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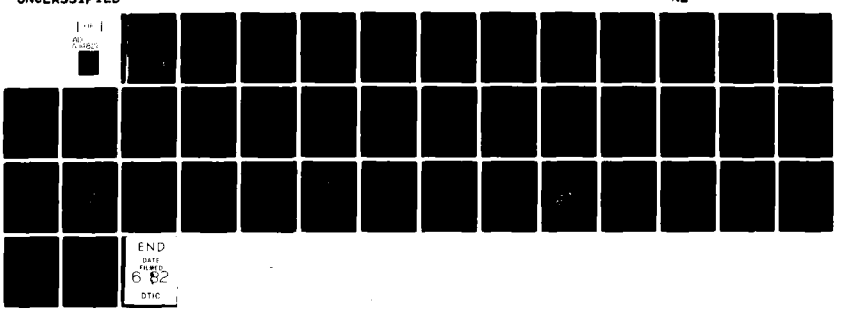

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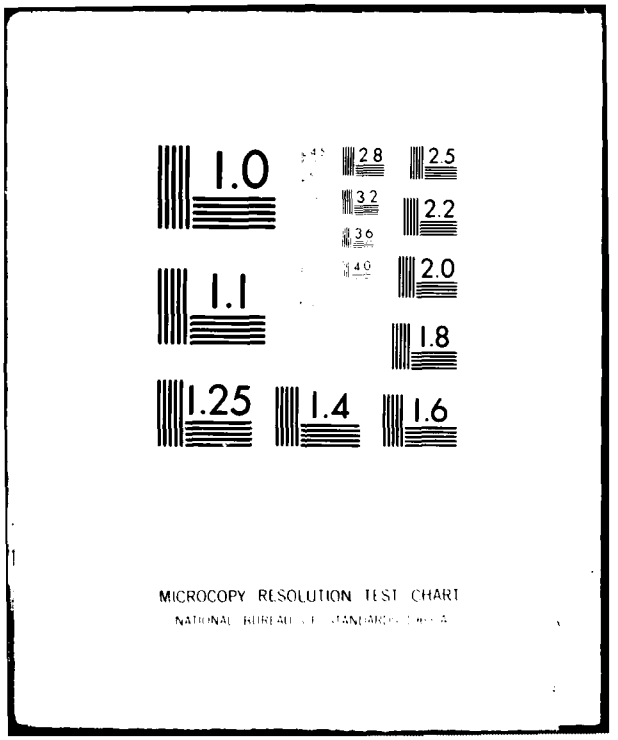
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THE DESIGN AND DEVELOPMENT OF MILITARY CLOTHING:

Part 1. The Selection of a Fabric for an Australian Army Combat Uniform.

M.G. KING

G.C. ADNAMS

APPROVED FOR PUBLIC RELEASE

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16. ABSTRACT

It is planned to introduce a new combat uniform material of lighter weight than the current all cotton uniform. This report describes the selection of an accelerated wear course for assessing the relative durability of combat uniforms. The durability of a range of candidate cotton/polyester uniform fabrics is compared with that of the existing uniform. The durability of the lighter weight, blend uniforms was as good as that of the inservice garments.

The analysis of a subjective comfort questionaire is discussed, and it is concluded that the respondents can discriminate between factors relating to comfort and expected durability. Under the test conditions (cool,wet) the cotton/polyester fabrics were rated as significantly more comfortable than the all cotton uniforms.

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ABSTRACT (CONT'D)

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THE DESIGN AND DEVELOPMENT OF MILITARY CLOTHING:

Part 1. The Selection of a Fabric for an Australian Army Combat Uniform

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CONTENTS

INTRODUCTION

1. It is planned to introduce a new combat uniform material for Australian Army use. For many combat situations it is believed that a material of lighter weight than the inservice uniform would be more suitable. However, it is important that the wear resistance should remain similar to that of the current items. Overseas and local experience has indicated that laboratory tests cannot be used to reliably rank the relative inservice durability of a range of different fabrics. It is therefore normal to conduct an accelerated wear trial to provide a quick and relevant estimate of the relative durability of candidate fabrics for combat uniforms. An accelerated wear course for Australian Army combat clothing (based upon the British APRE and the Canadian DREO accelerated wear courses) has been designed. This report presents the results of a trial of candidate fabrics for a combat uniform.

AIMS

2. The aims of the trial were:

a. to compare the durability of candidate fabrics with the existing inservice fabric;

b. to use the results of the accelerated wear trial in the selection of a new combat uniform fabric;

c. to provide information for inclusion in a data base relating to the properties of textiles for Army application.

CONDUCT OF THE TRIAL

3. Number of Men. A platoon of 41 men was involved in the wear programme, using the Australian Army Accelerated wear course which is described in Annex A.

4. Number of Uniforms. Twelve (or in some cases 13) uniforms were made from each candidate material. These uniforms were of standard inservice sizes and styles, to fit the men involved in the trial. To the 98 trial uniforms were added a further 25 uniforms of the current inservice type. The data from the current issue uniforms provided control data for the present trial, and the results will also be included as part of a data base against which future trials results can be compared.

5. Distribution of Uniforms. Each participant was given three uniforms, which were marked "I", "II" and "III".

6. Wear Course Timetable. The proposed Accelerated Wear Course for combat clothing consists of 13 activities. These activities are described in Annex A. Each participant was expected to complete 26 rounds of the course. After each round, each uniform was checked for wear, and the

/ participant

participant continued to the next round, each working at his own pace. In the event of premature wear of such a magnitude that a garment was considered unserviceable, the trialling of that uniform ceased, and the number of rounds for that uniform was recorded.

7. Subjective Comfort. After completing the trial of each uniform, each participant was required to fill out a questionnaire which was designed to assess the subjective acceptability of the trial fabrics. The 17 items on the questionnaire are listed in Annex B. The results from the first 15 items were used for statistical analysis.

8. Fabrics to be Trialled. The fabrics under test were provided by two manufacturers. Four shirting fabrics, and four trouser fabrics from each manufacturer were to be compared with the control fabric (current issue all cotton uniform). All trial fabrics were composed of 50% polyester, 50% cotton. Details of the fabrics are given in Annex C.

