
	A	696			5.49
TOTAL					10.83
					5.21
					5.44
					10.65
					4.89
					5.68
					10.57
					5.42

INWARDS GOODS ADVICE NOTE

№ 57893

FROM: OUTSIDE SOURCE

INTERNAL SOURCE D701810 DEPT. AEL

DATE 24.8.95

QUANTITY | FULL DESCRIPTION OF GOODS | $ | c

150

BLACK WILLOW

148 SIDE GRADE A — 259.98 m² } 263.55

2 SIDES GRADE (B) — 3.57

52 BUNDLE

(DELIVERY DOCKET Nº 29040)

TO BOOTS DEPT.

SIGNATURE

18284-0 30 Bks 11/92

BEST COPY AVAILABLE

18

Cutting ticket

who uses it? where?

This cutting ticket tells the *pattern marker the number of boots of each size to be cut. The area of skin needed to be cut has already been shown with a circle on the area chart. The figures across the top of the chart show how much shrinkage can be expected. The vertical axis is the percentage of usable skin. Taking both of these into account, an area of 102.2 squ ft. has been calculated by computer. These figures have been worked out over a long period of time and after a lot of experience with leathers from different parts of the world and from different suppliers.

The pattern marker takes this ticket to Stores to get the area of skin needed, 102.2sq ft. The storeperson has to issue more than that to cover it, and records the amount that has been issued, 117.6 sq ft.

If the pattern marker doesn't think they can use the percentage indicated, the foreperson is called to check, and the part that is unusable is measured with an area template.

why is it used?

- To monitor efficient use of leather
- Quality management of leather usage

what maths skills are used?

Number and code recognition
Understanding of %
Ability to interpret the chart
Understanding of area, and visual estimation
Use of area templates

useful extras

- Area templates

**Pattern marker: The person who marks out the patterns on the skins ready to be cut*

SATRASumm Cutting Ticket 24/09/95

Ticket number 37\ 80\ 1 Cut Week 37

Issued Week 37 Cutters Number 1

Style Code KANGA.41F Part B541F/1

Material Code B000600.41 Desc. CHESTNUT ROO

Supplier BESTBU Type of Cutting Selective

Material Skin Size 5.8 (Sq.Ft.) Skin Trimmed N

Total Pairs 24 Adjustment Factor -13

Nominal Sizes

Knife code	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0
FHVAMP	--	--	--	--	--	--	--	--	--	--	2	--	2	--	10	--	2	--	--	--	4	--	4	--	--	--	--

Special Instructions

1 2

3 4

AREA

	101	100	99	98	97	96	95	94	93
87	88.7	89.6	90.5	91.4	92.4	93.3	94.3	95.3	96.3
86	90.9	91.9	92.8	93.7	94.7	95.7	96.7	97.7	98.8
85	93.3	94.2	95.2	96.2	97.1	98.2	99.2	100.2	101.3
84	95.8	96.7	97.7	98.7	99.7	100.8	101.8	102.9	104.0
83	98.4	99.4	100.4	101.4	102.5	103.5	104.6	105.7	106.9
82	101.2	102.2	103.2	104.3	105.3	106.4	107.6	108.7	109.9
81	104.1	105.1	106.2	107.3	108.4	109.5	110.7	111.8	113.1
80	107.2	108.3	109.4	110.5	111.6	112.8	114.0	115.2	116.4
79	110.5	111.6	112.7	113.9	115.0	116.2	117.5	118.7	120.0
78	114.0	115.1	116.3	117.5	118.7	119.9	121.2	122.5	123.8
77	117.7	118.9	120.1	121.3	122.6	123.8	125.2	126.5	127.8

Amount Issued 117.6 Extra _____ Returned _____ Used _____

Stock transfer sheet

who uses it? where?

When the *pattern marker gets the skins from the store, the number of skins is recorded on this form.

Some skins come in *sides, such as cowhide, some in whole skins, such as kangaroo, and some come in *squares, which are trimmed to a square shape.

The area of the skins is usually marked on the back of each. Some tanneries write the area in square metres, some in square feet. The pattern marker measures the skins on the area scanning machine, to check the tanneries' measurements.

At the end of the day, the sheet goes back to the store. The total quantities issued are taken off the stocklists on the computer. The storeperson will convert most of the areas to square metres first.

why is it used?

- To monitor transfer of goods within the factory
- Stock inventory

what maths skills are used?

Number recognition
Counting
Adding
Conversion of square feet to square metres

useful extras

- Area scanning machine
- Calculator
- Conversion formula

*Side: A half of a hide
*Square: A whole hide which has been trimmed to a squarer shape
*Pattern marker: The person who marks out the patterns on the skins ready to be cut

R.M. WILLIAMS PTY LTD

9700

STOCK TRANSFER SHEET

TO: CLICKING

FROM: **Raw Material Store**

COMPONENT No.	SIZE	DESCRIPTION	UNIT OF MEASURE	TOTAL
	T	RED KIP (PITT)	25 SQUARE	1·80m
		TAN WILLOW (ASTLEY)	5 SIDES	91·7ft
		BLACK WILLOW (ASTLEY)	3 SIDES	55·8ft
		WHEAT NUBUCK (PRIME)	—	5ft
		CHEST ROO B/B	SKINS	
	T	DARK TAN YLG (CIDEC)	1 SIDE	14¾ ft
	T	CHEST YLG (CIDEC)	2 SIDES	34 ft
	T	DUSTY BROWN SPLITS	1 SIDE	11¾ ft
		BLACK PONY CLUB (ASTLEY)	1 SIDE	19½ ft²

ISSUED BY
Signed R Hardy
Date 14 / 8 /19 95

RECEIVED BY
Signed .....
Date ...../...../19.....

ENTERED BY
Signed R Hardy
Date 14 / 8 /19 95

Daily order and Weekly tally

who uses it? where?

As order tickets are attached to the correct pairs of boots, the person doing the *pairing-up writes down the number of pairs, job code and style code for each order on the daily order sheet.

Boots are added up in 10's and written on the tally sheet. At the end of the day this makes it easy to work out the total for the day.

The daily order sheet goes to the office at the end of the day, where is used to monitor the progress of each order.

The weekly tally is used as a rough check on the level of work flowing from one section to the next.

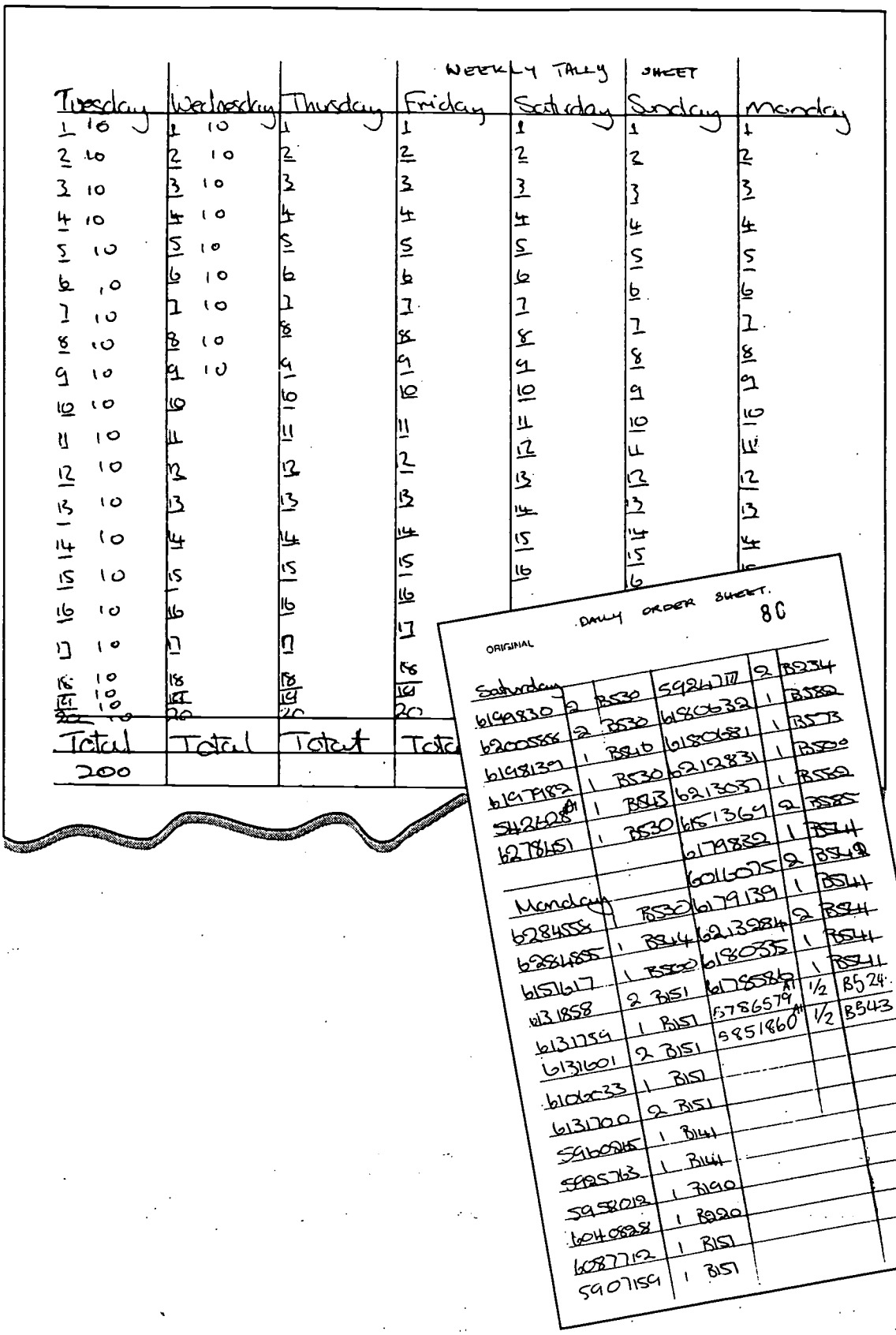
why is it used?