RESULTS FROM ACCELERATED WEAR TRIAL

9. Durability Results. The overall results from the accelerated wear course indicated general support for the range of activities and the number of rounds specified in the design of the trial. A reasonable distribution of types of wear (abrasion, snagging and tearing) was observed on the garments. Although the target number of rounds was 26, it was anticipated that any garment which survived 26 rounds of the course should be regarded as highly durable. The results were in accord with this expectation: the average number of rounds to failure for trousers was 14 (standard deviation 7.8) and that for shirts was 15.2 (standard deviation 9.1).

10. Difference Between Shirting Fabrics. Table 1 lists the mean and standard deviations of the number of rounds to failure for the shirts under test. For this analysis, a shirt which did not fail was credited with 26 rounds. Because of the relatively high variation in the number of rounds to failure (as indicated by the large standard deviation values), none of the shirts can be considered to be significantly different from the control garments. Table 2 gives the distribution of number of rounds to failure, with four potential categories: 0 to 9, 10 to 19, 20 to 25 and those which did not fail by the 26th round. In fact no shirts were listed as failing in the third category (20 to 25 rounds).

11. Difference between Trouser Fabrics. The average number of rounds to failure for each trouser fabric are listed in Table 3, and in Table 4, the distribution of rounds of the wear course for each fabric is given. As with the shirting fabrics, these data do not provide evidence of a statistically significant difference between any of the candidate fabrics compared with the control garments (all cotton).

12. Differences in Subjective Comfort. The results from the questionnaire were analysed in the following way:

a. a factor analysis of the items (excluding questions 3 and 4, which related to perspiration absorption - a meaningless dimension considering that it was raining during the trial) indicated that three main factors were present. These factors could be described as relating to comfort (Factor 1), comfort/warmth (Factor 2) and acceptability/durability (Factor 3). The magnitude of the loadings of each item on these factors are given in

/ Table

Table 5; only loadings greater than 0.4 are presented in this table.

b. An average score for trouser comfort was computed from the average score on items 7, 9, and 11 (the three items which were best correlated with the Comfort factor), and similarly an average comfort score for shirting fabrics was computed from items 6, 8, and 10. Preliminary analyses indicated that there was no apparent difference in distribution of comfort scores between the cotton/polyester shirting fabrics, nor between the cotton/polyester trousering fabrics. Furthermore, it was found that in terms of obtaining approximately equal frequencies in each of two groupings, a convenient division on the comfort scale was:

(1) less than an average score of 5.

(2) an average comfort score of 5.

A contingency table distinguishing between three classifications of fabric (1 = fabrics by Bruck, 2 = fabrics by Actil, 3 = current garments) on the one hand, and the two classifications of conform was constructed for shirtings, and for trouserings. These data are presented in Tables 6 and 7 respectively. Although the difference in favour of the blend fabrics was not significant (chi square test, $p = 0.05$) when shirts and trousers were analysed separately, when the data were combined, Table 8, the comparison of blend uniforms with all cotton uniforms indicated a significant difference (chi square test, $p = 0.05$).

Implications for Future Trials

13. From the combination of trouser data and shirt data, the pooled estimate of variance of number of rounds to failure of an item is 72.2, mean 14.5, degrees of freedom 123. The 99% confidence interval for a standard combat uniform item is $\pm$ 1.9 rounds (that is, there is a 99% certainty that the true mean number of rounds of an item is 14.5 $\pm$ 1.9 rounds). Furthermore, from this data it is possible to predict how many repeats will be necessary to enable a particular difference to be indicated as significant. This information is important for the design of future accelerated wear trials. For example, if a future trial is intending to compare two different uniform items, and it is decided that a difference of 3 in the mean number of rounds completed would be important, then it is predicted that a total of 53 repeats (N1 + N2) would be necessary for the difference of 3 to be significant at the 99% level. Table 9 gives the number of repeats necessary for differences of other magnitudes; in each case N1 plus N2 for a 99% significant level is given.

DISCUSSION

14. Analysis of Subjective Comfort. The results from the questionnaire can be taken to support two important issues:

a. that the loading of items on three recognisable factors indicates that an overall responsible attitude was taken towards the questionnaire by the respondents, and that they are able to distinguish different aspects of subjective acceptability of combat clothing;

/ b. that

b. that there was a consistent, statistically significant, difference between the trial fabrics (cotton/polyester), and the current issue all cotton fabrics. This difference was in favour of the blend fabrics.

15. Analysis of Durability. From the results of this trial, the durability of any of the cotton/polyester fabrics is not shown to be significantly different from that of the inservice all cotton uniforms, although all of the trialled cotton/polyester fabrics were considerably lighter than the inservice fabric. These results indicate that any of the trialled fabrics may be expected to provide garments with a life span similar to that of the current uniforms.

16. Selection of Fabrics. The selection of a candidate fabric for further trialling was made by choosing the lightest weight shirting (a 165 $g.m^{-2}$ oxford weave fabric listed as shirting number 1), and the lightest weight trousering (a 225 $g.m^{-2}$ twill weave, trousering number 2).

CONCLUSIONS

17. General Conclusions. To enable the rapid selection of a candidate fabric or fabrics for an Australian Army combat uniform, an accelerated wear course was set up and a group of candidate fabrics was trialled. The results obtained from this trial were the number of rounds to failure, and a subjective rating of comfort. The following general conclusions were supported by this trial:

a. that the accelerated wear course described in Annex A is a suitable means for providing a rapid comparison of combat uniform materials;

b. that from the results of this trial, it is possible to estimate the number of replications which should be used in the design of future trials;

c. that a meaningful structure of responses can be obtained from the use of a subjective comfort questionnaire.

18. Specific Conclusions. With regard to the selection of a fabric for further trialling for a new, lighter weight combat uniform, the following conclusions were supported:

a. that for the shirting although all fabrics were considerably lighter than the inservice all cotton fabric, none of the tested fabrics was shown to have significantly poorer durability than the inservice item;

b. that for the trousering fabrics, although all were considerably lighter than the inservice cotton fabric, none of the tested fabrics was shown to have significantly poorer durability than the inservice item.

c. that under the conditions of the test (cold, wet) cotton/polyester uniforms are more comfortable than all cotton uniforms.

/ RECOMMENDATIONS

RECOMMENDATIONS

19. Considering the findings of trial reported in this paper - that is, that lighter weight polyester/cotton fabrics have similar durability and possibility superior comfort compared to the inservice all cotton uniform - it is recommended that the lightest of the trialled shirtings, and the lightest of the trialled trouserings be selected as candidate fabrics for fuller trials as candidate materials for the new Australian Army combat uniform.

20. The recommended fabrics are approximately 50% polyester, 50% cotton. The shirting is a 165 $g.m^{-2}$ Oxford weave fabric. The trousering is a 225 $g.m^{-2}$ twill weave fabric.

TABLE 1

ANALYSIS OF SHIRT FABRIC RESULTS: MEAN AND STANDARD DEVIATION OF NUMBER OF ROUNDS TO FAILURE

FABRIC NUMBER	MEAN	STD DEV	N
1	16.1	9.7	7
2	15.4	8.9	8
3	15.1	8.1	7
4	14.6	10.5	8
5	16.3	11.3	4
6	22.0	8.0	4
7	7.4	5.2	5
8	17.6	7.9	7
9 Control Greens	14.2	9.7	12
TOTAL	15.1	9.1	62

TABLE 2

The distribution of number of rounds to fail by shirt fabric

	NUMBER OF ROUNDS TO FAIL			
Fabric Number	0 to 9	10 to 19	26+	Total
1	2	2	4	8
2	4	1	3	8
3	4	3	2	9
4	4	1	3	8
5	2	0	3	5
6	0	2	3	5
7	4	1	1	6
8	0	4	4	8
9	6	6	4	16
Total	26	20	27	73

TABLE 3

MEANS AND STANDARD DEVIATIONS OF TROUSER FABRIC RESULTS

FABRIC NUMBER	NO OF ROUNDS	STD DEV	N
1	10.6	6.5	8
2	16.6	8.6	5
3	11.8	6.0	10
4	11.0	7.4	7
5	14.7	7.9	10
6	17.0	10.9	5
7	14.3	8.9	9
8	14.6	7.5	5
9 Control Greens	15.8	7.8	16
TOTAL	14.0	7.8	75

TABLE 4

Distribution of number of rounds to fail by trouser fabrics

Fabric Number	NUMBER OF ROUNDS				
	0 to 9	10 to 19	20 to 25	26+	Total
1	5	2	0	1	8
2	1	2	0	2	5
3	6	3	0	2	11
4	4	2	0	2	8
5	4	3	1	3	11
6	3	1	0	1	6
7	4	2	0	3	9
8	1	5	0	1	7
9	7	7	1	4	19
Total	35	27	2	20	84

TABLE 5

Factor Loadings of 13 Questions related to Subjective Assessment of Comfort and Acceptability

Item No	Item Relates To	Factor 1 (Comfort)	Factor 2 (Comfort/Warmth)	Factor 3 (Acceptability/ Durability)
1	overall comfort	.56	.79	.41
2	shirt, hot/cold	-	.83	-
3	trousers, hot/cold	-	-	-
6	shirt, heavy, wet	.88	-	-
7	trousers, heavy, wet	.66	.50	-
8	shirt dry quickly	.65	.42	-
9	trousers dry quickly	.59	-	-
10	shirt rub or chafe	.57	.42	-
11	trousers rub or chafe	.40	-	-
12	shirt durability	-	-	.64
13	trousers durability	-	-	.63
14	shirt acceptable	.42	-	.65
15	trousers acceptable	-	-	.73

TABLE 6

Distribution of Subjective Comfort Rating Scores for Shirting Fabric

Fabric Group	Comfort Rating	
	Less Than 5	Equal to 5
fabrics by Bruck	16	24
fabrics by Actil	19	20
control greens	12	7

chi square 2.78, not significant.

TABLE 7

Distribution of Subjective Comfort Rating Scores for Trouser Fabrics

	COMFORT RATING	
Fabric Group	Less Than 5	Equal To 5
fabric by Bruck	20	19
fabric by Actil	21	17
control greens	15	6

chi square 2.35, not significant.

TABLE 8

Distribution of Subjective Comfort Rating Schores for the Uniforms (Trouser results plus Shirt results)

	COMFORT RATING	
Fabric Group	Less Than 5	Equal to 5
Blend Uniforms	76	80
All Cotton Uniforms	27	13

chi square 4.5, significant ($p < 0.05$).

TABLE 9

NUMBER OF REPEATS NECESSARY FOR DIFFERENCE BETWEEN TWO MEANS TO BE SIGNIFICANT AT 99% LEVEL

Magnitude of Difference	Total Repeats (N1 + N2)
1	480
2	120
3	53
4	30
5	19
6	13

REFERENCES

Gasper, N.A. and Hargreaves, J.N. A review of Laboratory Abrasion Testing and Actual Accelerated Wear Testing of Textiles. Twelfth Commonwealth Defence Conference on Operational Clothing and Combat Equipment. Ghana. 1978.

Nolan, R.W. and Dalpe, A. The DREO Fabric Wear and Design Course. Defence Research Establishment Ottawa. Technical Note No 77-18. 1977.

Ramsay, D.A. Accelerated Wear Trials in the Assessment of Operational Clothing. Twelfth Commonwealth Defence Conference on Operational Clothing and Combat Equipment. Ghana. 1978.

ANNEX A

AN ACCELERATED WEAR COURSE FOR AUSTRALIAN ARMY COMBAT CLOTHING

INTRODUCTION

1. An important aspect in the design and development of military combat clothing is the prediction of the service life of the garments. Essentially there are three methods which can be used to predict the life of a garment made from a specific fabric. These are:

   a. wearer trials in which the articles are used in their intended fashion by representatives of their intended wearers;

   b. accelerated wear trials, in which garments are intensively tested by a group of wearers performing a selection of activities;

   c. laboratory testing, in which abrasion resistance, tensile and tear strength and other properties may be measured quantitatively.