- To monitor the progress of each order through the production process
- To regulate the level of work flowing from one section to the next

what maths skills are used?

Number and code recognition
Counting
Addition
Multiplication

*Pairing-up: Matching a boot to its pair



WEEKLY TALLY SHEET

Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday
1 10	1 10	1	1	1	1	1
2 10	2 10	2	2	2	2	2
3 10	3 10	3	3	3	3	3
4 10	4 10	4	4	4	4	4
5 10	5 10	5	5	5	5	5
6 10	6 10	6	6	6	6	6
7 10	7 10	7	7	7	7	7
8 10	8 10	8	8	8	8	8
9 10	9 10	9	9	9	9	9
10 10	10	10	10	10	10	10
11 10	11	11	11	11	11	11
12 10	12	12	12	12	12	12
13 10	13	13	13	13	13	13
14 10	14	14	14	14	14	14
15 10	15	15	15	15	15	15
16 10	16	16	16	16	16	16
17 10	17	17	17			
18 10	18	18	18			
19 10	19	19	19			
20 10	20	20	20			
Total	Total	Total	Total			
200						

DAILY ORDER SHEET. 80

ORIGINAL

Saturday					
6199830	2	B530	5982777	2	B934
6200586	2	B530	6180632	1	B580
6198139	1	B846	6180681	1	B573
6197182	1	B530	6212831	1	B580
5982628	1	B943	6213037	1	B550
6278451	1	B530	6513647	2	B585
			6179832	1	B544
			6011605	2	B549
Monday			6179139	1	B544
6284558		B530	6213984	2	B544
6284855	1	B844	6180335	1	B544
6151617	1	B530	6175586	1	B544
613858	2	B151	5786579	1/2	B524
6131759	1	B151	5851860	1/2	B543
6131601	2	B151			
6104033	1	B151			
6131700	2	B151			
5960245	1	B144			
5985763	1	B144			
5958012	1	B190			
6040828	1	B920			
6087712	1	B151			
5907159	1	B151			

Daily work summary

who uses it? where?

At the end of the line, the finished boots are inspected, and put into boxes. The boxes are labelled, put onto racks and counted.

As each rack is taken to the Distribution section, the number of finished boots on the rack is recorded in the quantity column, and added to the previous total, so there is a cumulative total for each day in the week.

The number of any rejects and boots that have been brought in by customers for repairs are also recorded.

The total for each day, for instance 426 on Monday, is compared to a benchmark and displayed on a blackboard. The supervisor calculates the % over or under this benchmark in order to work out bonus payments.

A reject rate is also worked out as a percentage of the total from this sheet.

why is it used?

- Quality management
- To monitor productivity
- To calculate bonus payments

what maths skills are used?

Counting
Addition
Understand and calculate %

useful extras

- Calculator
- Formula for working out %
- Check that people understand %

BOOT FACTORY DAILY WORK SUMMARY

stk/non	rack	qty	cum	reject/date	stk/non	rack	qty	cum	reject/date
	1				STOCK	51	43	363	
	2				STOCK	52	43	406	
	3				STOCK	53	43	449	
	4				STOCK	54	16	465	
STOCK	5	43				55	8	475	
STOCK	6	44	87			56			
NON STOCK	7	20	107			57			
	8	MONDAY 28TH AUG				58	THURSDAY 31ST		
	9					59			
STOCK	10	42			STOCK	60	37		
STOCK	11	44	86		STOCK	61	40	77	
NON STOCK	12	13	98	X REJECTS	STOCK	62	41	118	
STOCK	13	43	141		STOCK	63	41	159	
STOCK	14	43	184		STOCK	64	39	198	
STOCK	15	41	225	19 REPAIRS	STOCK	65	40	238	
STOCK	16	43	268		STOCK	66	39	277	
STOCK	17	42	310		STOCK	67	37	314	
NON STOCK	18	44	354		STOCK	68	37	351	
STOCK	19	43	397		STOCK	69	40	391	
STOCK	20	26	423		N/STOCK	70	22	413	4 REPAIRS
NON STOCK	21	3	426		STOCK	71	27	440	
	22	TUESDAY 29TH AUG				72			
	23					73			
STOCK	24	43				74	FRIDAY 1ST SEPT		
STOCK	25	42	85	18 REPAIRS	STOCK	75	44		
STOCK	26	43	128		STOCK	76	43	87	
STOCK	27	41	169		STOCK	77	44	131	
STOCK	28	40	209		STOCK	78	44	175	
STOCK	29	40	249		STOCK	79	43	218	
STOCK	30	40	289		STOCK	80	41	259	
STOCK	31	40	329		STOCK	81	43	302	
N/STOCK	32	13	342	X REJECTS	STOCK	82	43	345	
STOCK	33	40	382		STOCK	83	42	387	
STOCK	34	4	386		NON STOCK	84	20	407	X REJECTS
N/STOCK	35	7			STOCK	85	6	413	
	36				STOCK	86	10	423	
	37					87	3	426	PREVIOUSLY TAKEN
	38					88	SATURDAY 2ND SEPT		
	39					89			
STOCK	40	40			STOCK	90	41		
STOCK	41	36	76		NON STOCK	91	22	63	
STOCK	42	42	118		STOCK	92	42	105	
STOCK	43	6	124		NON STOCK	93	2	107	
	44				STOCK	94	9	116	
STOCK	45	42	183			95			
STOCK	46	41	224			96			
	47					97			
STOCK	48	41	277			98			
STOCK	49	43	320			99			
	50					100			

Despatch weights

who uses it? where?

This form is a total of the cartons that are despatched during the day with one of the carriers.

The storeperson weighs each carton being despatched, and records the number of cartons and their weights sent to each state on this form.

Small items are circled, those under 500 gms and they are not included in the tally. The total number of cartons, not including the small items, is added at the bottom.

The total weights for the different delivery rates are rounded off at the bottom of the form.

why is it used?

- To monitor the cost of postage with this carrier

what maths skills are used?