2. Of the above three options, normal wearer trials provide information which is readily interpreted. If the items are satisfactory in a properly conducted wear test, then it is reasonable to expect that they will be suitable for general release. However, wearer trials are time consuming, and may take from several months to more than a year to return an answer. This period of delay is not compatible with the task of designing a new wearer article.

3. Laboratory testing provides quantitative answers in a few days, and a wide range of fabrics can be compared. However, in a review of the literature relating wear trials to laboratory test results, Gaspar and Hargreaves found "no evidence that any of the laboratory tests afforded a satisfactory means of predicted serviceability" (p 12, 1978).

4. In contrast with laboratory tests, or wearer trials, the option of accelerated wearer trials has been reported as satisfactory. The results from accelerated wear trials are available within a reasonable period of time, and the inferances drawn from the results are in reasonable agreement with the actual serviceability of the trialled garments (Ramsay, 1978).

5. Within the context of the Australian Army, new design features and new fabrics are currently under consideration for the specification of an updated combat uniform ensemble. It is therefore desirable that an accelerated wear course be used to enable the designers to make valid comparisons between the available options. This report will discuss the feasibility of establishing an accelerated wear course facility for the purpose of testing Australian Army combat uniforms.

AIM

6. The aims of this report are:

   a. to establish, from the literature, the essential

/ features

features of a military clothing accelerated wear course;

b. to report on the facilities available for the accelerated wear testing of combat uniforms at the Infantry Centre, Singleton;

c. to specify the components of an accelerated wear course at the Infantry Centre, either nominating existing obstacles, or by recommending appropriate modifications to particular assault course activities.

BRITISH AND CANADIAN ACCELERATED WEAR COURSES

Description of the Courses

7. The APRE Accelerated Wear Course. The APRE course (Ramsay, 1978) consists of eight items. A typical trial of a garment may involve 48 circuits of the course. The course is aimed to provide wear to the garment in the following regions:

a. frontal wear, which is achieved by:

(1) leopard crawl over:

(a) sand (item 8);

(b) gravel (item 2);

(2) crawl over low concrete hurdle (item 3);

(3) climbing a high concrete wall (item 4);

b. wear to the back of the uniform, which is caused by sliding face up through a concrete pipe (item 6);

c. the crutch areas, worn by sliding legs astride along a concrete pipe (item 7);

d. lateral wear, which is effected by running through a wooden walled trench;

e. stretching to seams, which occurs in climbing in net (item 2).

8. The Canadian DREO Wear Course. This course (Nolan and Dalpe, 1977) has 29 obstacle stages which involves the repetition of eight basic activities. The regional wear to the garments is as follows:

a. frontal wear caused by:

(1) leopard crawl over

(a) a total of 34m of sand (items 1,3,13,17,21)

(b) one stretch of 11m of gravel (item 14),

/ (2) crawling

(2) crawling on hands and knees in sand for a total of 118m (2,9,15,18,19,26),

(3) sliding face first down ramps (6,25,28),

(4) climbing vertical walls (4,29),

(5) crawling over low hurdles (8,16,20),

(6) crawling through obstacles or pipes (4,11,22,23);

b. the back of the trial article, worn by crawling face up through sand, 32.5m (7,10,24,27);

c. the crutch area is abraded by sliding legs astride along logs (12);

d. lateral wear, occurs in the obstacles/crawling items (4,11,22,23);

e. stretching to seams, particularly on climbing vertical walls (4,29).

APRE and DREO Courses Compared with Australian Requirements

9. A summary of the features of the two courses (APRE and DREO) is given in Table 1; in both cases there is an emphasis upon frontal wear. Both courses cover the five basic types of wear - frontal, side, back, crutch and stretch. Although in the APRE and DREO courses concrete and brick structures have been chosen as the abrasive agent, current Australian Army combat exercises are not routinely carried out in an urban environment. For an Australian Army accelerated wear course, more natural materials such as dirt, wood, sand and rocks, may provide a more realistic type of wear: there is no justification for duplicating the overseas use of concrete.

10. A further point of practical importance is that neither the APRE nor the DREO course provides for the wetting of the clothing under standard test conditions. Since the laboratory-assessable properties of most textiles change dramatically when wet, it may be more representative of actual wear conditions if the accelerated wear course were to include a thorough wetting of the clothing under test.

Facilities at the Infantry Centre

11. The obstacles available on the assault course at the Infantry Centre have been inspected, and components from the course have been identified as satisfying most of the requirements of an Australian Army accelerated wear course for combat clothing. The selected activities are illustrated in figures 1 to 13. As with the APRE and DREO courses, there is an emphasis on frontal wear however, there is an increased proportion of activities which involve stretching on the Australian course; it is believed that the additional stretching activities should increase the failure rate of abrasion-weakened areas. The Australian course is compared with the others in Table 1, and the wear associated with each Australian activity is listed in Table 2.

/ Table 1

Table 1

Summary of the Wear from each of the accelerated Wear Courses:

APRE, DREO and Australian

Regional Wear	Number of Activities		
	APRE	DREO	AUS
FRONT	4	23	5
LATERAL	1	4	2
BACK	1	4	1
CRUTCH	1	1	0
STRETCH	1	2	6

/ Table 2

Table 2

Description of the 13 activities comprising the Accelerated Wear Course

Illustration Number	Description	Regional Wear*
not shown	jump 1 m fence	S
2	climb 2 m wall	S,F
3	three times through sandbag tunnels	F
not shown	jump 30 cm hurdle	S
5	scale "A frame" scaffold	F
6	hands and knees under barbed wire	F
7	over and under horizontal bars	S
not shown	leopard crawl under barbed wire on sand	F
9	run through wooden walled maze	L
10	crawl on back under net	B
11	run across barbed wire	S
12	slide down wooden ramp	L
13	slide over rock barrier	F

* F = Frontal Wear

S = Stretch

B = Back

L = Lateral

12. Preliminary testing showed that the inclusion of specific crutch wear by sliding, legs astride across a concrete pipe led to a rapid failure of the stitiching in the crutch. The trousers then became unserviceable although the fabric was not damaged. This indicated that further attention should be paid to the design and constructional aspects of the trousers, however as the present test required an accelerated wear course for testing differences between fabrics, the crutch wear item was eliminated from the course. The remaining four types of wear are therefore represented in the selected activities. It is recommended that sand should be used as the abrasive agent in two of the frontal wear (crawling) activites. It is recommended that the opportunity to wet the uniforms during each round should be provided (for example by the inclusion of a water hazard, or by specifically showering the participants at the conclusion of each round).