Weighing
Addition
Subtraction
Understand and use decimals
Rounding off

useful extras

- Check that workers can round off
- Weighing scales
- Calculator

Despatch Weights

SA		NSW & ACT		QLD		VIC		WA & NT		TAS ALL AREAS
MET	CTRY	MET	CTRY	MET	CTRY	MET	CTRY	MET	CTRY	
	2·4	4·6	4·9	5·2	1·8	3·2	3·4	1·9	800	1·5
	4·4	3·6	3	5·2	1·5	3	800	1·6	3·8	900
	3·8	3	1·7	1·8	1·9	1·6	800	3·8	1·7	750
	3·3	1·8	2·3	1·7	1·7	1	1·5	800	2·3	750
	3·1	1·6	1·4	1·3	3·1	3·1	2·3	1·5	750	1·2
	1·6	1·5	2·1	1·6	800	2·6	1·5	3·5	800	
	~~850~~	800	2·6		4	750	2	3·6		
		750	800		1·6	800	(350)	2·1		
		1·7	1·5		4·6	3·6	2	3·8		
		1·6	1·5		2·5	800	1·9	700		
		900	2·1		1·7	1·2	1·6			
		(200)	1·7		1·7		3·6			
			1·8		2·4		1·8			
			1·6		1·8		1·5			
			5·2		1·9		800			
			800				800			
			800							
			700							
			1·6							
			5·2							
			1·7							
			800							
			4·1							
			1·5							
			800							
			2							
			800							
			5·2							
			900							
			1·9							
			1·7							
			3·3							
			1·6							
			2·8							
			4·4							
			4·7							
			1·4							
	7	11	37	6	15	11	15	10	6	5
	19	23	82	16	33	21	26	23	10	5

Clothing

Stocksheet

who uses it? where?

These stocksheets are attached to rolls of fabric on the store shelves. They quickly tell the storeperson if an item is running low.

The storeperson totals the lengths of rolls of a type of fabric as they are delivered. If there are already some in stock, this new quantity is added on and the total amount is recorded on a stocksheet like this. The stocksheet is attached to the front of the rolls on the shelves so they are easy to see.

The batch number is important, because if any fault is found during production, the batch can be traced.

Each time some of the fabric is issued to the cutters, that amount is subtracted to keep a running total.

It is obvious then, if an item is running low and the purchasers can be told. The amount issued is entered into a computer daily to keep a running stock total.

why is it used?

- Stock control
- To alert purchasers if an item is running low

what maths skills are used?

Counting
Addition
Subtraction

useful extras

- Calculator

31

STOCKSHEET

CODE No.	
SUPPLIER:	National Textiles
MATERIAL	Slate Jackaroo
DATE	22.6.95
BATCH NUMBER	46933
QUANTITY	~~[illegible]~~ 459.3m.

Order docket

who uses it? where?

This docket is put together by the *pattern marker when orders are received. The orders are grouped according to the same style and fabric and number; 40 of size 34 style T180 are needed, so it is put down in two batches of 20, because no more than 20 of this fabric can be cut at once.

From this information, the pattern marker calculates the amount of fabric needed and writes up a *laysheet for the cutter. A laysheet tells the cutter what to cut.

This docket goes with the laysheet to the cutter and after the cutting is completed it is then returned to the pattern marker for records.

why is it used?

- To group orders so that *markers can be made
- To create *bundle labels that are attached to cut pieces ready for sewing

what maths skills are used?

Number and code recognition
Matching
Counting

Pattern marker: The person who marks in the patterns for the cutters
Laysheet: An order sheet telling the cutter how many of each style to lay out and cut
Marker: A pattern marked with all the components ready to lay up the fabric
Bundle labels: Labels that are attached to batches of cut pieces of fabric

ORIGINAL

34

27·6·95

20 T180
pr

Lay 14 A

32·32 ✓
34·32 ✓ 44600
34·32 ✓
36·32 ✓
36·32 ✓ 44601.
38·32 ✓
38·32 ✓

LAY 14 B

32·32
34·32 44600
34·32
36·32 8
36·32 44601 11
38·32
38·32 19PR

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Laysheet

who uses it? where?

The *pattern marker calculates the fabric required for these orders and then draws up this *laysheet for the cutters.

The cutters then get the quantity of material needed from Stores, which needs to be at least 422.24 metres. They measure the width exactly to check that the width of the *marker will fit. This is essential because even a difference of one or two centimetres can mean that the roll is useless for this width.

They then lay and cut the 19 pairs according to these details. Two rolls of fabric are used to cut 11 and 8 pairs. The cutters measure and record how much fabric is left as end rolls. They also have to calculate the amount of flaws, if they needed to cut any from the roll.

why is it used?

- To tell the cutters what they must cut

what maths skills are used?

Number and code recognition
Measuring
Addition
Subtraction
Multiplication
Division
Averages
Spatial recognition

useful extras

- Calculator

**Pattern marker: The person who marks the patterns for the cutters*
**Laysheet: An order sheet telling the cutter how many of each style to lay out and cut*
**Marker: A pattern ready to use for cutting*

NAME: PETER LAY No: 14A + 14B DATE: 29/6/95

STYLE No.	TOTAL SIZES	TOTAL SIZES	MARKER WIDTH 'm'	LENGTH OF LAY 'm'	AVE METRES per size	AVE SIZE per length	NO. OF GARMENTS 'm'	NUMBER METRES per roll	BATCH NO. OF ROLL 'm'	MATERIAL REQUIRED 'm'	FLAWS 'm'	END ROLLS 'm'
T180	32·32		131cm	[redacted]	1.5m	W: 35·42	19PR			422·24m		
	34·32			10·556m		IL: 32						
	34·32											
TYPE OF MATERIAL	36·32						11PR	242·3m	38868			10 MTRS
	36·32						8PR	170m	37168			1½ MTRS
Moleskin	38·32											
	38·32											
	32·32											
	34·32											
COLOUR	34·32											
Bone	36·32											
	36·32											
	38·32											
	38·32											

FB 30180-O 100 Pads 4/95

Stock transfer and Stock update

who uses it? where?

As finished pants and jeans reach the end of the production line, the packer inspects them. Then they are labelled, counted and put into bundles the same size.

The sub-totals are written on this sheet. For instance, 5 + 6 + 7 + 4 = 22 of size 31.32. Then the sub-totals are added to get a full total of 148 at the bottom. The number of any seconds would also be recorded in the Seconds column.

This sheet goes with the bundles of pants and jeans to the Receipt part of the Distribution Section. There the storeperson counts the items and cross-checks against the totals on the sheet. Then the data is entered into the computer to update stocklists.

The storeperson makes a stock update printout such as this a number of times during the day. It is used to cross-check that the items entered from the Stock Transfer Sheets are registered as stock on the shelves. In this case the items T759.F3 at the bottom are from the Stock Transfer Sheet.

why is it used?

- Quality management
- To monitor movement of stock
- To update stocklists

what maths skills are used?

Number and code recognition
Counting
Addition

25-Aug-1995
R M Williams

BARCODE STOCK UPDATE - AUDIT REPORT

R. M. WILLIAMS PTY LTD 5253

STOCK TRANSFER SHEET

TO STORES
FROM BOTTOMS

PRODUCT No. T 759
COLOUR FAWN
DESCRIPTION

PRODN. No.	SIZE	TOTAL QTY	BUNDLES		BASKET No.	SECONDS
	30-32		6,8,4	18		
	31-32		5,6,7,4	23		
	32-32		7,6,4	17		
	33-32		5,8,3	16		
	33-35		8	8		
	34-30		5	5		
	34-32		6,4	10		
	36-30		6	6		
	36-32		5,4	9		
	40-32		5,3	8		
	42-32		7,6,6,4	23		
	44-32		6	6		

FULL TOTAL QUALITY: 148
SECONDS TOTAL:

PACKED BY
Signed.....
Date...../...../...../19.....

RECEIVED BY
Signed.....
Date...../...../...../19.....

ENTERED BY
Signed.....
Date...../...../...../19.....

			ıtered	SOH before	SOH after
			1	1	2
			1	2	3
			1	0	1
			3	5	8
				1	18
				18	21
				1	28
				28	38
				38	66
				66	68
				1	29
				29	57
				57	85
				85	110
				33	61
				61	89
				89	99
				14	41
				41	44
				0	1
				0	1
				1	2
				0	1
		XL	1	0	1
T759.F3.30		32	18	0	18
T759.F3.31		32	22	0	22
T759.F3.32		32	17	22	39
T759.F3.33		32	16	0	16
T759.F3.33		35	8	0	8
T759.F3.34		30	5	0	5
T759.F3.34		32	10	0	10
T759.F3.36		30	6	0	6
T759.F3.36		32	9	0	9
T759.F3.36		32	9	9	18
T759.F3.40		32	8	0	8
T759.F3.42		32	23	0	23
T759.F3.44		32	6	0	6

Picking list

who uses it? where?

This *picking list is a customer's order.

The storeperson finds the items in the Store shelves, using Item and Location codes and then writes down how many have been picked.

The correct placement of items in the shelves must be constantly checked while items are being picked.

The order is packed and each carton is weighed. If there is more than one carton, the weights are added together and the total weight is written on this list. In this order there are 4 cartons, but only 2 are shown on this page.

why is it used?

- To monitor stock locations and stock numbers
- Quality customer service

what maths skills are used?

Number and code recognition
Counting
Addition
Weighing

useful extras

- Weighing scales
- Calculator

**Picking: Selecting items that have been ordered from the store shelves*

Run# 314
PRINTED 28-Aug-1995

Our Order no. 184464
Our Pick No. L I S T
Cust. P/O no. 15790/1/3
Cust. Dept. nc.

WAREHOUSE: ADELAIDE

Deliver to:

DELIVERY DATES : NOT BEFORE 01/09/95
NOT AFTER 30/03/96

3806

Delivery Via: ************************

Special Instructions: *INV. 1/9/95*

BACK ORDERED? YES NO

Locn.	Code	Description	Colour	Size	SKU	Ordered	Pick	Line
D43-3	T353.M2	3 BUTTON POLO SHIRT	RUBY	L	096490	1	/	48
D43-2				XL	096491	1	/	48
D37-4	T353.87	3 BUTTON POLO SHIRT	FOREST.GREE	M	096480	1	/	50
D37-3				L	096481	1	/	50
D37-2				XL	096482	1	/	50
J86-5	T351.M2	T-SHIRT	RUBY	XS	096469	1	)	51
J86-5				S	096470	1	)	51
J86-4				M	096471	1	)	51
J86-3				L	096472	1	)	51
J86-2				XL	096473	1	)	51
J52-2	T351.87	T-SHIRT	FOREST.GREE	XS	096460	1	/	52
J52-2				S	096461	1	/	52
J52-1				M	096462	1	/	52
J50-4				L	096463	1	/	52
J50-3				XL	096464	1	/	52

-------- END OF ORDER --------

1

2

Date picked: A. BUDA

Picked by: 28/8/95

Page 2

Carton count: 4 Kgs. 52.7

Total pick: 46

Total page: 15

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42

Laundry

Continuous Batch Washer report

who uses it? where?

This form is used to monitor the productivity of the Continuous Batch Washing machine.

The operator of the CBW reads from the computer screen the total number of loads completed each hour, and writes it down.

To work out how many loads have been done each hour, the previous total is taken away from that number. From 8.00 am to 9.00 am, 66 – 30 = 36 loads. Any lost time is also recorded.

Periodically the supervisor works out the average of loads/hour, which is not recorded on this form yet.

The operator also has to record how many loads were done with Wash Formula 1, how many with Formula 2, and so on. This is added up at the end of the day, and the two totals should agree.

why is it used?

- To monitor the productivity of the machine

what maths skills are used?

Number and code recognition
Subtraction
Understand and calculate averages

useful extras

- Check that workers feel confident about subtraction
- Calculator
- Formula to calculate average

CENTRAL LINEN

CONTINUOUS BATCH WASHER REPORT

C.B.W. No. THREE | Day THURSDAY | Date 7 / 9 / 95

OP 1 Time JOHN 7.00 AM | OP 2 Time | OP 3 Time | RELIEF: PAUL

Time START.	Loads Total	Loads Per Hour	•Temp Check	Comments	Lost Time
7.00	↓	↓		WAIT FOR H^2O	10 MINS
8.00	↓ 30	↓ 30	✓		
9.00	66	36	✓		
10.00	96	30	MODULE 4 OVER TEMP	CBW HOLDING TWO BAGS TRYING TO BY PASS AT THE SAME TIME. 10MINS LOST ER-01 3MINS	13 MINS
11.00	↓	↓ 33	✓		
12.00	162	66 33	✓		
1.00	198	36	✓	OVERTIME ON A+B 2MINS LOST	2 MINS
2.00	225	27	✓	NBR 5 MINS NBR	
3.00					
4.00					
5.00					
Finish time					

Wash Formula	No
01	
02	
03	
04	
05	
06	
07	
08	
09	
10	
11	
12	
13	
14	
15	
16	
Total	

HOUSE KEEPING TASK

All of the below task must be performed daily by all operators and initialed completed.

	INITALS
• VACUUMED BY JP ↙ Conveyor floor area 1	• JP 1
• Cabinets(Milnet&Miltron) 2	• JP 2
• Side dryer lint filters. 3	• JP 3
• Press area. 4	• JP 4
• Catwalk area. 5	• JP 5
• Discharge belt pit. 6	• JP 6
• CBW release point area. 7	• JP 7
• Fire exit area. 8	• JP 8
• Flow splitter tanks(12.00noon) 9	• JP 9
• Flow splitter tanks(end of shift) 10	• .....

BREAKDOWNS

Record all breakdowns that occur during the day and also lost time.

- SBS 3 BAG'S NOT ROLLING AWAY FROM RELEASE
- .....
- BAGS NOT ROLLING AWAY FROM DISCHARGE POINT CBS
- .....
- .....
- .....
- .....
- .....
- .....

Production run card

who uses it? where?

This card goes with items in a production run through a section and on to the next section. A run card involves everyone in the laundry.

Finished items are added together and recorded on this card by workers. In this case, 1,610 face-washers are needed. They are counted and packed in 50's, then the 50's are added up. When there are the correct number, it is recorded in the card.

why is it used?

- To keep track of items being processed and match them to order requirements

what maths skills are used?

Number and code recognition
Counting
Addition
Subtraction
Multiplication

useful extras

- Check that people feel confident about adding and subtracting
- Calculator

PRODUCTION RUN FOUR

DAY		DATE	/ / 95
PRODUCT TYPE	D56		
NUMBER	~~1610~~ 1455		
CUSTOMER'S NAME	Despatch		
OPERATOR'S NAME	1005		

Blues daily figures and Tally

who uses it? where?

The chart tells the operator how many of each type of item must be processed in the 4 production runs during the day.

*Blues are clothing products processed through a dry-finishing machine.

The hand-written docket is the worker's own method of keeping track of run requirements as they are processed. For example:

= not enough, only 15

= order filled.

The worker is constantly counting, adding and subtracting to get the correct totals.

why is it used?

- To monitor the output from the machine to meet order requirements
- To add finished items and match numbers against run requirements

what maths skills are used?