13. Combat Equipment. Both the APRE and the DREO courses include an activity which involves crawling on the back, apparently to cause wear to the back of the garments under test. However, if this action is performed in combat ensemble (as illustrated in figure 8a), then very little wear occurs on the clothing. Figure 8b shows that the standard webbing and the packs protect the garment from wear. This emphasises the importance of maintaining a close relationship between accelerated test conditions and expected service conditions, since unexpected interactions between clothing wear and equipment can occur. Any additional clothing or equipment which will be used with the test ensemble on normal service must be carried during an accelerated wear trial. If it is not desirable to submit this additional equipment to the rigors of an accelerated wear course, then a suitable substitute should be used. For example on the DREO course (Nolan et al, 1977) the soldier carries a wooden facsimile rifle.

CONCLUSIONS

14. The length of service life of an item of clothing is best assessed by field trials under normal service conditions, however, this procedure may be too time consuming, especially in the early stages of clothing design and development.

15. The results of laboratory tests on fabrics cannot be readily interpreted in terms related to the service performance of a garment.

16. A rapid and reasonably realistic comparison of a range of clothing items can be obtained from the results of an accelerated wear course - providing that the course includes the appropriate types of wear under conditions which represent the intended use of the garment.

17. The facilities at the Infantry Centre were inspected and after an analysis of the features of overseas accelerated wear courses, a series of 14 activities were identified as suitable components of an accelerated wear course for the assessment of Australian Army combat clothing.

18. Further facilities would be required - such as the inclusion of sand and rocks as abrasive agents - to better reflect the nature of Australian field conditions.