Number and code recognition
Counting
Addition
Subtraction

useful extras

- Check that workers feel confident about adding and subtracting
- Production run rings to hang with counted items to indicate the end of a run
- Calculator

Blues: Hospital clothing made of blue fabric

BLUES DAILY FIGURES

DRYFOLD

TUESDAY / THURSDAY

PRODUCTION RUN 3 7 AM - 9 AM		PRODUCTION RUN 4 9 AM - 11 AM		PRODUCTION RUN 1 11 AM - 1 PM		PRODUCTION RUN 2 1 PM - 3 PM	
Product Code	Number Required	Product Code	Number Required	Product Code	Number Required	Product Code	Number Required
E01	5	E01	0	E01	0	E01	0
E02	5	E02	0	E02	0	E02	0
E03	5	E03	0	E03	0	E03	0
E04	5	E04	0	E04	0	E04	0
E06	75	E06	96	E06	0	E06	30
E07	130	E07	142	E07	50	E07	52
E08	50	E08	89	E08	90	E08	37
E09	0	E09	22	E09	90	E09	24
E10	20	E10	17	E10	0	E10	0
E13	40	E13	39	E13	0	E13	10
E14	35	E14	30	E14	30	E14	5
E15	17	E15	25	E15	25	E15	5
E16	35	E16	42	E16	0	E16	15
E17	37	E17	50	E17	30	E17	10
E18	0	E18	0	E18	25	E18	0
E40	0	E40	0	E40	5	E40	0
E41	0	E41	0	E41	50	E41	0
E42	0	E42	0	E42	50	E42	0
E43	0	E43	0	E43	50	E43	0
E45	0	E45	0	E45	5	E45	
E46	0	E46	0	E46	50	E46	
E47	0	E47	0	E47	50	E47	
E48	0	E48	0	E48	50	E48	
E57	35	E57	30	E57	25	E57	
E58	65	E58	31	E58	25	E5	
E59	20	E59	63	E59	35	E	
E60	20	E60	60	E60	30		
E61	50	E61	46	E61	35		
E66	10	E66	0	E66	0		
E67	20	E67	0	E67	0		
E89	15	E89	35	E89	13		

TUE 8-9-95

E7 -	75	96	50	30
8 -	130	142	90	52
9 -	50	89	90	37
10 -	-	22	-	24
13 -	20	17	-	-
14 -	40	39	30	10
15 -	35	30	25	5
57 -	35	30	25	-
58 -	65	31	25	-
59 -	20	63	35	-
60 -	20	60	30	7
61 -	50	46	35	5
689 -	15	35	13	5

Delivery docket

who uses it? where?

Dockets are completed as orders are filled. A copy of the docket goes out with each trolley of linen in a delivery to a customer. The numbers must match those on the larger requisition order. The docket goes to the office so that customers can be charged for what has been delivered.

Some customers are *item customers, and are charged by the number of items they lease. Workers in Despatch write down the counted items and their codes in the left-hand box as they are collected and put on the trolley.

Some customers are charged by weight. This is for customers who regularly receive large quantities of linen. For *weight customers, the worker writes the number of each item in the left box. The items are weighed, and the worker writes the weight in the right box. For example, there are 50 of item C17, and their weight has been rounded off to 7 kg. The customer will be charged for 7 kg of that item.

why is it used?

- To ensure accuracy of a delivery
- To work out costing
- To encourage accountability for quality management and costing

what maths skills are used?

Use of numbers and codes
Weighing
Counting
Addition
Multiplication

useful extras

- Weighing scales
- Check that workers feel confident about counting, weighing, and about rounding off

**Item customers: Customers that are charged for the number of items of linen they receive*
**Weight customers: Customers that are charged by the weight of linen they receive*

Account

Operator No.	Delivery Date
Z01 ✓	Z56 2
Z02	Z57 2
Z03	Z62
Z04	Z66 4
Z05	Z89
Z11	Z95 1
Z12	
Z17 7	
Z18 2	
Z22	

CODE	QUANTITY	CODE	QUANTITY	CODE	QUANTITY
C17	50				
D56	100				
D57	100				
C18	10				
C95	50				
D66	40				

ONE CODE ONLY FOR EACH COLUMN LINE

SPBA A250-008528

WEIGHED BY .....

DELIVERY DOCKET

CSSD daily linen requirements

who uses it? where?

An order for linen is issued to the *CSSD section each day.

Coded items for the operating theatres are inspected, folded and counted until there are enough items in stock for the people who fold them in their special way and wrap them.

An approximate number is satisfactory at this stage. The items will be accurately counted as they are prepared for specific orders.

Finished items are counted and sub-totals added to the list until there are enough.

why is it used?

- To meet the orders for the following day

what maths skills are used?

Number and code recognition
Counting
Addition

useful extras

- Check that workers feel confident about counting and addition
- Calculator

*CSSD: Central Sterile Services Department - items in this section are processed for the Central Sterile Services Departments in hospitals

Daily .Linen Requirement For CSSD

11-Sep-95

Linen Code	Quantity
Head Sheet	17 ✓
92'S	20 ✓
A86 (Pillow Case)	10 ✓
F17	31 20, 11
F23	178 50 50 50 26
F27	10 ✓
F32	20 ✓
F34	137 30, 30, 40, 40
F35	1387 150, 150, 100, 150, 150, 200, 200, 100, 150, 40
F35	84 44, 40
F37	432 150 100 50 100 32
F40	105 55, 50
F80	768 200, 50, 100 50 200 170
F66	15
F70	83 40 43
F80	1
F82	1007 300 100 200 200 150 50 7
F87	20
F88	118 68 50
F92	136 40, 40 56
X34	101 51 50
X34	2 ✓
Z40	11 ✓
Z60	26 ✓
Z87	130 30 50 50
Z88	130 50 50 30

Payslip

who uses it? where?

Maths skills are used by all employees to check their payslips. This employee will probably cross-check by adding up the hours worked, multiply the hours by the rates, add on any loadings, subtract any deductions like social club payments, and look at any other adjustments.

Most people will also check the pay period and the dates, and the accumulations in the box at the bottom. In this case the accumulations are the same as the pay details, because it happens to be at the beginning of the financial year.

why is it used?

- Personal information

what maths skills are used?

Number and code recognition
Addition
Subtraction
Multiplication

Pay Period 14.0 Days

PAY POINT 53 LOCATION 03 EMPLOYEE 10886 PERIOD END 07/07 PAY DATE 11/07/95

TYPE	HOURS	RATE	AMOUNT	TYPE	HOURS	RATE	AMOUNT
Normal	75.40	10.0553	758.17				
T/HALF	2.00	15.0830	30.17				
CAS LOAD	77.40	2.0111	155.66B				
AGWA CAS/PT			-7.90A				
SOCIAL CLUB			-2.00A				
* FLA 1/SPEC	61.50	0.2700	16.61B				

A = After Tax B = Before Tax * = Non-Standard Value

EARNINGS	THIS PAY	YEAR TO DATE
Gross	960.61	960.61
Tax	194.00	194.00
Net Pay	756.71	756.71

MicrOpay
3.51

STANISLAW
35 ANGAS RD
GLENELG
5388

MESSAGE

Footwear Manufacture: Shoes

Component forecast

who uses it? where?

This forecast tells the storeperson what *components, or parts for the shoes, are needed ahead of time. The forecast is issued the day before the materials are needed, so the supply of the components can be checked.

*Trims are calculated by volume. For instance, 1,000 eyelets = 1 mL, therefore 8.24 means 8.24 mL, and that means they need 8,240 singles. The storeperson enters a code into the computerised weighing scales, and then only needs to keep adding eyelets onto the scale until it reads 8,240.

1,030 black laces have been requisitioned, but boxes of laces hold 100.

So 11 boxes of 1,100 laces are issued to cover it. The storeperson keeps a record of the extras issued and the next day will try to take a few off the requisition, to balance the extra 70 that have been issued.

why is it used?

- Daily issue of stock to the floor

what maths skills are used?

Number and code recognition
Use of correct number codes
Subtraction
Multiplication

useful extras

- Computerised weighing scales
- Calculator

Components: Parts for the shoes, such as trims and eyelets
Trims: Articles on a shoe to make it look attractive eg toe-taps, buckles

REPORT 652 - CELL 3 F311 COMPONENT FORECAST DATE 24/07/95 PAGE 5

COMP	DESCRIPTION	UNIT				TOTAL REQTS
4493295	BONTEX 1.75MM NATURAL	sh				
	STOCK	28/07/95				
ORDERS						
REQTS		8.24				
BALANCE	155.00	146.76				
4493316	TEXON 4 IRON NATURAL	sh				
	STOCK	LATE	28/07/95			
ORDERS		2100.00				
REQTS			.22			
BALANCE	167.00	2267.00	2266.77			
4493457	1.8MM WHITE LACQ T90	m2				
	STOCK	LATE	28/07/95			
ORDERS		39.00				
REQTS			1.66			
BALANCE	10.40	49.40	47.73			
5134331	LACES 319/3533 BLACK 66CM	sg				
	STOCK	LATE	28/07/95			
ORDERS		5000.00				
REQTS			1030.00			
BALANCE	9768.00	14768.00	13738.00			
5201009	BOXES NO 3 CRASHPAK	sg				
3304034	EYELETS RIMMON LONG BLACK (30.25 ml					
	STOCK	LATE	24/07/95	28/07/95		
ORDERS		300.00	100.00			
REQTS				8.24		
BALANCE	98.30	398.30	498.30	490.06		
4310573	DANCER TPR BLACK IMPORTED	pr				

Requisition listing

who uses it? where?