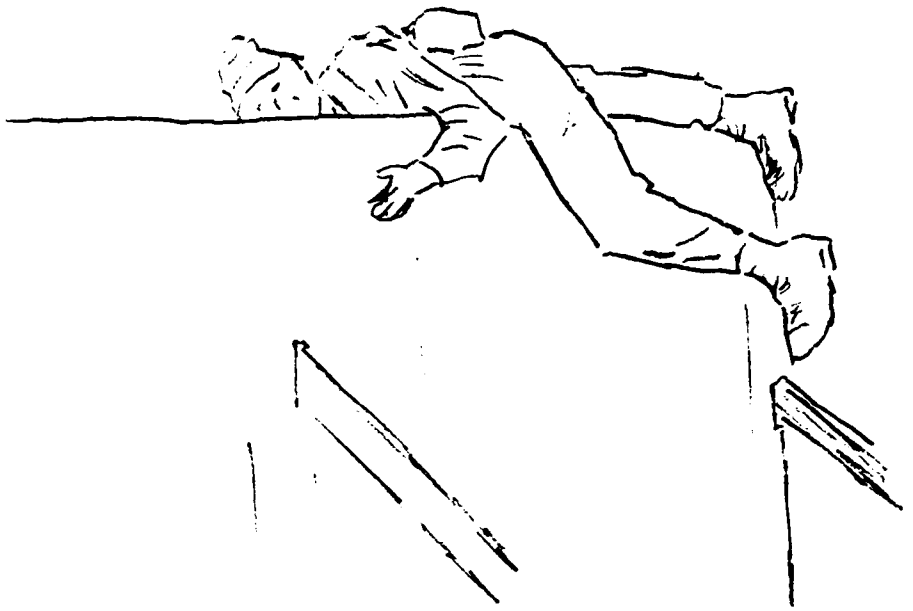


Figure 2

Climb over wooden wall

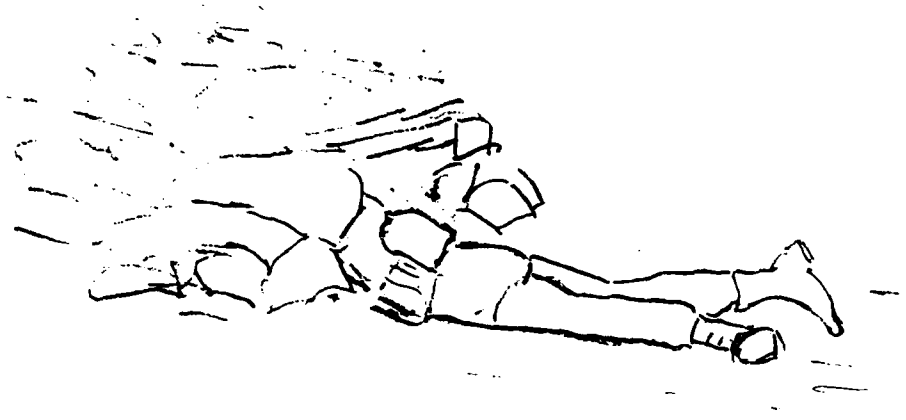


Figure 3

Crawl through dirt and sandbag tunnel

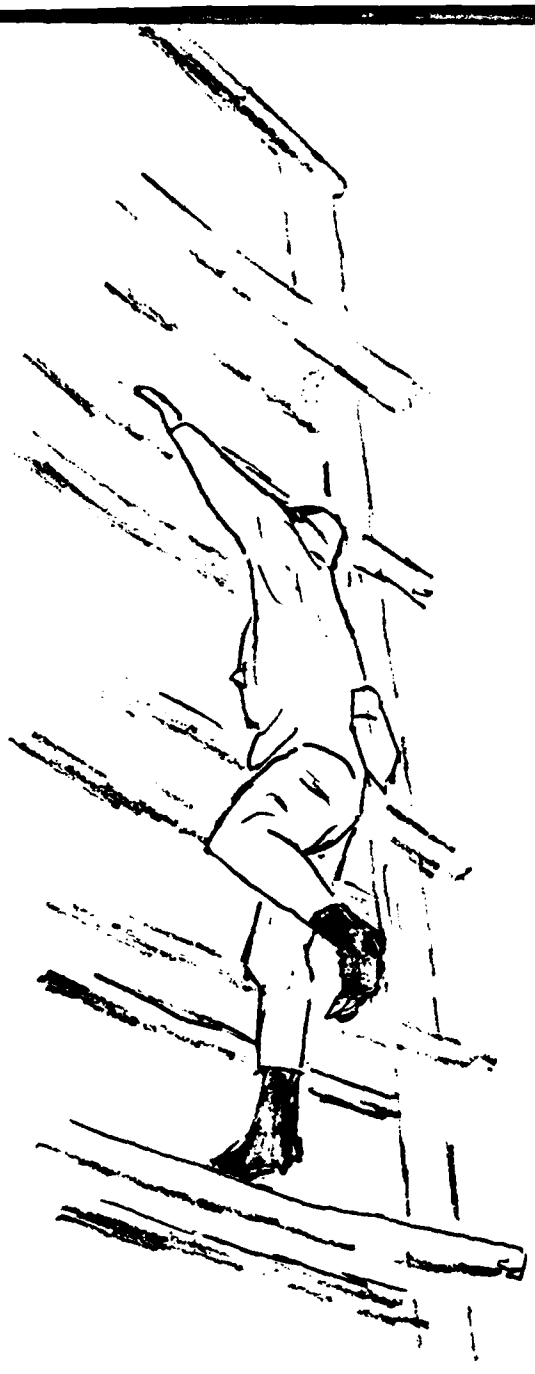


Figure 5

Climb "A Frame" wooden scaffold

Figure 6

Crawl on hands and knees under wire

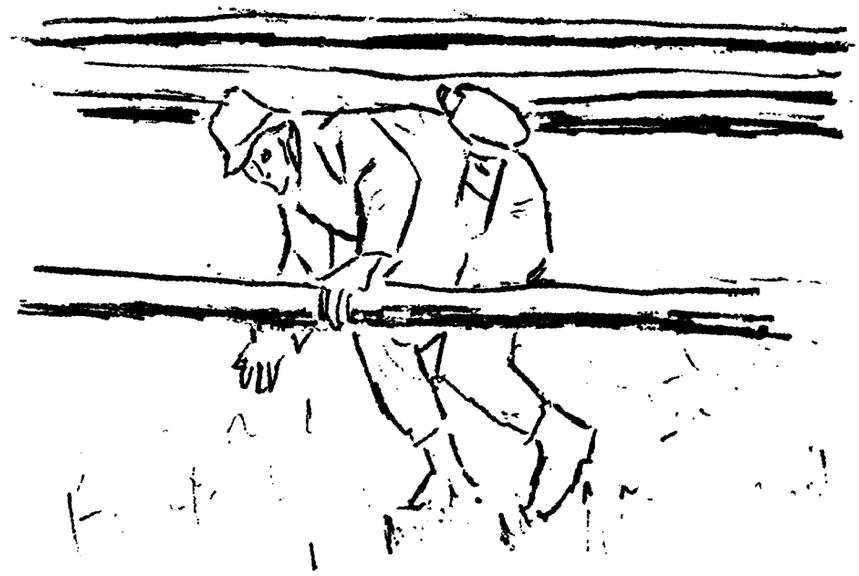


Figure 7

Climb over and under horizontal bars

Figure 9

Run through wooden walled maze

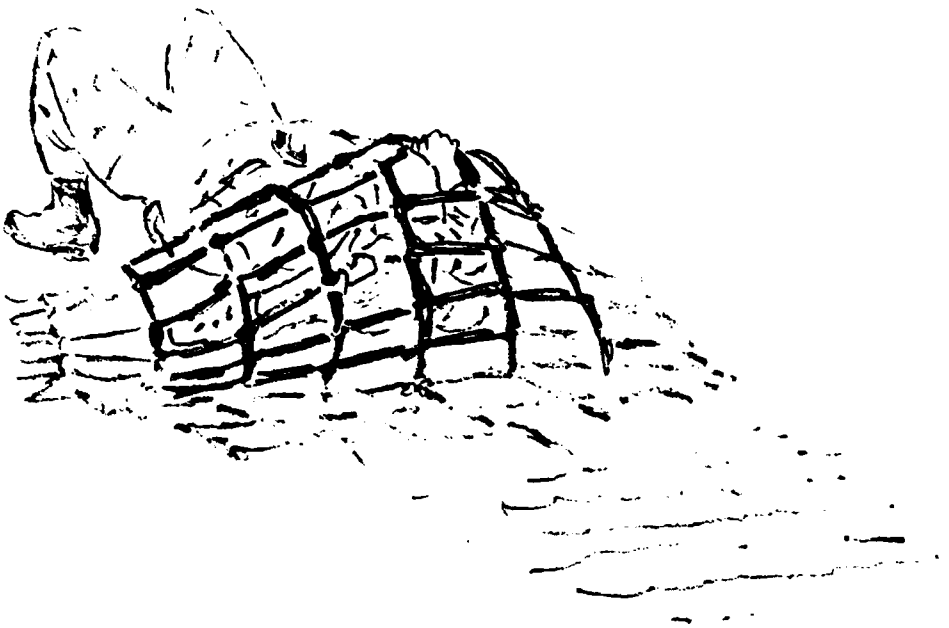


Figure 10a

Crawl on back under net.

Figure 10b

Shaded area indicates region of high wear from crawling on back under net.

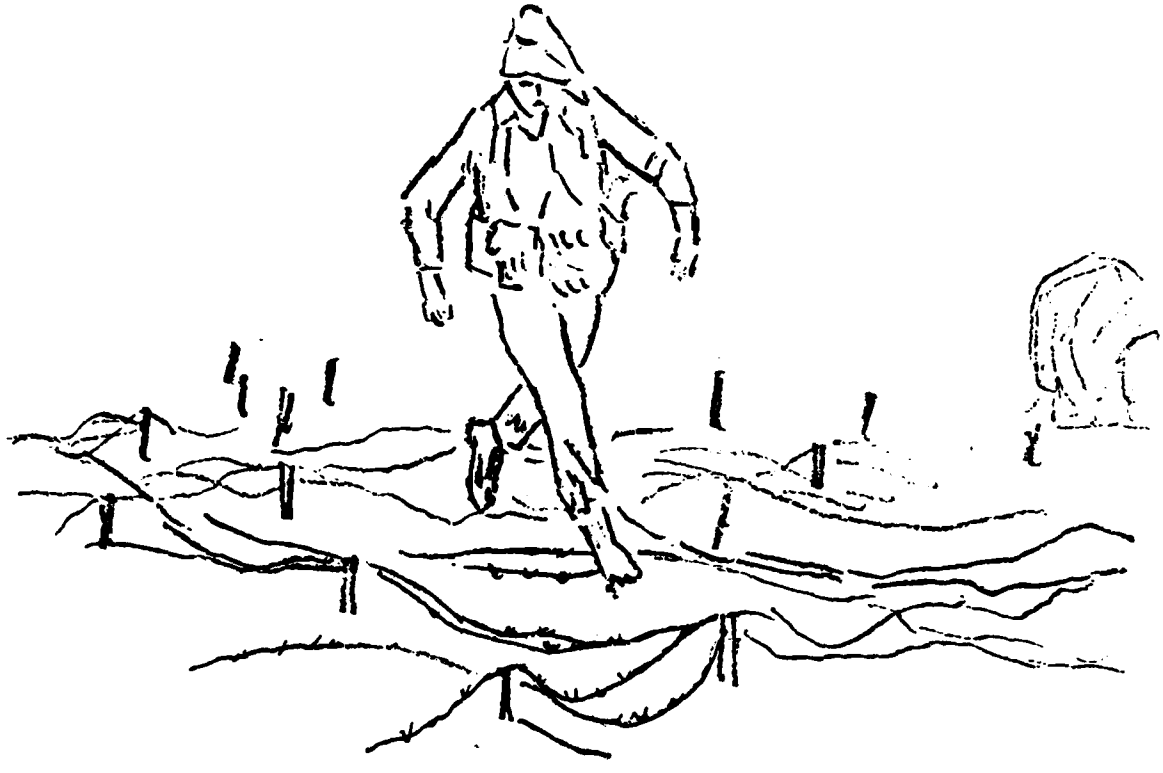


Figure 11

Run through barbed wire hazards

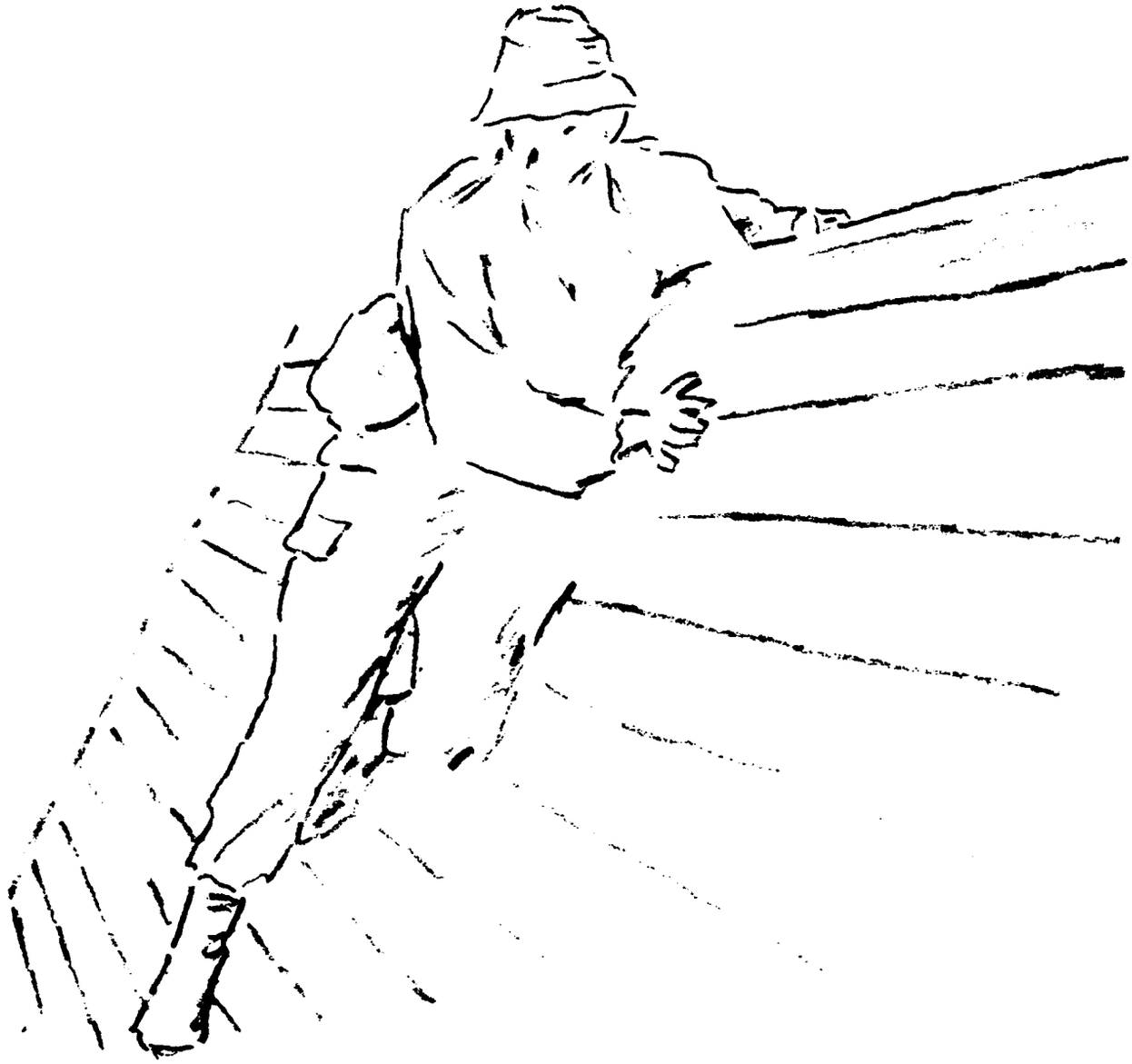


Figure 12

Slide down angled wooden ramp.