This listing goes to the clickers and tells them how much stiffener must be cut. For instance, 230 pairs of size 11 are needed.

The stiffener is cut 5 layers together, so the *clicker stacks 20 lots at a time. This is so that a tally in 100's can be kept.

The clicker cuts 5 layers at a time, so 2.5 **pairs** of stiffener are actually being cut. In other words, the clicker has to make 2 cuts to create 5 pairs. If 230 pairs are required, this number must be divided by 2.5 to work out how many cuts must be made. In this case 230 ÷ 2.5 = 92 cuts, so they will need to make 92 cuts to cut the 230 pairs required.

why is it used?

- To inform the clicker of the numbers that must be cut

what maths skills are used?

Number and code recognition
Addition
Multiplication
Division
Division with fractions

useful extras

- Calculator
- Formula for calculation

Clicker: Person who cuts leather and other materials for the shoes

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REQUISITION LISTING

MODULE... ....CELL.1... FOLDER....360....

PART	DESCRIPTION		UNIT		RQ	SP
2700916	shank H990	83x10x9	ml		0.000	
924		89x10x9	ml		0.000	
932		95x10x9	ml		0.000	
940		102x10x9	ml		0.000	
959		108x10x9	ml		0.000	
967		114x10x9	ml		0.000	
975		121x10x9	ml		0.000	
2702601	shank H584	89x10x9	ml		0.000	
600		95x10x9	ml		0.380	
602		102x10x9	ml		0.378	
604		108x10x9	ml		0.162	
606		114x10x9	ml		0.070	
608		120x10x9	ml		0.070	
2702555	shank H528	89x10x9	ml		0.000	
567		95x10x9	ml		0.000	
573		102x10x9	ml		0.000	
580		108x10x9	ml		0.000	
587		114x10x9	ml		0.000	
2700529	shank H342	70x10x9	ml		0.000	
537		76x10x9	ml		0.000	
545		83x10x9	ml		0.000	
4463500	foam arch support	"C" small	pr		290	
3505		"B" medium	pr		180	
3511		"A" large	pr		60	
5202007	boxes plain no.3 crash pack		sg		0	
5202015	boxes plain no.4 crash pack		sg		2	
5202514	boxes plain ladies crash pack		sg		0	
5202569	boxes plain mens flat & lid		sg		0	
5201015	boxes no.4 crash pack		sg		~~300~~ 290	
5201028	boxes ladies crash pack		sg		240	
5201039	boxes mens flat & lid		sg		0	
5201049	boxes mens ex lge staple		sg		0	
5202600	boxes trek ladies		sg		8	
5202611	boxes trek mens		sg		0	
	stiffener PR81	2	pr		5	
		4	pr		15	
		6	pr		10	
		8	pr		35	
		10	pr		35	
	stiffener PR8/677	9	pr		55	
		11	pr		230	
		13	pr		125	
		2	pr		20	
	stiffener PR71/677D	2	pr		0	
		4	pr		0	
		6	pr		0	
		8	pr		0	
		10	pr		0	
	stiffener PR29/677	1	pr		0	
		3	pr		0	
		5	pr		0	
		7	pr		0	
	stiffener PR68/677	2	pr		0	
		4	pr		0	
		6	pr		0	
	stiffener PR84/677	4	pr		0	
		6	pr		0	
		8	pr		0	
		10	pr		0	
	stiffener PR3/677D	4	pr		0	
		6	pr		0	
		8	pr		0	
		10	pr		0	

Bulk cutting ticket

who uses it? where?

This ticket tells the clickers who cut all the manmade materials how many they need to cut in a day. Looking at size 055, which means size 5¤ , they need 10 D fittings, 50 E fittings and 15 F fittings.

To cut 50 E fittings, for example, the clicker divides by 2, because two sheets are cut face-to-face. Then the clicker cuts 25 with the right foot pattern, and 25 with the left foot, to give 50 of each foot for the 50 pairs.

The clicker checks the numbers against the sub-totals on the right, then bundles together all the pieces of one size and labels them.

why is it used?

- To inform clickers of the numbers of each size to cut

what maths skills are used?

Number and code recognition
Addition
Division

**Clicker: The person who cuts the materials for the shoes*

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Bulk cutting ticket

FOLDER No.	323	BOTTOM SPEC No.	027090	FACTORY	A	KNIFE/CASTOR
LAST	10976	EDGE COLOUR				KNIVES

2 IRON NATURAL TEXON BOARD. SOLUTION SEAT.

SIZE	035	040	045	050	055	060	065	070	075	080	085	TOTAL
FIT												
D				5	10	10	5	15	5	10		60
E	10	35	35	20	50	60	10	5	50		25	300
F	15			5	15	10	15	10	15	15		100
TOT	25	35	35	30	75	80	30	30	70	25	25	460

GRAND TOTAL 460

Planning report

who uses it? where?

This report is used by the assembler in the *Making Room to plan workflow for the day. There are only a certain number of each size of *last to use and these numbers control the number of turns around the Making Room that can be planned. 20 pairs of size 2, or 020, fitting E are needed. Because there are 5 lasts for this size, so there can be 4 turns to make the 20 pairs.

The assembler plans to have as few changes as possible during the day in order to assist the flow of work.

The flow of work relies on the people and what works best for the team in the Making Room, so the plan for the day does not just depend on numbers.

why is it used?

- To plan workflow

what maths skills are used?

Number and code recognition
Multiplication
Division

**Last: A mould to shape the shoe around*
**Making Room: Sometimes called the Lasting Room, where the upper part of the shoes are put together*

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FACTORY PLANNING REPORT - SUMMARY DATE-24/07/95 PAGE- 9

CELL 1 05 FOLDER - 311 LINE - 1

LAST -			120	125	130	135	010	015	020	025	030	035	040	045	050	055	060	065	070	075	080	085	090	
12215	.* SUNSET																							
	C	30	3	2	3	2	3	2				4	3		3	2								3
	D	135	5	5		5	5	5	10	10	15	15	5	10	5	5	10	10	5	5	5			
	E	300	5	10	10	20	15	20	20	15	15	15	15	15	15	20	20	20	20	15	10	5		
	F	50			5	5	5	5			10	5	5	5		5								
	G	30				5			5	5	5				5	5								
		545	13	17	18	37	28	32	35	30	45	39	28	30	28	37	30	30	25	20	15	5	3	
LAST -			120	125	130	135	010	015	020	025	030	035	040	045	050	055	060	065	070					
11098	BRINDLE																							
	D	51	1	1	4	4	4	4	4	4	4	4	4	4	4	3	2							
	E	24	1	1	3	2		4	2		1			3	3		4							
		75	2	2	7	6	4	8	6	4	5	4	4	7	7	3	6							

LINE TOTAL 620
FOLDER TOTAL 620

Output sheet

who uses it? where?

As the shoes are inspected, the inspector fills in this sheet. Shoes are added up in 5's to get a total produced for the day.

The supervisor then works out the total units for the day. This total is based on the value in minutes allowed to make each different style of shoe. For instance, shoe code 12213 has a value of 22.94 minutes. A total of 495 shoes x 22.94 minutes are added to 140 of code 52303 x 30.47 minutes to get the total units for the day.

This figure is used to calculate productivity each week, by comparing the output to a benchmark. It is worked out as a percentage and then shown on a graph on the wall.

why is it used?

- To monitor daily production

what maths skills are used?

Use of numbers and codes
Addition
Multiplication

useful extras

- Calculator

Socking: The heel liner is put into the shoe
Socking Room: Where the heel liner is put into the shoe and final touch-ups are done

MODULE/CELL: ONE DATE: 29.5.95 TOTAL PRS: 635PRS TOTAL UNITS: 15621·1

SHOE CODE	VALUE	SHOE CODE	VLAUE	SHOE CODE	VALUE	SHOE CODE	VALUE	SHOE CODE	VALUE	SHOE CODE	VALUE	SHOE CODE	VALUE
12213	22·94	12213	22·94	12213	22·94	12213	22·94	52303	30·47	52308	30·47		

TKT. NO.	PRS	TKT. NO.	PRS.	TKT. NO.	PRS.	TKT. NO.	PRS.	TKT. NO.	PRS.	TKT NO.	PRS.	TKT. NO.	PRS.
213 440	5	213 455	5	213454	5	213471	5	213514	5	213536	5		
439	5	463	5	419	5	506	5	515	5	541	5		
445	5	460	5	438	5	431	5	516	5	540	5		
484	5	430	5	417	5	434	5	517	5				
415	5	508	5	456	5	507	5	519	5				
481	5	433	6	446	5	502	5	524	5				
442	5	459	5	489	5	478	5	525	5				
443	5	505	5	495	5	509	5	522	5				
418	5	468	5	451	5	436	5	518	5				
491	5	467	5	422	5	512	5	521	5				
421	5	473	5	486	5	416	5	520	5				
425	5	472	5	423	5	476	5	527	5				
447	5	435	5	461	5	487	5	523	5				
428	5	474	5	462	5	452	5	530	5				
492	5	510	5	482	5	420	5	529	5				
499	5	508	5	429	5	483	5	533	5				
427	5	475	5	497	5	449	5	526	5				
450	5	487	5	465	5	488	5	528	5				
448	5	3511	5	469	5	493	5	534	5				
457	5	513	5	501	5	424	5	535	5				
453	5	477	5	426	5	500	5	531	5				
458	5	480	5	470	5	498	5	532	5				
496	5	441	5	490	5	504	5	537	5				
466	5	485	5	494	5	479	5	538	5				
469	5	444	5	482	5			539	5				
TOTAL PRS.	125	TOTAL PRS.	125	TOTAL PRS.	125	TOTAL PRS.	120	TOTAL PRS.	125	TOTAL PRS.	15	TOTAL PRS.	

11355·3 4265·8

70 71

Instock order form

who uses it? where?

This form is a *picking list is a company's order.

As the storeperson collects each pair of shoes that are ordered, the shoe codes are checked against the code on the box and each item is crossed off.

(1) means those shoes are not available. Then the two totals are changed. 5 is changed to 4 and 28 changed to 27. The addition of the totals is checked, which is the total that has been picked.

why is it used?

- To meet order requirements
- Quality management
- To monitor stock numbers

what maths skills are used?

Use of numbers and codes
Addition
Multiplication

useful extras

- Calculator

*Picking: *Collecting the items that have been ordered*

INSTOCK ORDER FORM

CUSTOMER NUMBER	
CUSTOMER ORDER No.	
CUSTOMER DEPT. No.	
OUR ORDER No.	

CUSTOMER	Company X
ADDRESS	

DELIVERY DATE	
DATE OF ORDER	
SPECIAL DELIVERY INSTRUCTIONS	

STYLE	MATERIAL COLOUR	SHOE No.	FIT	2	½	3	½	4	½	5	½	6	½	7	½	8	½	9	½	10	½	11	½	12	½	13	½	1	½	TOTAL PAIRS	
	BLACK	83183	EE													3				1	1			1						6	
	BURG	88185	EE													1		1						1						3	
	V	84068	EE													1				1										2	
	BLACK.	83973	EE													1		1		2										(5)	4
	BROWN	83982	EE													1		1		1				1						5	
	BLACK	83193	EE													2		1		2				1						6	
	BURG	83195	EE																	1										1	

SIGNATURE .....

TOTAL 28 27

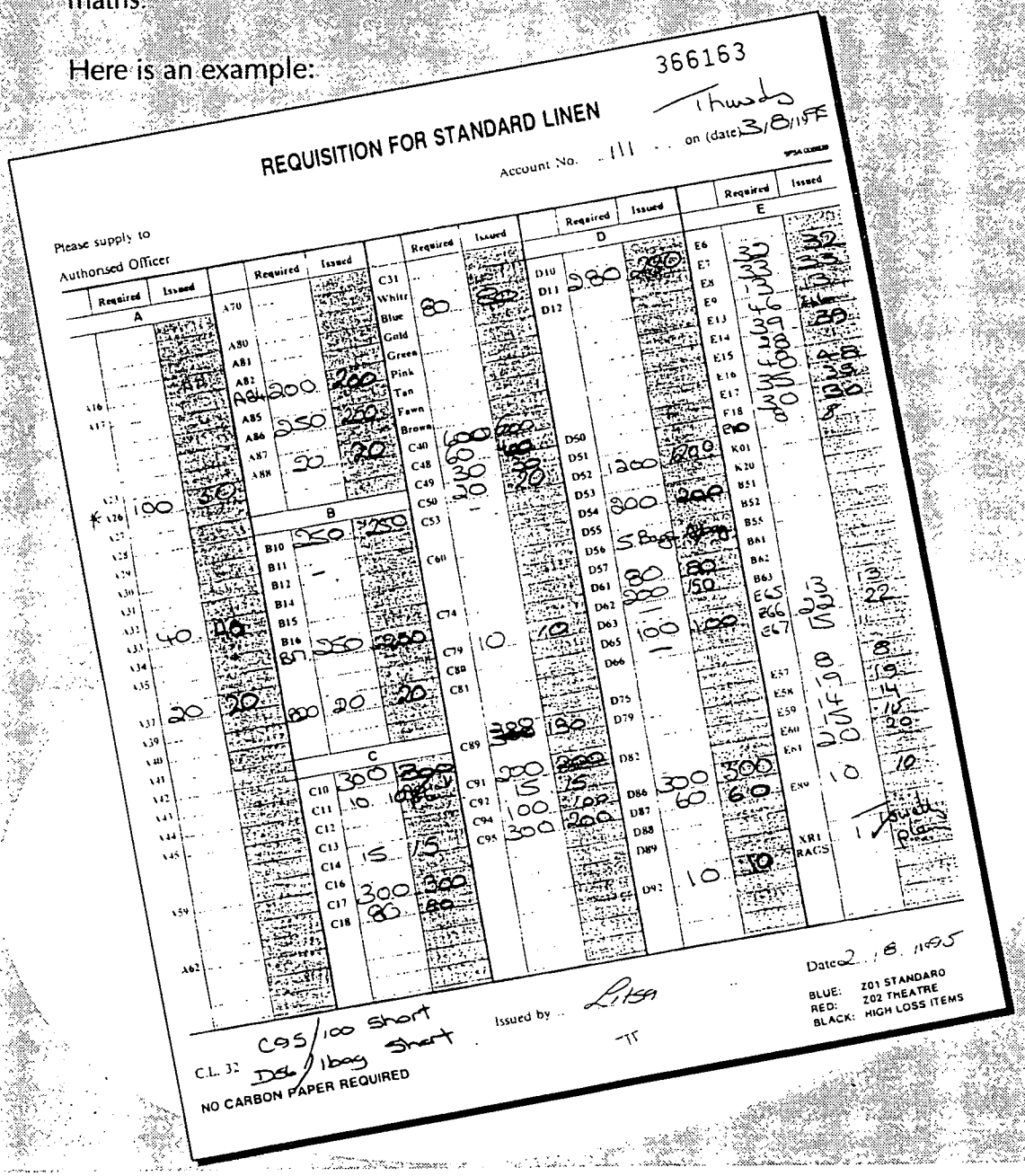
Focus

Quality Management

Many of the examples in the earlier pages relate to **Quality Management.** Quality is important in every workplace. It can help a company to maintain a market edge. Orders depend on the quality of products or services.

Quality is no longer purely the responsibity of someone else. A quality product or service is the result of the entire workforce being involved and responsible. A lot of this depends on the ability of workers to use maths.

Here is an example:



This is a laundry requisition order. The form goes with the delivery of the linen from the laundry to the hospital. Any worker in Despatch could be responsible for this order. The worker collects and counts the finished items required to meet this order and then signs it when the order is complete.