Figure 13

Slide over rock barrier.

ANNEX B

QUESTIONNAIRE ON THE SUITABILITY OF COMBAT UNIFORM FABRIC

The aim of this test is to help in the choice of a new combat uniform material. The colour of the material is not under test. Your trial uniform should be similar in fit to standard combat uniforms. Please do not comment upon either the colour or the size of your trial uniforms.

Your comments about the comfort of the fabric in each uniform will be considered when the new fabric is selected. Please complete one questionnaire as soon as possible after each uniform has been trialled. Thank you for your help in running this trial.

Name ..... Rank .....

Number .....

THIS FORM RELATES TO UNIFORM NUMBER: I II III (circle answer)

1. Overall, was the uniform comfortable?

1	2	3	4	5
(yes, extremely comfortable)		(OK)		(no, extremely uncomfortable)

have you any additional comments on overall comfort:

2. Did the shirt make you feel too hot?

1	2	3	4	5
(yes)		(comfortable)		(too cold)

Comments:

3. Did the trousers make you feel too hot?

1	2	3	4	5
(yes)		(comfortable)		(too cold)

Comments:

/ 4. Did

4. Did the shirt absorb enough perspiration?

1	2	3	4	5
(yes, it was very good)		(OK)		(no, it was very poor at absorbing sweat)

Comments:

5. Did the trousers absorb enough perspiration?

1	2	3	4	5
(yes, it was very good)		(OK)		(no, it was very poor at absorbing sweat)

Comments:

6. Did the shirt feel heavy when it was wet?

1	2	3	4	5
(yes, much too heavy)		(OK)		(no, it felt light)

Comments:

7. Did the trousers feel too heavy when wet?

1	2	3	4	5
(yes, much too heavy)		(OK)		(no, they felt light)

Comments:

/ 8. Did

8. Did the shirt dry quickly when wet?

1	2	3	4	5
(yes, very quickly)		(OK)		(no, it dried very slowly)

Comments:

9. Did the trousers dry quickly when wet?

1	2	3	4	5
(yes, very quickly)		(OK)		(no, dried very slowly)

Comments:

10. Did the shirt rub or chafe your skin?

1	2	3	4	5
(yes, a lot)		(just a little)		(not at all)

Comments:

11. Did the trousers rub or chafe your skin?

1	2	3	4	5
(yes, a lot)		(just a little)		(not at all)

Comments:

/ 12. Do

12. Do you think the shirt would wear out quickly?

1	2	3	4	5
(yes, too quickly)		(its OK)		(no, it would last a long time)

Comments:

13. Do you think the trousers would wear out quickly?

1	2	3	4	5
(yes, too quickly)		(they are OK)		(no, they would last a long time)

Comments:

14. Would you be pleased if this shirt fabric is used in the new combat shirt?

1	2	3	4	5
(yes)		(don't care)		(no, it would be awful)

Comments:

15. Would you be pleased if this trouser fabric is used in the new combat trousers?

1	2	3	4	5
(yes)		(don't care)		(no, that would be awful)

Comments:

16. Have you any more comments about the fabric?

17. Have you any comments about the accelerated wear trial?

1	2	3	4	5
(good to be involved in uniform selection)		(it was OK)		(it was bad, for reasons given below)

ANNEX C

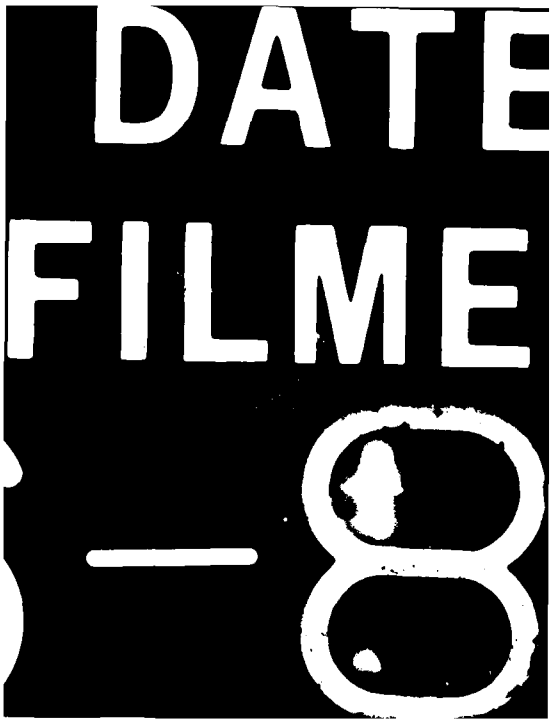
DETAILS OF FABRICS FOR ACCELERATED WEAR COURSE

SHIRTS

Uniform Fabric No	Manufact	Sample No	Quality No	Weave	Weight gm/m^2
1	Bruck	1	5744/2	Oxford	165
2	Bruck	2	5688/1	2 x 1 Twill	176
3	Bruck	4	5687/1	3 x 1 Twill	185
4	Bruck	6	5745/1	2 x 1 Twill	229
5	Actil	1+2	489/472	Plain	190
6	Actil	3	AG197/1	2 x 1 Twill	220
7	Actil	7	725	2 x 1 Twill	220
8	Actil	8	443A	2 x 1 Twill	230

TROUSERS

Uniform Fabric No	Manufact	Sample No	Quality No	Weave	Weight gm/m^2
1	Bruck	3	G11137/1	2 x 1 Twill	259
2	Bruck	5	G11137	3 x 1 Twill	225
3	Bruck	7	G11137/5	Plain	235
4	Bruck	8	G11137/9	3 x 1 Twill	225
5	Actil	4	AE197/4	2 x 1 Twill	242
6	Actil	5	728/147	3 x 1 Twill	225
7	Actil	6	AE197/5	2 x 1 Twill	261
8	Actil	9	443B	2 x 1 Twill	240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