When the items are packed, the worker writes the Numbers Issued next to Numbers Required. If there is a shortfall, they record at the bottom how many of each items the order is short. For instance, 300 C95's are required, but only 200 can be issued, so they are 100 short.

A number of maths skills are used while filling this order, such as knowing the number codes for each item, counting and adding the items required, writing down the numbers issued and subtracting if there are not enough. It is vital that this requisition is accurately filled and that the customer receives quality service.

The language of quality

These are some terms that are often used in relation to quality. They are part of the jargon of Quality Management that can set up a barrier of understanding, for people of **all** backgrounds.

variation	***verification***
measurement	***non-conforming***
audit	***error***
recording	***waste***
charting	***data collection, collation &***
statistics	***documentation***

All of these terms have a bearing on maths tasks. People are being asked to become involved more and more in measuring and recording for quality purposes. Therefore, it is important to be able to perform maths tasks with confidence.

Some strategies to assist

Make sure they can add and subtract accurately. They could be given pencil and paper, or could be issued with a calculator if necessary, after checking that they can use a calculator.

It would be helpful to show them how to estimate an answer by rounding off the numbers and getting an approximate answer. This is particularly useful for people using calculators. If they have entered an incorrect number their answer could be very wrong and they need some check for this.

Stock control

Monitoring the levels of stock is an essential part of running an efficient workplace. It does not matter if inventories are kept on paper, in a filing cabinet, on an index card system, or on a modern computerised system. It does not matter if items are to be stored, or if a company operates on Just-In-Time principles. Stock numbers will still need to be monitored.

Keeping an inventory of stock often applies to the whole of the work process from start to finish. Maths tasks are performed by many workers in the course of their jobs while they are keeping a check on stock numbers.

Stock numbers and quantities may cause difficult maths problems for companies which import fabrics and textiles from overseas. Here is an example.

CHARGED TO:
R W WILLIAMS PTY LTD
5 PERCY STREET
PROSPECT SA 5082

White - Original
Blue - Duplicate
Yellow - Sales
Green - EDP
Pink - Mill

DELIVERED TO:
R W WILLIAMS
FROSTROAD
SALISBURY SA 5108

SALES TAX No.
DATE OF INVOICE 8.9.95
CUSTOMER CODE WIGF
SALESMAN S20
FABRI

OUR CONTRACT No. 54500/01
GROUP 07
STYLE 832
PRODUCT FIN. 27
COLOUR 2792
GRO
DESCRIPTION HUNTER BOWL
QUA 67

No. ROLLS 3
BALANCE ON ORDER
CUSTOMERS ORDER No. 14660
TOT TE

PIECE No.	METRES	PIECE No.	METRES	PIECE No.	METRES	PIECE No.	METRES
54454 1a	179						
2	241						
3	253						
TOTAL	673						

This packing list arrives with a delivery of fabric.

As the delivery comes in the storeperson counts the number of rolls and adds together the lengths written on each roll to get a total length. 179 + 241 = 673 metres.

Some packing lists have no total recorded on them. This one does, but it is still checked. This total is then entered into the computer to record stock quantities, and to check if the correct order has arrived.

Some fabrics and other textiles come from overseas countries already measured and recorded in yards. If the order was made for a certain length in metres and it comes in yards, or the other way round, someone must convert from one to the other first, and **then** check the order.

Not all companies have a person who specialises in this. In some companies people are required to do a range of tasks, and it is often the people on the shop-floor who have to do these conversions. Young workers are not accustomed to yardage, and metres can still be difficult for older workers brought up learning the imperial system. For people of all ages, conversions can be a problem.

Some strategies to assist

Give people a chart that shows comparisons between some standard lengths. For instance, have a chart that gives an inch, a yard and a mile in metric lengths, and a centimetre, a metre and a kilometre in imperial lengths. This will help people to have some rough comparisons in their heads.

When absolute accuracy is needed, items will need to be measured with accurate measuring aids such as a steel rule. A conversion formula is essential. A calculator is also a necessary item in these situations.

These same strategies could be used if similar problems arise with

Trainers' notes

Maths is everywhere at work and in training.

These are some of the things that a trainer needs to think about:

The possible effects of making assumptions

- Don't assume anything. How much do you miss if you assume a person is good, or poor, at maths?
- English-speakers could have hidden maths weaknesses.
- People with poor language skills could be very good at maths.

Cultural groups

- People from different cultures have been taught different ways to work things out.
- Different methods of learning maths at school have an effect on people's approach to maths. For instance, some education systems do not encourage discussion and a problem-solving approach.
- If people had low levels of schooling it could mean that they **never** learnt some maths concepts.

Methods of training

- Allow and **encourage** NESBs to discuss and work things out in their first language.
- NESB workers with good English language skills can be helpful in translating for others in training sessions.
- Encourage and support all trainees.
- Be inclusive—try to involve people at their own level. Let them work in a group where people contribute what they can.
- Use Plain English when you are explaining, and use as many visual aids as possible.
- Allow people to work at their own pace.
- Use a mentor—pair up each worker who needs extra help with a support person.
- Use an expert who can help you to modify teaching materials and methods.
- Try to have small training groups.
- Use a team-teacher to help you in training sessions.
- Check for understanding all the time. Ask them to explain in their own words.
- Use real things. People remember more and find it more interesting if learning uses real work examples.

Resources

Printed materials

If you are a:

manager
trainer
support person, or
supervisor / team-leader

and want to help people with their maths, it may be useful to have some basic maths materials at work to use in training sessions.

Workbooks and worksheets need to:

- be easy to read
- be clearly set out
- be self-paced
- include answers
- have clear explanations about the **meaning** of things, not just practise at a lot of 'sums'.

Workbooks and resources are often not related to workplace maths, and are usually not specific to a particular industry. They need to be given a workplace focus, to be put into the context at work where the maths is needed.

Some suggestions:

Title	*Author*	*Publisher*	*Approx. Cost*
Family Math	J Kerr Stenmark et al	University of California 1986	$33
Mathematics Curriculum Guide: Measurement	Education Dept, Vic.	Curriculum Branch	$12.50
Mathematics: A New Beginning	B Marr & S Helme	State Training Board of Vic.	$30
Numeracy on the Line: Language Based Numeracy Activities for Adults	B Marr, C Anderson D Tout	National Automotive Industry Training Board	$35
Strength in Numbers	R Goddard, B Marr, J Martin	Division Further Education, Vic.	$30
The Value of Time: Numeracy for Workers in Manufacturing	R Goddard, M Regan	Council of Adult Ed., Melb. 1995	$20
Working With Numbers	B Gabony, J Traxler	ALBSU 1982	$50

These may also be useful. They are materials that a worker could borrow and take home, with some helpful guidance from a support person.

Affordable Study Videos 1–4		Affordable Study Videos	$70 ea
Basic Maths Pack	Numeracy Group, ALBE	ALBE Resources Unit, Tas .1991	$36
Commonsense Maths (1 & 2)	P Kaner, G Gibbs	Edward Arnold	$15
Developmental Maths 1–4 (school texts)	A Thompson & E Wrightson	McGraw-Hill	$25 ea
Off-Campus Maths, Arithmetic A & B series	Adelaide Institute of TAFE	Dept of TAFE, SA 1988	$50
Real Life Maths (no answers)	B Barry & M Costigan	Ashton Scholastic	$10
TAFE Maths Notes	Maths Department	Northern Metropolitan College of TAFE, Vic.	

Who can help?

If you think some workers have difficulty with maths, giving them a workbook is not the only or the best option.

You could contact the Australian Light Manufacturing Industry Training Advisory Board. The Board can advise you on all aspects of language, literacy and maths training and put you in touch with funding sources, providers and state industry training boards.

Australian Light Manufacturing Industry Training Advisory Board
132–138 Leicester Street
Carlton
Victoria 3053

Telephone: (03) 93481311
Fax: (03) 9349 1637
Contact: Simon Wallace, National TCF WELL Coordinator.

You could also contact the Industry Training Advisory Board in your state.

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V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

Acquisitions Coordinator
ERIC Clearinghouse on Adult, Career, and Vocational Education
Center on Education and Training for Employment
1900 Kenny Road
Columbus, OH 43210-1090

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to: