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Aircraft Evacuation Tests - An Initial Assessment of the Influence of Various Aisle Configurations and Lighting Conditions Under Different Evacuation Scenarios

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by

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16. Abstract

This report details an experimental programme of research investigating the influence of changes to the aisle configuration and interior/exterior lighting on the rate at which passengers could evacuate the aircraft. The configurations evaluated involved a conventional single, straight aisle and an aisle with a “jog” or “kink”.

In order to reproduce the urgency that can occur in an emergency, incentive payments were used to motivate the participants. The two protocols that were used involved competitive and co-operative evacuations.

The evacuations were documented using video cameras that had internal time bases. These provided information on the time taken for each individual to evacuate and the order in which the participants disembarked. This information together with questionnaire data will be available for the development and validation of emergency egress models.

Test results indicated that in both of the evacuation scenarios used for the tests, an optimum condition for the rapid evacuation of passengers involves a straight aisle and good internal and external lighting conditions.

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16. Résumé

Le présent rapport explique en détails un programme expérimental de recherche sur l'influence que peuvent avoir des modifications de configuration de couloirs et d'éclairage intérieur/extérieur sur la vitesse à laquelle il est possible d'évacuer les passagers d'un avion. Les configurations évaluées portaient sur un simple couloir en ligne droite et sur un couloir avec un «coude».

Pour pouvoir recréer la réalité d'une situation d'urgence, on a accordé un montant incitatif aux participants pour les encourager à bien jouer leur rôle. L'évacuation faisait appel à deux protocoles : le «sauve-qui-peut» et le coopératif.

Les deux modes d'évacuation ont été filmés à l'aide de caméras vidéo équipées de bases de temps. On a pu ainsi obtenir de l'information sur la durée des évacuations individuelles et sur l'ordre dans lequel les participants ont quitté l'appareil. Cette information jointe aux données recueillies par questionnaire permettront d'élaborer et de valider des modèles d'évacuation d'urgence.

Les résultats des tests indiquent, dans les deux scénarios utilisés pour les tests, qu'une des conditions optimales pour l'évacuation rapide des passagers repose sur des corridors en ligne droite et sur un bon éclairage à l'intérieur comme à l'extérieur de l'appareil.

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SUMMARY

Cranfield University was requested by the Transportation Development Centre to conduct an experimental programme of research into passenger behaviour in aircraft emergencies. The objective was to investigate the influence of changes to the aisle configuration and interior/exterior lighting on the rate at which passengers could evacuate the aircraft. The configurations evaluated involved a conventional single, straight aisle and an aisle with a "jog" or "kink".

Participants were recruited from the public in groups of approximately 60, to perform a series of emergency evacuations. In order to reproduce the urgency which can occur in an emergency, incentive payments were used to motivate the participants. The two protocols which were used involved competitive and co-operative evacuations. On half of the test days the participants performed four trials involving the competitive protocol. During the other tests, participants performed four trials involving the co-operative protocol. In the competitive evacuations, an incentive payment of £5 was made to the first 75% of participants to evacuate the aircraft. If everybody on board evacuated within a target time in the co-operative evacuations, each participant received an incentive payment of £2.50. A total of 463 participants took part in the evacuations, and a narrow-bodied aircraft cabin simulator in the College of Aeronautics at Cranfield was used for the programme.

The evacuations were documented using video cameras which had internal time bases. These provided information on the time taken for each individual to evacuate and the order in which the participants disembarked.

The results indicated that in both of the emergency scenarios used for the tests, an optimum condition for the rapid evacuation of passengers involves a straight aisle and good internal and external lighting conditions. The results suggested that the introduction of a "jog" in the aisles can lead to blockages and a reduction in the mean evacuation rate, particularly in a competitive scenario. The effect appears to be even greater in conditions of darkness. Further testing will be required to quantify the influence of an aisle "jog" and darkness on the evacuation rate. This information together with questionnaire data will be available for the development and validation of egress models.

SOMMAIRE

Le Centre de développement des transports a demandé à l'Université Cranfield de mener un programme expérimental de recherche sur le comportement des passagers dans les situations d'urgence à bord d'avions. Il s'agissait d'analyser l'influence des modifications de configuration de couloirs et de conditions d'éclairage intérieur et extérieur sur la vitesse à laquelle les passagers peuvent évacuer un avion. Les configurations évaluées comportaient un couloir classique en ligne droite et un couloir coudé.

Les participants ont été recrutés dans le grand public, par groupes d'environ 60 personnes, pour simuler une série d'évacuations d'urgence. Pour pouvoir recréer la réalité d'une situation d'urgence, on a accordé un montant incitatif aux participants pour les encourager à bien jouer leur rôle. L'évacuation faisait appel à deux protocoles : le «sauve-qui-peut» et le coopératif. Pendant la moitié des journées-test, les participants ont effectué quatre essais dans le cadre du protocole «sauve-qui-peut». Au cours des autres tests, les participants ont effectué quatre essais de type coopératif. Pour les évacuations en «sauve-qui-peut», on a accordé un montant incitatif de £5 aux quelque 45 premiers participants (75 %) à évacuer l'avion. Si, dans le cadre du protocole coopératif, tout le monde évacuait l'appareil dans les temps prescrits, chaque participant recevait un montant incitatif de £2.50. Un total de 463 participants a participé aux exercices d'évacuation d'une maquette grandeur réelle cabine d'avion à fuselage étroit au College of Aeronautics à Cranfield.

Les exercices d'évacuation ont été enregistrés sur systèmes vidéo, lesquels étaient équipés de bases de temps. C'est ainsi qu'on a pu obtenir des données sur le temps d'évacuation de chaque personne et sur l'ordre dans lequel les participants ont quitté l'appareil.

Dans les deux scénarios d'urgence utilisés pour faire les tests, les résultats indiquent que le couloir en ligne droite et de bonnes conditions d'éclairage intérieur et extérieur figurent parmi les conditions optimales d'évacuation rapide des passagers. Ces mêmes résultats laissent croire que l'introduction d'un «coude» dans les couloirs peut entraîner des blocages et une réduction de la vitesse moyenne d'évacuation, surtout dans le cas du scénario «sauve-qui-peut». L'effet semble être plus grave dans l'obscurité. D'autres tests seront requis pour quantifier l'influence d'un «coude» de couloir et de l'obscurité sur la vitesse d'évacuation. Cette information jointe aux données recueillies par questionnaire permettront d'élaborer des modèles de validation et d'évacuation d'urgence.

CONTENTS

APPENDICES

LIST OF TABLES

1. INTRODUCTION

The regulatory authorities need to be confident that when a new aircraft is developed (or a change is made to an existing aircraft), all of the passengers can be evacuated quickly and safely in the event of an emergency. In recent years the "90 second" certification evacuation, used for this purpose, has encountered difficulties because:

A) Accidents have shown that problems, such as congestion at exits do occur; which were not predicted from the certification demonstration evacuation, and

B) The injury rate incurred during the evacuation demonstrations has given rise to criticism.

Due to the difficulties associated with the certification test there is a need to develop a testing programme in which the following can be achieved:

A) The simulated behaviour is such that it will allow the regulators to be confident that no aspect of the cabin configuration or emergency procedures will seriously hinder the evacuation of passengers in an emergency.

B) Standard protocols are developed and agreed upon which can be used for evacuation testing in the future. These will enable the data to be pooled and new criteria developed (e.g. aisle widths).

C) The data from the tests are collected in such a way that they can be used for the development and validation of computer evacuation simulation models.

D) A long term objective will be to use computer egress models to limit the need for human testing although, from time to time, some retesting will be required for validation purposes.

E) The injury rate associated with evacuation certification demonstrations can be reduced (from time to time there will inevitably be injuries associated with any human testing programme, but their severity potential should be limited).

It is envisaged that, in order to reduce the injury rate, certification evacuations and much of the testing work in the future will involve tests in which passengers exit the aircraft onto platforms rather than using slides. Specific and detailed data is therefore required on passenger behaviour and performance when transiting from their seat to the exit in different cabin configurations and evacuating onto slides, under various lighting conditions and under different emergency evacuation scenarios.

Previous tests involving members of the public evacuating from a 737 simulator onto slides, conducted as part of a major programme investigating the influence of cabin crew performance and exit availability on evacuation rate, have provided valuable baseline data on the behaviour and performance of passengers under "bright" cabin lighting conditions and several seating configurations (Ref. 1). Additional data is needed to further quantify such behaviour and allow the determination of the differences due to various light conditions, different configurations and various emergency evacuation scenarios.

The Department of Applied Psychology at Cranfield University was commissioned by Transport Canada to conduct a programme of research into emergency evacuations. The general objective of the programme was to provide the regulatory authorities with the data required to develop and improve transport category aeroplane emergency evacuation standards. Broadly, it was intended to provide data to support the development of alternative conditions for demonstrating compliance with the "90 second" certification evacuation demonstration requirement, and to allow the further evolution and validation of the passenger emergency evacuation computer simulation models presently being developed.

At the initiation of the investigation Transport Canada indicated that their requirement was for an experimental programme which would provide information relating to the behaviour of passengers evacuating an aircraft as follows:

A) The influence of changing the configuration of the aisle from a straight aisle to one with a "jog" on the time taken for passengers to evacuate the aircraft.

B) The extent to which the lighting conditions both within the cabin and externally would affect passengers' evacuation time.

C) The effect of different emergency scenarios (competitive or co-operative) on the time taken for passengers to evacuate the aircraft.

A brief description of Cranfield University and the project staff may be found in Appendix J. Appendix K contains the quality control procedures including an organisational chart, the project organisational chart, the safety plan for organisational and procedural safety, and the procedures for external audit.

2. METHODOLOGY

In the assessment of any facilities or procedures to be used by members of the public in an emergency, the major dilemma is how to introduce a realistic test without putting people at serious mental or physical risk. Researchers in the UK (at Cranfield) had already pioneered techniques which the regulators believe had the potential to provide both the behavioural and statistical data required for the assessment of design options or safety procedures for use in emergency evacuations. These techniques maximise the degree of realism permissible in test conditions (Ref. 1), and they were used for the evacuation testing.

In order to simulate the urgency which can lead to passengers pushing towards exits in order to evacuate quickly, two techniques were used, representing two emergency evacuation scenarios. The first technique involved offering incentive payments to the first 75% of the passengers to exit the aircraft: *competitive scenario.* The second technique involved making bonus payments to all of the passengers if they all evacuated within 60 seconds: *co-operative scenario.* These techniques were developed in the UK and have been found to produce reliable data.

The programme involved nine independent groups of participants each taking part in four evacuations. The first test day was used as a pilot in order to check procedures and the various variables under investigation. The tests were conducted from a narrow bodied cabin simulator (B737-200) configured to the current regulations (with exits which were typical of those used on actual aircraft (see Appendix A for details)). Each test involved the evacuation of a target of 60 volunteer passengers seated in the aft section of the simulator, through both the rear floor level exits and down evacuation slides. Previous testing programmes at Cranfield had demonstrated that in order to maximise the opportunities for data collection each individual group of participants could successfully take part in up to four evacuations in one session.

The participants were recruited by local advertising and told that they would be paid a £10 attendance fee after they had completed four evacuations. Although the participants were told that they would be required to take part in evacuations from a simulator, they were not given any information about the procedures or configurations under review, or the order in which the evacuations were to be performed. The participants were instructed that their task was to evacuate as quickly as possible, once the exits had been opened by the cabin crew. The incentive techniques developed by Cranfield were used: during five test days (one pilot test and four test days) bonus payments of £5 were offered to the first 75% of participants through the exits used (competitive); on the other four test days bonus payments of £2.50 were paid per evacuation to all of the participants if they all evacuated within 60 seconds (co-operative).

The bonus payments were made immediately after each evacuation in the competitive trials and after the first two evacuations and last two evacuations in the co-operative trials. Seating plans were developed for the participants for the four successive evacuations from the

aircraft on each test day, which gave every participant an equal chance of receiving the monetary incentive. Participants were not allowed to take part in a test session on more than one occasion.

Each independent group performed each of the following evacuations (Appendix B shows the counterbalanced order):

A) A straight aisle with normal lighting both inside and outside the cabin.

B) A straight aisle with emergency lighting inside the cabin and dark of night conditions outside (see Appendix C for specific lighting conditions).

C) A joggled aisle with normal lighting both inside and outside the cabin.

D) A joggled aisle with emergency lighting inside the cabin and dark of night conditions outside (see Appendix C for specific lighting conditions).

In all of the tests two cabin crew members were present and adopted assertive behaviour (assertive behaviour included calling participants to exits, clearing blockages occurring at the bulkhead and pushing them through exits as rapidly as possible in a highly active manner). In order to accomodate differences in levels of assertiveness, the exit which cabin crew members operated was counterbalanced during the test programme.

The safety of participants was an important consideration. To this end, only participants who claimed to be reasonably fit, were between the ages of 20-50, and weighed less than 15 stone (for men) or less than 12 stone (for women) were recruited. On arrival all of the participants were given a medical examination. Demographic and psychological information relating to each participant and all of the cabin crew was collected. In addition, they were also asked to complete a questionnaire indicating that (i) they had fully understood the purpose of the tests, (ii) the medical information which they had supplied was correct and (iii) that they were satisfied with the insurance cover. A doctor and members of the airfield fire service were present to assist participants at the bottom of the slides. A system of alarms was available to stop any evacuations should a real emergency occur or should there be concern for the safety of any participant. Prior to boarding the cabin simulator, the participants were given a briefing by Professor Muir on all safety aspects, how the trials would run and how to use the evacuation slides. A transcript of this briefing can be found in Appendix D.

In order to introduce as much realism as possible, on their arrival at the 737 simulator the participants were met by members of the research team trained in emergency evacuation techniques and dressed as cabin crew. After boarding the simulator, they were given a modified pre-flight briefing by the cabin crew (see Appendix E for safety card), and they then heard a recording of an aircraft starting up, taxiing to a runway and taking off. This sequence of recording was varied using one of four scenarios (see Appendix F) but included the simulated sounds of an aborted take-off and a period of silence in which time the pilots were supposedly carrying out the shut-down of engines and liaising with the cabin crew. The

variation reduced the possibility of the participants anticipating the precise time at which the call to evacuate would be given. On the command "Undo your seat belts and get out" (time 0.00 secs), the two rear exits were opened by the cabin crew and the participants evacuated down the slides. Airfield fire crew were located at the bottom of each slide to assist participants to move away quickly.

Video cameras with time bases were used for the recording of the behaviour of the participants and the evacuation times. White cotton vests were worn by participants during the evacuation so that it was possible to identify individual participants on the video recordings and to be aware of their seat location prior to the evacuation. Each vest was painted with the number of the seat which the participant had been allocated for that evacuation.

After each evacuation all of the participants were required to complete a questionnaire commenting on various aspects of their evacuation (Appendix G). Before participants left the site they were given a debriefing in which they were reminded of the safety of air travel and advised that they should get back in touch with Cranfield if they experienced any physical or emotional problems as a result of participating in the evacuations. At the end of the test programme the participants were invited to return to Cranfield to attend a lecture about the work in which they participated. Further details of the background and methodology may be found in Ref. 2.

3. RESULTS

3.1 Pilot Test

A pilot test was carried out in order to check that the experiments, procedures and equipment would enable the variables under investigation to be evaluated. In the pilot test a group of 56 participants took part in four competitive evacuations. The data was not used in the final analysis but can be seen below in Table 1 (raw data can be found in Appendix J). These evacuation rates include exit preparation time. The first evacuation, which was in darkness, was abandoned because the procedure which had been developed for the issue of bonus tickets caused congestion at the bottom of the left slide. At the start of the third evacuation the operation of the exits was delayed because one of the cabin crew was not at the crew jump seat when the evacuation began. By the time she reached the exits, participants had attempted to open the exits but failed, consequently the egress rate for this evacuation was slow. Following this pilot test the interior and exterior lighting levels were set and minor alterations were made to the logistics of participant direction at the bottom of the slides. The four evacuations carried out in the pilot test were therefore replicated in test eight so that the procedures and lighting were the same in all of the tests used for analysis.

Table 1 Evacuation times and rates for pilot evacuations

	Last participant receiving bonus payment - Time in seconds	*Mean evacuation rate for each participant*
Evacuation 1 Jog aisle, dark lighting conditions	Abandoned	Abandoned
Evacuation 2 Straight aisle, dark lighting conditions	37.16	0.88
Evacuation 3 Straight aisle, bright lighting conditions	38.44	0.92
Evacuation 4 Jog aisle, bright lighting conditions	32.00	0.76

3.2 Test Programme

The test programme involved 8 test days. On each test day a group of participants from the public took part in 4 simulated emergency evacuations. A total of 407 participants took part in the tests. The number of participants on any test day ranged between 44 and 54 with the average being 51. Sixty-four percent of the participants were male. The final data base used

for analysis included information from 29 evacuations. A number of evacuations were halted because the conditions in the cabin became so extreme that there was a risk of participants becoming injured (details in Appendix H). None of the evacuations were halted in the co-operative payment scheme trials but in the competitive payment trials three evacuations were halted.

Table 2 Number of evacuations

Cabin Conditions	*Number of evacuations*			
	Competitive		*Co-operative*	
	Completed	*Halted*	*Completed*	*Halted*
Straight aisle, bright lighting conditions	4		4	
Straight aisle, dark lighting conditions	3	1	4	
Jog aisle, bright lighting conditions	3	1	4	
Jog aisle, dark lighting conditions	3	1	4	

3.3 Competitive Evacuations

Participants flow rates through the exits were obtained from the video recordings. The camera's internal time base and audio recordings provided information on the time taken for each individual to evacuate and the order in which they disembarked. An individual's time to evacuate the aircraft was calculated from the command "Undo your seat belt, and get out" to when they had reached the bottom of the evacuation slide.

The evacuation rates have been calculated using the time for the last participant who received a bonus payment to reach the ground. Since bonus payments were only available to the first 75% of participants and there were approximately 60 participants on the aircraft it was assumed that some of the participants coming out after this point would not be competing. For this reason their data were not included in the analysis. The mean evacuation rates, that is, the average time that it took each individual to evacuate from the simulator, can be seen in Table 3. These rates include exit preparation time.

Table 3 Competitive evacuations - mean evacuation rates for each participant (time in seconds)

Cabin conditions	*Last participant receiving bonus payment*	*Mean*	*S.D*	*E/N*
Straight aisle, bright lighting conditions	30.50	0.79	0.05	4
Straight aisle, dark lighting conditions	49.37	0.85	0.14	3
Jog aisle, bright lighting conditions	49.07	0.82	0.05	3
Jog aisle, dark lighting conditions	51.66	0.91	0.097	3

SD = Standard deviation associated with the mean
E/N = number of evacuations included in the analysis

The raw evacuation times can be found in Appendix I.

Although the mean evacuation rates suggest a difference, no significant effects on total participant evacuation time due to either lighting or aisle configuration were found ($F_{1,9}$ = 2.19 NS, $F_{1,9}$ = 0.92 NS respectively). If all of the tests in each condition had been successfully completed, or the test programme extended, a significant difference due to lighting and aisle configuration may have been found.

3.4 Co-operative Evacuations

The evacuation rates have been calculated using the time for the last person to evacuate the aircraft.

Table 4 Co-operative evacuations - mean evacuation rates for each participant (time in seconds)

Cabin conditions	*Last participant receiving bonus payment*	*Mean*	*S.D*	*E/N*
Straight aisle, bright lighting conditions	37.73	0.79	0.02	4
Straight aisle, dark lighting conditions	38.89	0.81	0.03	4
Jog aisle, bright lighting conditions	39.92	0.83	0.04	4
Jog aisle, dark lighting conditions	39.92	0.89	0.05	4

SD = Standard deviation associated with the mean
E/N = number of evacuations included in the analysis

In the co-operative evacuations a significant difference was found between the evacuation rates as a function of aisle configuration and level of lighting ($F=4.52$ df 1,12 <0.05 and $F=12.14$ df 1,12 <0.005 respectively). The mean evacuation rates clearly showed that participants took longer to evacuate when there was a jog in the aisle or when there was only emergency lighting available.

4. DISCUSSION

4.1 Evaluation of the Test Procedure

The research clearly demonstrated that the bonus payment techniques can be used to simulate the range of behaviour which may occur in an aircraft emergency in which an evacuation is required.

The video recordings provided a valuable insight into the behaviour which can occur during an emergency evacuation. In the competitive tests the aisles and area in front of the bulkhead frequently became blocked by the number of people trying to pass through the narrow aperture between the bulkhead at the same time. The cabin crew often had to work extremely hard pulling participants out from this area, a result clearly indicating the importance of cabin crew being trained to adopt assertive behaviour in an emergency.

4.2 Competitive and Co-operative Tests

The results from both the competitive and co-operative tests suggest that passengers are able to evacuate with the greatest speed when the aisle is straight and the level of lighting is equivalent to that of normal daytime conditions. It is interesting that not only are the mean evacuation rates shortest for this condition, but that in the competitive evacuations this was the only condition in which it did not become necessary to halt an evacuation. Although in the competitive condition the results from the four conditions were not significantly different, the mean suggested that further testing would lead to the achievement of a significant difference due to the conditions.

The mean evacuation times from both the competitive and co-operative evacuation tests clearly suggest that the introduction of a jog in the aisle reduces the rate at which participants can evacuate the aircraft. The fact that participants take longer in darkness lends support to the practice of conducting certification evacuations in conditions of darkness or, alternatively, suggests the need to introduce appropriate “factors” if these are performed under different lighting conditions.

The fact that the effect of an aisle jog and darkness appear to be cumulative in that when combined they lead to an even greater increase in evacuation times has serious implications for safety. Further work would be required to confirm this result and also to explore the extent to which aspects of the cabin configuration which have been shown to be satisfactory in daytime conditions would also be satisfactory in conditions of darkness.

The result also raises the question of whether, when aircraft are to be certificated by partial testing and analysis, consideration should be given to the inclusion of conditions of darkness or the introduction of appropriate factors.

The detailed analysis of the video recordings and the questionnaire data will enable information to be obtained on the factors influencing the behaviour and performance of passengers leaving their seats and transiting to an exit and passengers traversing from an exit sill area onto a slide. The analysis will also provide new information for the validation of computer evacuation simulation models.

5. CONCLUSIONS

A) The results indicate that an optimum condition for a rapid evacuation rate involves a straight aisle and good internal and external lighting conditions.

B) The preliminary results suggest that the introduction of a "jog" in the aisle can lead to both blockages on occasions and a reduction in the mean evacuation rate, particularly in a competitive scenario. The effect appears to be even greater in conditions of darkness. Further testing will be required to quantify the influence of an aisle "jog" and darkness on the evacuation rate.

C) The fact that conditions of darkness seem to lead to a reduction in the evacuation rate in both competitive and co-operative scenarios requires further exploration since this may have implications for the procedures used in any partial tests for aircraft certification.

D) The fact that the influence of aisle "jog" and darkness appear to be cumulative suggests that further work is required to determine the extent to which these and other changes to the cabin configuration and environmental conditions are cumulative.

E) Further testing should be undertaken to determine whether improved emergency lighting in the cabin and at the exits could increase the speed at which passengers are able to evacuate the aircraft.

F) Further detailed analysis of the video and questionnaire data will provide information on the factors influencing the performance of individual passengers from the range of seating locations tested.

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2. Muir, H. Marrison, C. & Evans A. “Aircraft evacuations: the effect of passenger motivation and cabin configuration adjacent to the exit”, Civil Aviation Authority, CAA Paper 89019, 1989.

CONTRIBUTORS TO THE RESEARCH

The programme was initiated and funded by Transport Canada (Mr C. Lewis, Airworthiness Branch and Mr R. Nishizaki, Transportation Development Centre) and also supported by the U.K. Civil Aviation Authority.

Dr. H. Muir, from the Department of Applied Psychology, was responsible for the management of the project.

Ms. A. Cobbett, from the Department of Applied Psychology, was responsible for the majority of the implementation of the evacuation programme and the analysis of the experimental data.

Dr. D. Harris and Mr. J. Morley, from the Department of Applied Psychology, and Mr. B. Walker from the College of Aeronautics laboratory were responsible for the operation of all the video, audio and electrical equipment.

Mrs. P. Forest-Holden and Mrs. A. Soden were responsible for recruitment and test day administration.

Ms. K. Dennis & Miss S. Stear, who along with Ms A. Cobbett, fulfilled the roles of the flight attendants.

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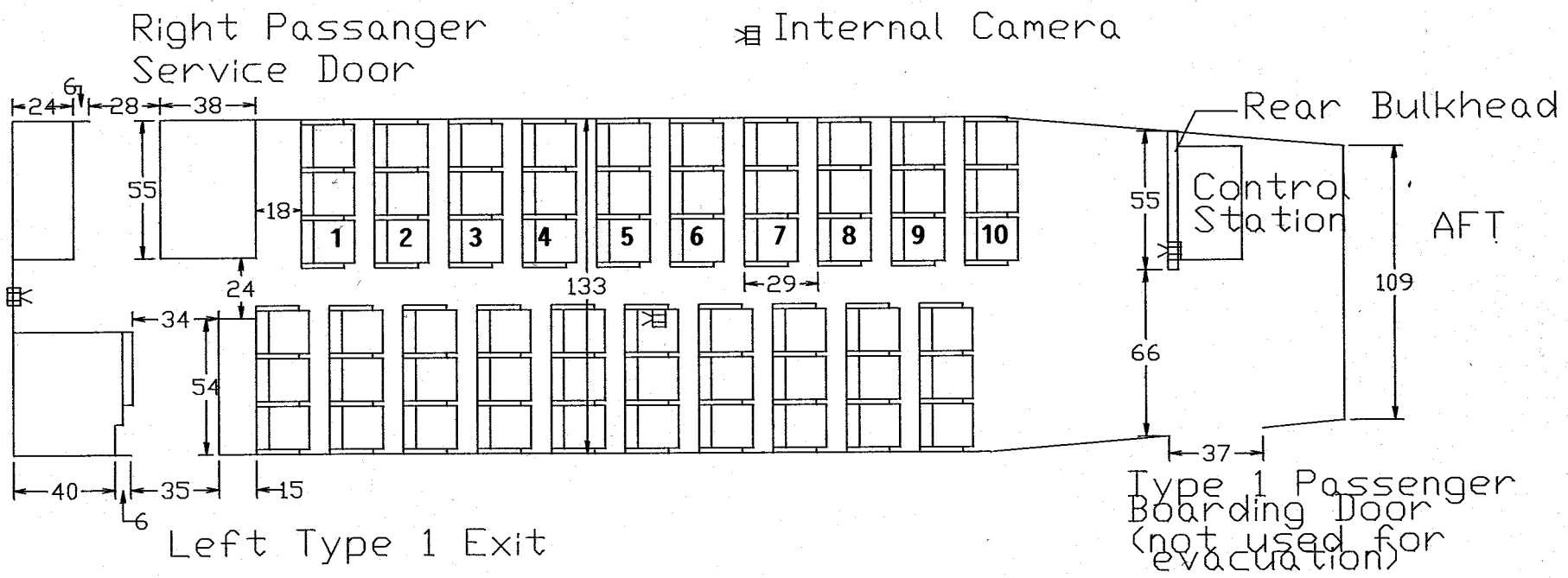
APPENDICES

APPENDIX A

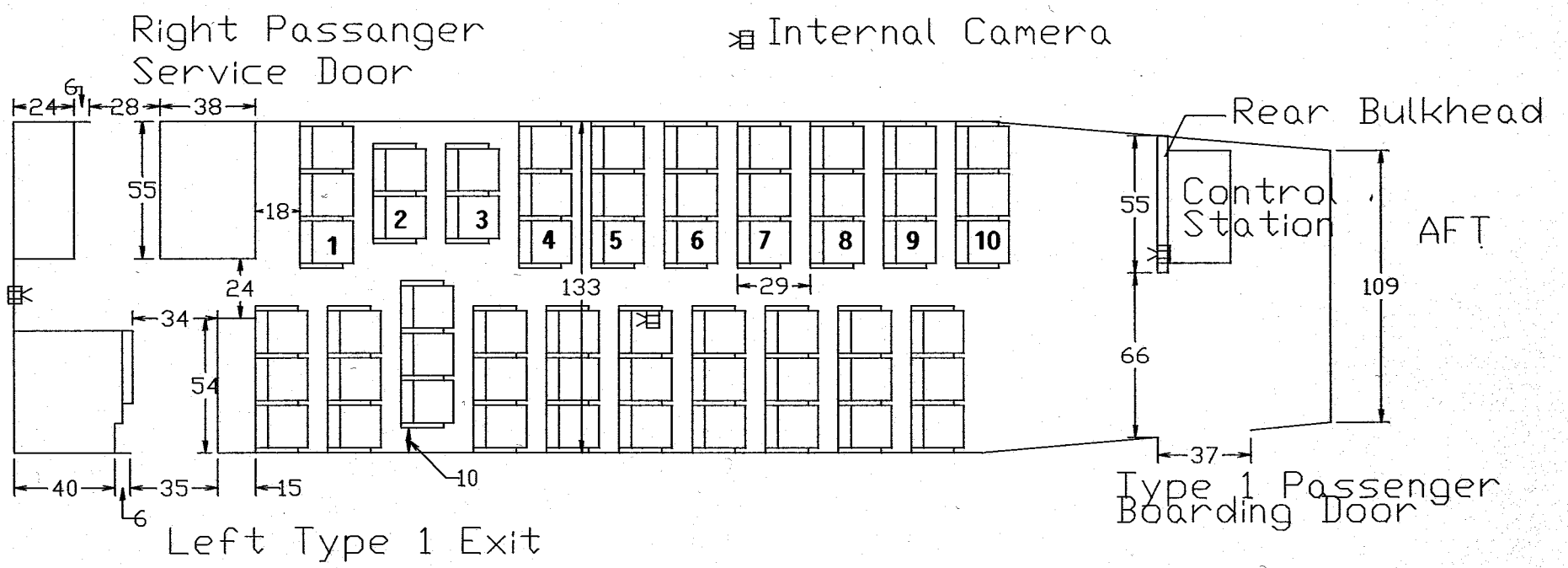
Plans of Boeing 737-200

Plan View of Boeing 737-200 Cabin Simulator - Straight Aisle Configuration
Plan View of Boeing 737-200 Cabin Simulator - Jog Aisle Configuration
Side Views of Boeing 737-200 Cabin Simulator - Exit Doors
Plan View of Evacuation Slide

Plan View of Boeing 737-200 Cabin Simulator
Straight Aisle Configuration

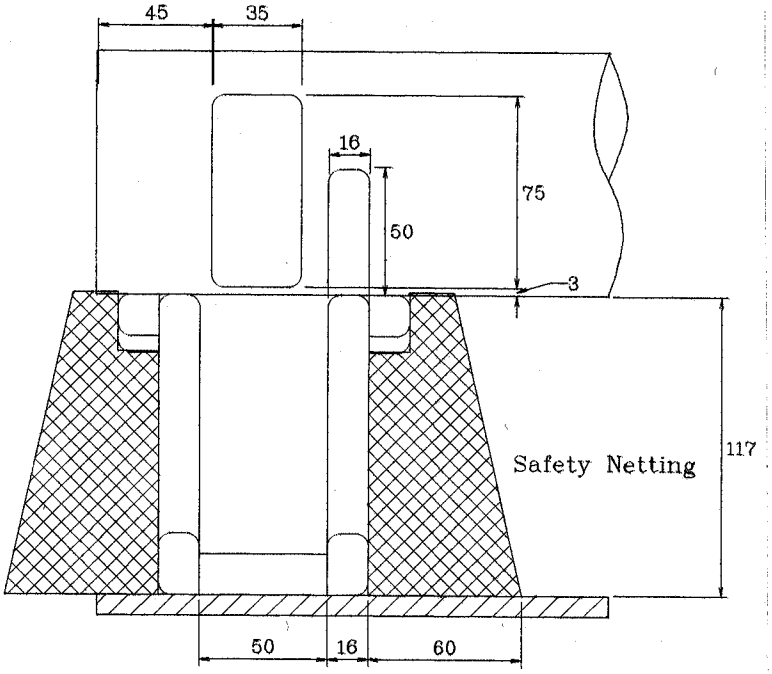


Plan View of Boeing 737-200 Cabin Simulator
Joggled Aisle Configuration

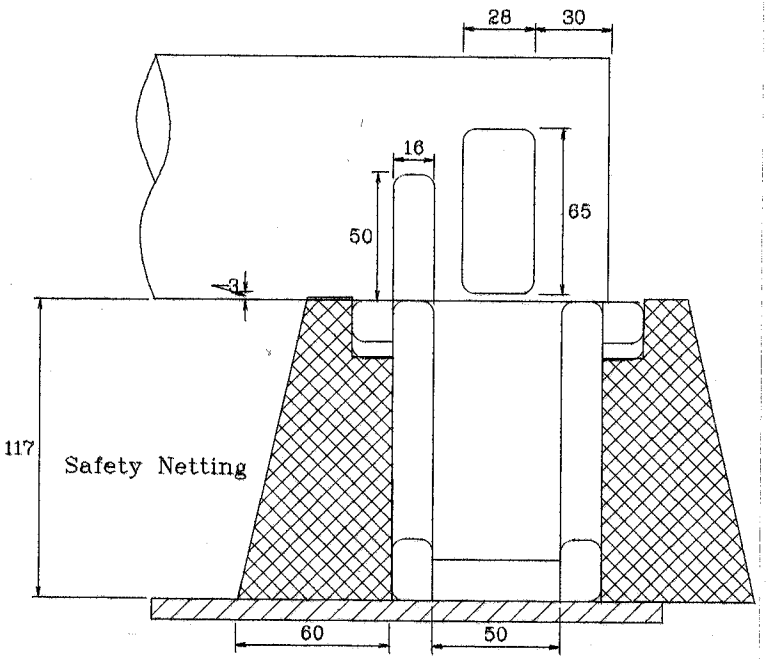


Side Views of Boeing 737-200 Cabin Simulator Exit Doors

Passenger Boarding Door (Type 1 Exit)

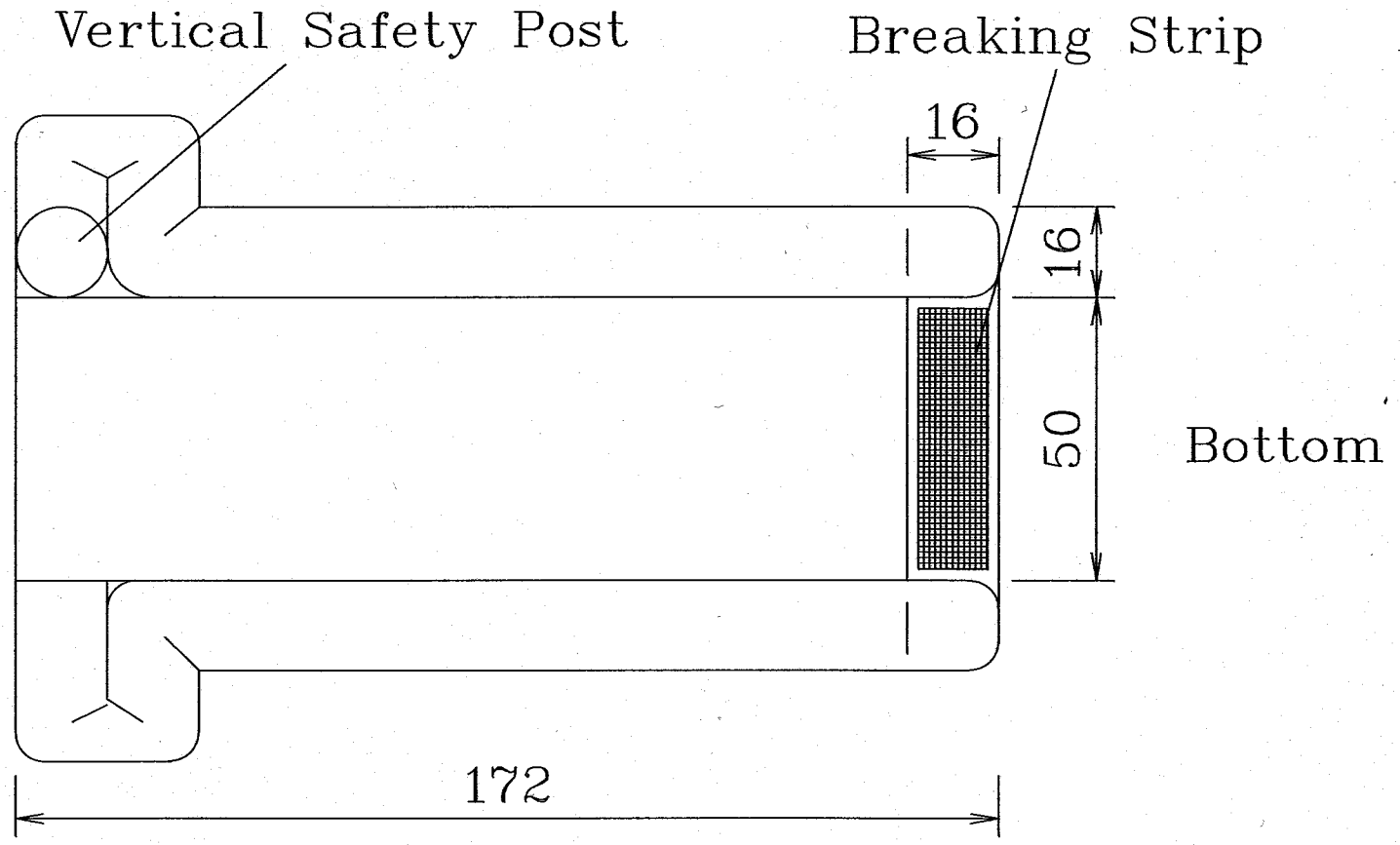


Passenger Service Door (Type 1 Exit)



N.B. All dimensions are in inches

Plan View of Evacuation Slide



All Dimensions in inches

APPENDIX B

Counter Balanced Trial Order

Counter Balanced Trial Order

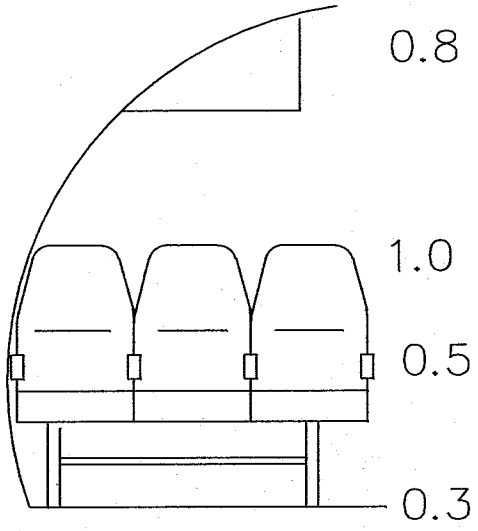
	Payment	Trial 1	Trial 2	Trial 3	Trial 4
Pilot test	Comp	Jog dark	Strt dark	Strt light	Jog light
Day One	Comp	Strt dark	Strt light	Jog light	Jog dark
Day Two	Co-op	Jog dark	Strt dark	Strt light	Jog light
Day Three	Co-op	Strt dark	Strt light	Jog light	Jog dark
Day Four	Comp	Jog light	Jog dark	Strt dark	Strt light
Day Five	Co-op	Jog light	Jog dark	Strt dark	Strt light
Day Six	Comp	Strt light	Jog light	Jog dark	Strt dark
Day Seven	Co-op	Strt light	Jog light	Jog dark	Strt dark
Day Eight	Comp	Jog light	Strt light	Strt dark	Jog dark

APPENDIX C

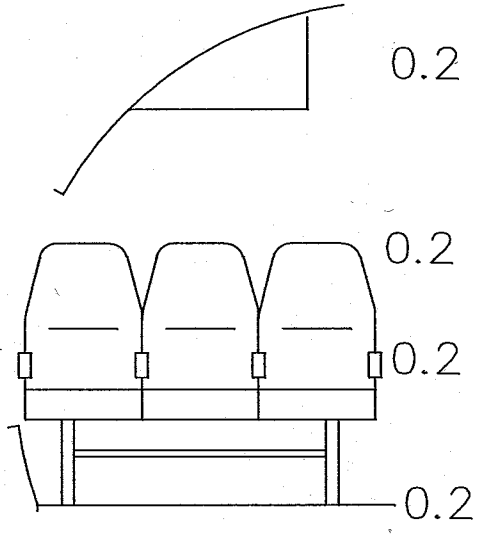
Evacuation Lighting Information
(All measurements are in lux)

Cabin Lighting Information

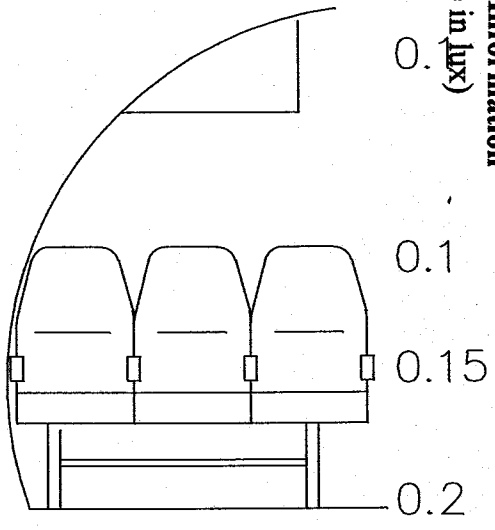
All measurements in lux



Front of Bulkhead
(Seating Row 1)



Seating by Overwing Exit
(Seating Row 5)



Seating by Control Station
(Seating Row 10)

Evacuation Lighting Information
(All measurements are in lux)

Cabin Galley

Floor level	0.8
Galley level	1.0
Ceiling level	0.5

At exit	Type I	Service door
Galley Height	3.0	1.3
Floor level	0.8	0.4

Appendix D

Professor Muir's Briefing

Professor Muir's Briefing

Good evening ladies and gentlemen, thanks very much for coming along and agreeing to help us this evening. I would now like to spend a few minutes doing two things, firstly just giving you a little bit of background about what these tests are about, how we come to be doing them here, and what we are trying to find out and then secondly, what in practise is going to happen when you go into the hangar and board our aircraft.

Why are we doing these studies? Some of you may have been to help us before but for those of you who haven't, since 1987 Cranfield have been helping the regulatory bodies, in other words the officers that make the safety regulations, to determine what they can do to increase the chance of people surviving an aircraft accident. Aircraft accidents are very infrequent but when they do happen, if a fire occurs, there can be loss of life. Typically once the fire has started there is only usually two minutes in which the conditions in the cabin remain survivable, so we have to make sure that we can get everybody out in less than two minutes. I am sure you can appreciate that in some of the large aircraft on which you fly that can be quite a challenge. At Cranfield we are carrying out testing work to see whether if we change something, it will help people to get out more quickly. For example, what happens if we change part of the cabin interior or the behaviour of the cabin staff? What can we change to try and improve the situation? and what can we learn about what is stopping people getting out in difficult situations? This is the purpose of this programme and I will tell you more details about the purpose of tonight's tests at the end of the evening. I should advise you that as accidents do not happen during daylight hours you may find some of the tests occur in night conditions.

Tonight we will be doing a total of four evacuations from the aeroplane and the arrangement that we have made is that we will pay you £10 each for coming along here tonight. ***(Bonus payment system in use on the particular test day (either competitive or co-operative) is explained here)***

You may have been wondering why we have been measuring you and taking all this detailed questionnaire information. It is because in addition to the overall time it takes to get people out we are interested in what sort of people are able to get out quickly, can big people get out faster than smaller people?, can younger people get out faster than older people? and all of this information will be used to help to develop a mathematical model of what determines how quickly people can get out of an aircraft accident. This is why we are collecting all of the information.

When we have finished talking here, I will ask you to leave your clipboards here and your coats and so on and go out into the hanger wearing the numbered bib you have been given. You will then be shown to our 737 cabin simulator. Our cabin staff here, of which Ann is a member, will show you to your seats, the seat you sit in for the first evacuation is the seat number on the bib which you are currently wearing. Once you are on board and everybody is seated, you will be given a typical pre-flight briefing, the sort of briefing you have when you go on a flight somewhere, demonstrating how to do the seat belts and so forth but we are not unfortunately giving you duty free drinks on this flight I am afraid. You will then hear the sound of the engines start up and things starting to happen and eventually the instructions from the captain "Undo your seat belts and get out". When you hear that instruction, that is your cue to move and you should make towards whatever exits seem to be being opened and indicated to you.

When you get to the exit you will find there are slides which enable you to get to the ground. These slides are typical of the ones that are used on real aircraft in real emergencies and I wanted to talk to you a little bit about how to come down the slides because it is very easy to injure yourselves going down the slides. There have been injuries going down slides and we don't want you to injure yourselves. If you do as I say you won't. It is very important that when you get to the door of the aircraft you will stand on the sill in front of you, you will see the slide and all you do is to cross your arms and literally jump forward and sit down onto the slide, just as if you are jumping down onto a trampoline. The slide is soft and you will just shoot rapidly down to the bottom. When you sit on the slide, it is most important to keep your feet together with your toes up.

Don't try and slow yourself down by letting your foot come out or by trying to dig your heels in. You will go down quite quickly but don't worry about it because at the bottom we have got our friendly fire officers there already to pick you up and move you along.

When you go onto the slide make sure you don't go on so close together that you crash into some body else. Don't try and go down two at once, but do go down as quickly as you feel you safely can after the person in front of you. When you get to the bottom of the slide, as I said, you will be helped up by our fire men, you will then be shown to an area where you must wait until you are told to move. When you get to the bottom of the slides you will see that there are members of our team with tickets, you'll be able to recognise them because of these delightful blue sweatshirts they are all wearing. You must take a ticket from them. When the evacuation has finished you will be shown where to leave your numbered bibs and then you can take the ticket and hand it in at the desk. The ticket will be used to determine when you have earned bonus payments.

Next you come back here and fill in your next questionnaire which is green. Once you have done this you come out back into the hanger, we give you a new bib with a new seat number and we all go back on board and start the process again, and as I have said we are doing a total of four evacuations.

I know there is a lot of questionnaire information here, but it really is important and it really is needed so please do bear with us and fill it in as best you can, it is quite important that we have this information as accurately as we can because all the time we are trying to learn more about things we need to look at and things that might possibly lead to an improvement. We obviously hope that there won't be any problems, but should there be a problem on the aircraft, suppose somebody falls and somebody else trips over them and people are in danger of being hurt then we would obviously stop the evacuation. If we have to stop the evacuation we will sound an alarm. I would like to demonstrate it to you now so that you know what to expect. It is terribly loud, you may want to protect your ears. *sounds rape alarm* You will be in no doubt if you hear that noise, if you hear that noise just stop and wait for instructions, it means that a problem has occurred. We have to say that we hope that you don't let a problem occur because if you do and we have to use the alarm no bonus payments will be made. So make sure we don't have to, please look after each other and be careful whilst at the same time really trying to get out as quickly as you can.

If anyone starts to become concerned and decides they want to drop out that is perfectly all right just come and have a word with me. We'll still pay you for coming along. Not everybody enjoys doing these things, and if you find you are starting to get worried about going down the slides or something, just come and say and we'll arrange for you to drop out.

Regarding your personal effects, we would ask you please not to take part in these evacuations wearing very expensive watches because straps sometimes get broken and they could get trodden on. If you can possibly manage please remove your glasses. If you need them for the questionnaires, if you give them to me, or if you come to me when you are about to board the aircraft I'll show you where you can leave them and from where they can be collected afterwards. We ask you not to go down the slides with glasses on unless you really can't see at all without them, just in case they get knocked off and broken. Please don't wear any long dangly chains or ladies, long dangly earrings or anything that could possibly either get damaged or injure you or somebody else. One further point, as you are going to be going down the slides fairly fast it is obviously not advisable to go down with a large bunch of keys or a wallet in your back pocket as they could make quite a permanent impression. It's just a question of being practical and sensible. If you have any of these items and you are not going to take them on the aircraft, Ann here has some brown envelopes, when I have finished talking if you come and get a brown envelope, out your name on the envelope, put whatever items you have in the envelope, seal it up, give it back to Ann. We will keep them safely for the duration of the exercise and then you can pick them up at the end.

Does anyone have any questions? Has anyone decided to drop out already? If you need an envelope, come forward to Ann, but if you don't or when you are ready if you just come with me and we will go out into the hangar.

APPENDIX E

Safety Card

(Not available in electronic format/
Non disponible en format électronique)

APPENDIX F

Evacuation Scenarios

Evacuation Scenarios

Scenario 1

After pre flight briefing " Ladies and gentlemen this is your captain speaking. We are currently in a queue of aircraft awaiting take off and should be airborne in a few minutes."

Engine noise for approximately 20 seconds then the command “Undo your seat belts and get out".

Scenario 2

During the pre flight briefing, after the seat belt demonstration the command "Undo your seat belts and get out" is heard.

Scenario 3

Following the pre flight briefing a cabin check is made.

A short engine noise lasting approximately 30 seconds is heard then the command "Undo your seat belts and get out"

Scenario 4

Following the pre flight briefing a cabin check is made.

A long engine noise lasting approximately 60 seconds is heard culminating with a large bang is heard then the command "Undo your seat belts and get out"

APPENDIX G

Questionnaire A - Demographics
Questionnaire B - Personality
Questionnaire 1

Questionnaire A - Demographics

QUESTIONNAIRE A

VOLUNTEER NO:

_____

1. AGE:
   _____ YEARS.

2. GENDER: (circle one)
   a. male
   b. female

3. Are you: (circle one)
   a. left handed
   b. right handed
   c. ambidextrous

4. What is the highest level of education completed? (circle one)
   a. less than GCSE/O-Level
   b. GCSE/O-Level
   c. A-level
   d. some university work
   e. university degree
   f. some post graduate work
   h. Post graduate degree

5. Have you previously participated in an evacuation test? (circle one)
   a. yes If yes, How long ago?_____
   b. no (if no, please skip to question 7)

6. If you previously participated in an evacuation test,
   did it involve using a slide or chute? (circle one)
   a. yes
   b. no

7. Have you ever flown in a commercial airplane? (circle one)
   a. yes
   b. no (if no, please skip to question 10)

8. If you have flown in a commercial airplane, have you ever had to make an emergency evacuation of the plane? (circle one)

a. yes
b. no (if no, please skip to question 10)

9. If you have made an emergency evacuation from an airplane, did you use a slide for the evacuation? (circle one)

a. yes
b. no

10. Do you ever wear eye-glasses or contact lens for better vision? (circle one)

a. yes (if yes, continue answering questions in order.)
b. no (if no, go directly to question 15.)

11. Are they: (circle one)

a. eye glasses
b. contact lens
c. both, at different times

12. Which are you going to wear today during the evacuation tests? (circle one)

a. eye glasses
b. contact lens
c. neither

13. If you wear eye-glasses, are they: (circle one)

a. single focus lens
b. bifocal lens
c. trifocal lens

14. Are your eye-glasses or contact lens for: (circle one)

a. seeing things close to you (such as reading)
b. seeing things at a distance from you (such as driving)
c. both close and distant vision

15. If you have any of the problems with your vision or eyes listed below, please circle the appropriate letter. (circle as many as are appropriate.)

a. cataracts
b. glaucoma
c. "tunnel vision"
d. night blindness - poor night vision
e. retinitis
f. poor depth perception
g. macular degeneration
h. other (please specify):_____

_____

16. Do you think your reflexes are: (circle one)

a. fast
b. about average
c. slow

17. Do you think you usually have an ability to move with quick and easy grace? (That is, are you physically agile and nimble?)

a. yes
b. no

18. Do you think you are usually mentally quick and resourceful? (That is, are you mentally agile and nimble?)

a. yes
b. no

19. Do you have any limitations in the use of your arms, hands, legs, feet, hips, etc.?

a. yes (please list which parts have limited use):_____

_____

_____.

b. no

22. Do you have any artificial joints in your body, such as hip, knee, finger, etc.?

a. yes (please list which joints):_____

_____.

b. no

Questionnaire B - Personality

QUESTIONNAIRE B

VOLUNTEER NUMBER_____

WE WANT TO KNOW HOW YOU WOULD DESCRIBE YOURSELF WITH THE FOLLOWING STATEMENTS. READ EACH STATEMENT, THEN PLACE THE NUMBER THAT REPRESENTS HOW OFTEN THAT STATEMENT WOULD APPLY TO YOU IN FRONT OF THE STATEMENT.

NEVER	SELDOM OR RARELY	SOMETIMES	OFTEN	VERY OFTEN
1	2	3	4	5

_____ 1. I try hard to impress people with my abilities.

_____ 2. I do dangerous things for the thrill of it.

_____ 3. I have periods of such great restlessness that I must be on the go.

_____ 4. I am afraid to try something new.

_____ 5. I get confused when working under pressure.

_____ 6. I worry about my health.

_____ 7. I have difficulty in starting to get down to work.

_____ 8. I ignore the feelings of others.

_____ 9. I need somebody to push me in order to get things done.

_____ 10. I am nervous when I must wait.

_____ 11. I make excuses for my behavior.

_____ 12. I worry about the opinions others have of me.

_____ 13. When I try a new sport or physical activity, I feel that I have **not** mastered the skill as well as the average person.

NEVER	SELDOM OR RARELY	SOMETIMES	OFTEN	VERY OFTEN
1	2	3	4	5

_____ 14. When I face new situations which require fast decisions, I feel that I can make fast decisions effectively.

_____ 15. When I try to reach important goals of any kind, I feel that I really succeed.

_____ 16. When it is necessary for me to speed up my performance in order to meet a deadline, I do so without sacrificing the quality of my work.

_____ 17. When I am part of group activities, my ideas and opinions influence the group.

_____ 18. When I am put in a situation which is new and unfamiliar, I feel that I am **not** able to function adequately.

_____ 19. When I need to take the initiative and act independently of others, I can handle things on my own.

_____ 20. When wise, careful, judgments are needed about something, I make sound judgments.

Questionnaire 1

Please note this questionnaire has questions on both sides of the page

Questionnaire 1

VOLUNTEER NUMBER_____

THE INFORMATION WE ARE REQUESTING IN THIS QUESTIONNAIRE IS VERY IMPORTANT IN OUR ATTEMPT TO IMPROVE THE SAFETY OF AIR TRAVEL. PLEASE BE AS HONEST AND COMPLETE AS POSSIBLE. YOUR ANSWERS MAY HELP SAVE LIVES SOMEDAY! THANK YOU. **Circle the letter in front of your answer.**

1. When you were given a briefing on how to use the slide to evacuate the aircraft, did you think that you thoroughly understood what to do and how to do it?

a. yes
b. no (if no, please explain why)

_____
_____
_____

2. In the evacuation test you just finished, do you think you used the evacuation slides as instructed in the earlier briefing?

a. yes
b. no (again, it will be of great assistance to us to know why you think you did not do it as instructed.)

_____
_____
_____

3. Did you have any difficulty in quickly undoing your seat belt? (In other words, did it seem to slow you down?)

a. Yes
b. No
If yes, why?

_____
_____
_____
_____

4. As you moved down the aisle towards the exit, did you exit to the door on your:

a. Left
b. Right
c. I do not remember

5. Did you look to see if the door on the opposite side was open and available for evacuation?

a. yes
b. no
c. I do not remember

6. When did you decide to use the exit you used?

a. before the captain called for the evacuation
b. as I left my seat
c. as I moved down the aisle
d. when I reached the front of the cabin
e. I did not make a conscious decision on which door to use

7. For what reasons did you chose this exit? (circle as many as applicable.)

a. I was told/directed to use it by the cabin crew
b. I was pushed by the cabin crew to it
c. the other exit was blocked or full
d. I followed the person in front of me
e. I was pushed by the passenger behind me
f. I am not sure

8. If the cabin crew directed you to an exit, did you use that exit?

a. yes
b. no (if no, please explain why not.)
c. they did not direct me to an exit

Why not;

_____

_____

9. Did you choose an exit originally and then change your mind?

a. yes
b. no

If yes, why did you change your mind?

_____

_____

10. Do you think that the cabin crew:
    a. aided your evacuation (then answer question 11A below)
    b. hindered your evacuation (then answer question 11B below)
    c. neither aided nor hindered your evacuation (skip to question 12)

11A. If you think the cabin crew aided your evacuation, please tell us how.(circle as many as applicable.)
    a. directed me to the exit
    b. shouted instructions
    c. shouted encouragement
    d. pushed passengers through the exit
    e. other. Please specify:

_____
_____

11B. If you think the cabin crew hindered your evacuation, please tell us how. (circle as many as applicable.)
    a. shouted too much/too loud
    b. added to the confusion of the situation
    c. pushed passengers through the exit
    d. did not help passengers that needed help
    e. occupied needed space
    f. distracted me from more important things
    g. other. Please specify:

_____
_____

12. In general, fellow passengers:
    a. aided the evacuation
    b. hindered the evacuation
    c. both aided and hindered the evacuation
    d. neither aided nor hindered (please skip to question 15)

13. In what way did the passengers:

    a. aid the evacuation: (please explain)

_____
_____

    b. hinder the evacuation: (please explain)

_____
_____

14. In what way, if any could fellow passengers improve the evacuation?

_____

_____

15. Do you think there was anything more the cabin crew could have done to aid your evacuation?
    a. yes (if yes, please specify or explain below)
    b. no
    c. don't know

    _____

_____

16. What method, if any, did you use when evacuating. (circle as many as applicable.)
    a. climbed over seats
    b. waited in line in the aisle
    c. pushed past other passengers
    d. pushed other passengers towards the exit
    e. shouted to speed-up other passengers
    f. allowed a passenger to get in front of me
    g. tried to get out of seat and as far down aisle as possible before others could
    h. none
    i. other. (please specify)

_____

17. Do you feel the method you used aided or hindered you in this evacuation?
    a. aided
    b. hindered
    c. did not make any real difference

18. Did anything in the cabin (physical features) <u>hinder</u> your progress in moving towards the exit and evacuating the aircraft?
    a. Yes
    b. No Go to question 19

If yes,

What hindered your progress?

_____

How did it hinder your progress?

_____

What, if anything, did you do to compensate for this hindrance?

_____

19. Did anything in the cabin (physical features) help your progress in moving towards the exit and evacuating the aircraft?

    a. Yes
    b. No Go to Question 20

If Yes,

What helped your progress?

_____

How did it help your progress?

_____

20. Please indicate on the scale below, from 1 to 10, the difficulty in progressing towards and reaching the exit. Place an "X" at the appropriate level of difficulty.

very easy									very difficult
1	2	3	4	5	6	7	8	9	10

_____

21. What did you consider to be the most difficult part (if any) in progressing towards the exit?

_____

_____

22. Please indicate on the scale below, from 1 to 10, the difficulty of using the evacuation slide. Place an "X" at the appropriate level of difficulty.

very easy									very difficult
1	2	3	4	5	6	7	8	9	10

_____

23. What did you consider to be the most difficult, if any, part of using the evacuation slide?

_____

_____

24. Are there any further points you would like to make about this evacuation?

_____

_____

_____

APPENDIX H

Abandoned Evacuations

Abandoned Evacuations

Cabin Condition	*Reason for abandoning*
Day 1 Evac 4 Jog aisle/Dark	Male passenger's leg was stuck in the jog.
Day 4 Evac 3 Straight aisle/Dark	One male passenger was pushed through the bulkhead and fell onto the floor. The alarm was used but man was lifted to feet by cabin crew.
Day 8 Evac 4 Jog aisle/Dark	A male participant was stuck in the jog, the cabin crew moved into the cabin but could not free him.

APPENDIX I
Raw Data

Trial Day Number: Pilot
Evacuation:One
Variables: Dark Jog

Undo: 00:25.58 Cabin crew 2 Undo: 00:09.93 Cabin crew 1

	RI Type I Exit					LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**	**Position**	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	9	1C	00:34.66	00:09.08	1	1	1A	00:16.49	00:06.56
2	49	2C	00:35.92	00:10.34	2	41	1E	00:17.61	00:07.68
3	45	1B	00:38.12	00:12.54	3	21	1F	00:18.07	00:08.14
4	51	6B	00:39.18	00:13.60	4	13	2D	00:28.57	00:18.64
5	56	3D	00:42.24	00:16.66	5	26	5C	00:18.99	00:09.06
6	29	2B	00:43.40	00:17.82	6	2	4D	00:19.93	00:10.00
7	?		00:45.26	00:19.68	7	47	6E	00:20.51	00:10.58
8	50	4C	00:47.30	00:21.72	8	34	4E	00:21.33	00:11.40
9					9	19	8B	00:22.59	00:12.66
10					10	28	9E	00:24.89	00:14.96
11					11	46	5B	00:25.93	00:16.00
12					12	42	5D	00:27.17	00:17.24
13					13	27	8D	00:27.29	00:17.36
14					14	43	7C	00:28.83	00:18.90
15					15				
16	ABORTED				16				
17					17				
18					18				
19					19				
20					20				

Trial Day Number: Pilot
Evacuation: Two
Variables: Dark Straight

Undo: 01:34.34

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	28	1D	01:40.80	00:06.46
2	4	1B	01:41.70	00:07.36
3	12	2C	01:43.58	00:09.24
4	51	4C	01:44.92	00:10.58
5	23	1A	01:47.78	00:13.44
6	20	2D	01:49.86	00:15.52
7	18	4A	01:51.20	00:16.86
8	16	2F	01:53.46	00:19.12
9	48	5C	01:54.34	00:20.00
10	21	4B	01:56.04	00:21.70
11	40	3F	01:57.94	00:23.60
12	17	5F	01:59.32	00:24.98
13	8	5D	02:00.38	00:26.04
14	14	7F	02:02.56	00:28.22
15	49	8A	02:04.06	00:29.72
16	1	10E	02:06.08	00:31.74
17	24	6C	02:08.32	00:33.98
18	5	5A	02:09.34	00:35.00
19	41	10C	02:12.10	00:37.76
20	46	8C	02:13.46	00:39.12
21	34	6A	02:15.54	00:41.20
22	9	10B	02:16.84	00:42.50
23	37	8E	02:17.24	00:42.90
24	3	9D	02:18.96	00:44.62
25	53	10D	02:20.84	00:46.50

Undo: 00:22.82

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	55		00:32.18	00:09.36
2	32		00:33.02	00:10.20
3	27		00:34.92	00:12.10
4	?		00:37.00	00:14.18
5	?		00:37.72	00:14.90
6	?		00:39.98	00:17.16
7	35		00:41.00	00:18.18
8	?		00:41.86	00:19.04
9	?		00:43.02	00:20.20
10	15		00:44.14	00:21.32
11	36		00:45.24	00:22.42
12	47		00:46.94	00:24.12
13	52		00:48.40	00:25.58
14	?		00:49.52	00:26.70
15	?		00:50.44	00:27.62
16	19		00:51.54	00:28.72
17	?		00:53.20	00:30.38
18	?		00:54.38	00:31.56
19	25		00:54.52	00:31.70
20	?		00:56.16	00:33.34
21	43		00:56.32	00:33.50
22	?		00:58.44	00:35.62
23	?		00:58.78	00:35.96
24	?		00:59.98	00:37.16
25	?		01:01.16	00:38.34
26	?		01:02.32	00:39.50
27	?		01:03.62	00:40.80

						28	?		01:05.10	00:42.28
						29	?		01:06.40	00:43.58
						30	?		01:07.64	00:44.82
						31	?		01:09.48	00:46.66

Trial Day Number: Pilot
Evacuation: Three
Variables: Light Straight

Undo: 00:38.44

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	23	3C	00:52.26	00:13.82
2	38	1D	00:53.46	00:15.02
3	11	2D	00:54.24	00:15.80
4	10	1A	00:55.02	00:16.58
5	8	1E	00:55.92	00:17.48
6	31	1F	00:56.84	00:18.40
7	42	2E	00:57.70	00:19.26
8	49	5F	00:58.40	00:19.96
9	51	9B	00:59.56	00:21.12
10	1	4C	01:00.76	00:22.32
11	47	8A	01:02.40	00:23.96
12	37	6F	01:02.98	00:24.54
13	24	2A	01:04.48	00:26.04
14	18	8E	01:06.22	00:27.78
15	9	3E	01:07.90	00:29.46
16	28	3F	01:08.72	00:30.28
17	44	4A	01:10.70	00:32.26
18	4	4F	01:11.66	00:33.22
19	41	5A	01:12.60	00:34.16
20	7	5C	01:14.42	00:35.98
21	6	9E	01:15.58	00:37.14
22	43	8F	01:16.88	00:38.44
23	5	6B	01:17.64	00:39.20
24	25	7A	01:19.00	00:40.56
25	46	10E	01:23.54	00:45.10
26	39	9F	01:25.68	00:47.24
27				

Undo: 00:41.42

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	34	1C	00:57.22	00:15.80
2	40	1B	00:58.82	00:17.40
3	54	2F	00:59.82	00:18.40
4	35	2C	01:00.70	00:19.28
5	2	2B	01:01.58	00:20.16
6	48	3D	01:01.82	00:20.40
7	26	3B	01:02.58	00:21.16
8	19	5D	01:03.86	00:22.44
9	27	5E	01:04.96	00:23.54
10	3	4E	01:07.34	00:25.92
11	13	3A	01:08.78	00:27.36
12	20	4B	01:10.46	00:29.04
13	17	9D	01:12.22	00:30.80
14	14	9C	01:13.14	00:31.72
15	12	5B	01:14.28	00:32.86
16	50	8B	01:15.20	00:33.78
17	16	7C	01:16.64	00:35.22
18	33	7E	01:17.60	00:36.18
19	32	6D	01:18.10	00:36.68
20	56	8C	01:19.24	00:37.82
21	53	6A	01:19.88	00:38.46
22	55	8D	01:21.02	00:39.60
23	30	7B	01:21.70	00:40.28
24	52	8E	01:23.18	00:41.76
25	36	7F	01:24.10	00:42.68
26	45	9A	01:25.08	00:43.66
27	22	10B	01:27.44	00:46.02

28						28	15	10C	01:29.56	00:48.14
29						29	29	10D	01:31.22	00:49.80

Trial Day Number: Pilot
Evacuation: Four
Variables: Light Jog

Undo: 00:00.06

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	18	1D	00:04.46	00:04.40
2	3	2C	00:06.38	00:06.32
3	30	2D	00:07.46	00:07.40
4	50	1F	00:08.48	00:08.42
5	56	1A	00:10.10	00:10.04
6	37	4C	00:11.02	00:10.96
7	47	2E	00:12.78	00:12.72
8	46	2A	00:14.36	00:14.30
9	11	4B	00:15.96	00:15.90
10	17	7A	00:18.40	00:18.34
11	22	3E	00:20.28	00:20.22
12	26	6D	00:21.38	00:21.32
13	16	5B	00:22.66	00:22.60
14	41	8C	00:23.52	00:23.46
15	24	4E	00:25.50	00:25.44
16	42	7D	00:26.36	00:26.30
17	1	8B	00:27.66	00:27.60
18	8	7C	00:28.50	00:28.44
19	29	9F	00:30.10	00:30.04
20	7	9A	00:32.06	00:32.00
21	10	10F	00:33.00	00:32.94
22	2	9E	00:33.99	00:33.93
23	19	10A	00:35.60	00:35.54
24	15	5A	00:38.03	00:37.97
25	13	10C	00:39.26	00:39.20
26	23	10B	00:40.50	00:40.44
27				

Undo: 00:00.74

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	00:06.60	00:05.86
2	14	1E	00:07.76	00:07.02
3	6	1B	00:09.50	00:08.76
4	32	3C	00:10.62	00:09.88
5	51	3A	00:11.48	00:10.74
6	52	3D	00:13.72	00:12.98
7	53	2B	00:14.94	00:14.20
8	43	4D	00:15.94	00:15.20
9	29	4A	00:17.06	00:16.32
10	33	4F	00:18.14	00:17.40
11	45	5C	00:19.82	00:19.08
12	54	5D	00:20.84	00:20.10
13	4	6C	00:21.78	00:21.04
14	49	9B	00:22.40	00:21.66
15	40	6B	00:23.38	00:22.64
16	36	5E	00:24.78	00:24.04
17	44	7B	00:26.88	00:26.14
18	27	9F	00:28.48	00:27.74
19	55	5F	00:29.78	00:29.04
20	12	7E	00:30.82	00:30.08
21	25	9C	00:31.78	00:31.04
22	48	6E	00:32.00	00:31.26
23	31	10E	00:32.76	00:32.02
24	20	6F	00:34.12	00:33.38
25	38	6A	00:35.58	00:34.84
26	9	7F	00:36.88	00:36.14
27	5	9D	00:37.76	00:37.02

28						28	35	10D	00:39.78	00:39.04
29						29	34	8F	00:41.66	00:40.92

Trial Day Number: One
Evacuation:One
Variables: Dark Straight

Undo: 00:57.67 Cabin crew 1 Undo: 00:21.57 Cabin crew 2

RI Type I Exit					LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**	**Position**	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	11	2D	01:08.49	00:10.82	1	38	1D	00:28.39	00:06.82
2	35	2C	01:10.33	00:12.66	2	34	1C	00:29.57	00:08.00
3	2	2B	01:12.53	00:14.86	3	23	3C	00:31.11	00:09.54
4	31	1F	01:13.51	00:15.84	4	48	3D	00:31.93	00:10.36
5	8	1E	01:15.61	00:17.94	5	40	1B	00:34.35	00:12.78
6	1	4C	01:20.05	00:22.38	6	10	1A	00:35.77	00:14.20
7	19	5D	01:21.75	00:24.08	7	26	3B	00:37.57	00:16.00
8	49	5F	01:22.77	00:25.10	8	24	2A	00:38.79	00:17.22
9	44	4A	01:23.49	00:25.82	9	13	3A	00:40.35	00:18.78
10	20	4B	01:25.05	00:27.38	10	9	3E	00:42.73	00:21.16
11	28	3F	01:25.91	00:28.24	11	42	2E	00:43.57	00:22.00
12	18	8E	01:27.45	00:29.78	12	27	5E	00:45.51	00:23.94
13	3	4E	01:29.19	00:31.52	13	41	5A	00:47.05	00:25.48
14	5	6B	01:31.29	00:33.62	14	7	5C	00:49.29	00:27.72
15	30	7B	01:33.27	00:35.60	15	16	7C	00:51.10	00:29.53
16	50	8B	01:33.89	00:36.22	16	4	4F	00:52.53	00:30.96
17	43	8F	01:34.99	00:37.32	17	21	6C	00:53.79	00:32.22
18	15	10C	01:35.81	00:38.14	18	51	9B	00:54.87	00:33.30
19	25	7A	01:37.29	00:39.62	19	33	7E	00:56.95	00:35.38
20	6	9E	01:39.19	00:41.52	20	14	9C	00:58.75	00:37.18
21	36	7F	01:40.13	00:42.46	21	22	10B	01:00.37	00:38.80
22	37	6F	01:41.31	00:43.64	22	12	5B	01:02.27	00:40.70
23	32	6D	01:42.42	00:44.75	23	47	8A	01:04.29	00:42.72
24	29	10D	01:43.57	00:45.90	24	46	10E	01:06.19	00:44.62
25	45	9A	01:45.73	00:48.06	25	17	9D	01:07.23	00:45.66
26	39	9F	01:48.03	00:50.36	26				

Trial Day Number: One
Evacuation: Two
Variables: Light Straight

Undo: 00:19.17

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	4	1B	00:25.13	00:05.96
2	28	1D	00:26.45	00:07.28
3	20	2D	00:28.23	00:09.06
4	7	2B	00:28.93	00:09.76
5	19	1F	00:30.11	00:10.94
6	32	1E	00:31.51	00:12.34
7	35	3B	00:32.71	00:13.54
8	51	4C	00:33.79	00:14.62
9	36	3E	00:35.19	00:16.02
10	8	5D	00:36.37	00:17.20
11	22	7C	00:38.29	00:19.12
12	44	5E	00:39.85	00:20.68
13	40	3F	00:41.41	00:22.24
14	34	6A	00:42.09	00:22.92
15	11	9E	00:42.93	00:23.76
16	29	6D	00:43.99	00:24.82
17	5	5A	00:45.07	00:25.90
18	50	6E	00:45.69	00:26.52
19	6	7D	00:46.99	00:27.82
20	14	7F	00:49.21	00:30.04
21	30	9C	00:51.09	00:31.92
22	9	10B	00:52.55	00:33.38
23	1	10E	00:54.67	00:35.50
24	10	8D	00:55.91	00:36.74
25				
26				

Undo: 00:22.33

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	23	1A	00:29.59	00:07.26
2	12	2C	00:30.81	00:08.48
3	15	3D	00:32.07	00:09.74
4	43	2E	00:32.93	00:10.60
5	27	2A	00:34.43	00:12.10
6	31	3A	00:35.19	00:12.86
7	48	5C	00:35.85	00:13.52
8	18	4A	00:37.47	00:15.14
9	16	2F	00:38.87	00:16.54
10	21	4B	00:39.65	00:17.32
11	47	4D	00:40.89	00:18.56
12	25	4F	00:42.33	00:20.00
13	24	6C	00:42.87	00:20.54
14	46	8C	00:43.77	00:21.44
15	39	5B	00:45.27	00:22.94
16	17	5F	00:47.09	00:24.76
17	49	8A	00:48.81	00:26.48
18	41	10C	00:49.29	00:26.96
19	13	7B	00:50.49	00:28.16
20	38	8B	00:51.55	00:29.22
21	2	7A	00:52.79	00:30.46
22	26	9F	00:54.09	00:31.76
23	45	7E	00:55.17	00:32.84
24	3	9D	00:56.07	00:33.74
25	33	9A	00:56.77	00:34.44
26	37	8E	00:58.51	00:36.18

27						27	42	8F	00:59.87	00:37.54

Trial Day Number: One
Evacuation: Three
Variables: Light Jog

Undo: 00:21.93

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	49	2C	00:27.75	00:05.82
2	33	1D	00:28.49	00:06.56
3	41	1E	00:29.05	00:07.12
4	37	2A	00:30.25	00:08.32
5	1	1A	00:32.81	00:10.88
6	5	3E	00:33.45	00:11.52
7	2	4D	00:34.83	00:12.90
8	34	4E	00:35.79	00:13.86
9	46	5B	00:36.73	00:14.80
10	18	6D	00:38.41	00:16.48
11	35	6F	00:41.19	00:19.26
12	14	4B	00:42.33	00:20.40
13	39	7D	00:45.57	00:23.64
14	10	5E	00:47.85	00:25.92
15	50	4C	00:48.87	00:26.94
16	43	7C	00:49.95	00:28.02
17	44	9C	00:51.95	00:30.02
18	23	7E	00:53.89	00:31.96
19	48	8F	00:54.33	00:32.40
20	19	8B	00:54.99	00:33.06
21	40	9D	00:57.45	00:35.52
22	7	7F	00:58.05	00:36.12
23	8	9A	00:59.83	00:37.90
24	36	10C	01:01.57	00:39.64
25	32	10F	01:02.39	00:40.46

Undo: 00:20.95

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	9	1C	00:27.61	00:06.66
2	29	2B	00:29.01	00:08.06
3	45	1B	00:30.19	00:09.24
4	21	1F	00:30.69	00:09.74
5	17	3B	00:32.27	00:11.32
6	13	2D	00:33.47	00:12.52
7	25	2E	00:34.45	00:13.50
8	26	5C	00:35.76	00:14.81
9	42	5D	00:36.69	00:15.74
10	31	8C	00:37.59	00:16.64
11	51	6B	00:40.05	00:19.10
12	22	4A	00:41.79	00:20.84
13	47	6E	00:44.13	00:23.18
14	6	5A	00:48.25	00:27.30
15	11	6A	00:49.44	00:28.49
16	4	10D	00:50.57	00:29.62
17	3	7A	00:51.49	00:30.54
18	24	9B	00:52.89	00:31.94
19	30	5F	00:53.83	00:32.88
20	27	8D	00:54.44	00:33.49
21	38	4F	00:55.87	00:34.92
22	15	8E	00:56.84	00:35.89
23	28	9E	00:58.24	00:37.29
24	20	10E	00:59.82	00:38.87
25	16	10B	01:01.08	00:40.13

Trial Day Number: One
Evacuation: Four
Variables: Dark Jog

Undo: 00:28.01

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	00:32.33	
2	14	1E	00:33.69	
3	3	2C	00:35.43	
4	50	1F	00:36.41	
5	30	2D	00:37.99	
6	32	3C	00:39.30	
7	51	3A	00:39.97	
8	43	4D	00:41.05	
9	37	4C	00:42.17	
10	11	4B	00:43.15	
11	29	4A	00:44.19	
12	36	5E	00:45.83	
13	34	8F	00:46.85	
14				
15				
16	ABORTED			

Undo: 00:11.00

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	18		00:16.84	00:05.84
2	6		00:19.04	00:08.04
3	46		00:20.20	00:09.20
4	47		00:23.02	00:12.02
5	22		00:24.52	00:13.52
6	4		00:25.84	00:14.84
7	26		00:27.92	00:16.92
8				
9				
10				
11				
12				
13				
14				
15				
16				

Trial Day Number: Two
Evacuation:1
Variables: Dark Jog

Undo: 00:07.00 Cabin crew 2

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	49	2C	00:18.24	00:11.24
2	13	2D	00:19.40	00:12.40
3	41	1E	00:21.22	00:14.22
4	37	2A	00:23.32	00:16.32
5	29	3E	00:25.34	00:18.34
6	25	5A	00:27.16	00:20.16
7	2	4D	00:28.54	00:21.54
8	53	3A	00:29.80	00:22.80
9	42	5D	00:31.20	00:24.20
10	26	5C	00:33.42	00:26.42
11	18	6D	00:37.88	00:30.88
12	31	8C	00:39.68	00:32.68
13	40	9D	00:40.82	00:33.82
14	39	7D	00:43.16	00:36.16
15	23	7E	00:45.58	00:38.58
16	19	8B	00:46.42	00:39.42
17	27	8D	00:47.76	00:40.76
18	7	7F	00:50.70	00:43.70
19	28	9E	00:51.80	00:44.80
20	36	10C	00:52.68	00:45.68
21	15	8E	00:54.24	00:47.24
22	48	8F	00:55.60	00:48.60
23	16	10B	00:57.66	00:50.66
24	32	10F	00:59.06	00:52.06
25				
26				
27				
28				

Undo: 00:38.42 Cabin crew 1

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	9	1C	00:46.44	00:08.02
2	33	1D	00:47.88	00:09.46
3	50	4C	00:49.68	00:11.26
4	45	1B	00:50.94	00:12.52
5	17	3B	00:51.24	00:12.82
6	21	1F	00:52.50	00:14.08
7	1	1A	00:53.36	00:14.94
8	5	3E	00:56.36	00:17.94
9	22	4A	00:56.80	00:18.38
10	14	4B	00:59.00	00:20.58
11	43	7C	01:00.10	00:21.68
12	10	5E	01:01.38	00:22.96
13	34	10C	01:02.86	00:24.44
14	46	5B	01:04.20	00:25.78
15	6	5A	01:05.68	00:27.26
16	38	4F	01:06.44	00:28.02
17	44	9C	01:07.26	00:28.84
18	30	5F	01:08.50	00:30.08
19	47	6E	01:09.82	00:31.40
20	35	6F	01:10.66	00:32.24
21	54	6C	01:12.38	00:33.96
22	3	7A	01:14.16	00:35.74
23	51	6B	01:15.84	00:37.42
24	24	9B	01:17.12	00:38.70
25	11	6A	01:17.52	00:39.10
26	52	8A	01:19.62	00:41.20
27	8	9A	01:22.54	00:44.12
28	12	9F	01:24.68	00:46.26

29						29	20	10E	01:26.00	00:47.58
30						30	4	10D	01:27.14	00:48.72

Trial Day Number: Two
Evacuation: Two
Variables: Dark Straight

Undo: 00:08.19

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	28	1D	00:12.59	00:04.40
2	32	1E	00:13.31	00:05.12
3	23	1A	00:16.09	00:07.90
4	19	1F	00:17.09	00:08.90
5	7	2B	00:18.35	00:10.16
6	27	2A	00:19.19	00:11.00
7	31	3A	00:21.03	00:12.84
8	47	4D	00:22.73	00:14.54
9	36	3E	00:23.73	00:15.54
10	48	5C	00:25.63	00:17.44
11	24	6C	00:26.61	00:18.42
12	22	7C	00:28.31	00:20.12
13	44	5E	00:29.61	00:21.42
14	50	6E	00:30.91	00:22.72
15	5	5A	00:31.99	00:23.80
16	10	8D	00:33.31	00:25.12
17	42	8F	00:34.99	00:26.80
18	34	6A	00:36.07	00:27.88
19	2	7A	00:38.19	00:30.00
20	37	8E	00:39.63	00:31.44
21	30	9C	00:40.57	00:32.38
22	38	8B	00:42.65	00:34.46
23	11	9E	00:44.51	00:36.32
24	54	9B	00:45.79	00:37.60
25	9	10B	00:47.87	00:39.68
26	53	10D	00:48.49	00:40.30
27				

Undo: 00:48.06

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	4	1B	00:53.88	00:05.82
2	12	2C	00:55.88	00:07.82
3	20	2D	00:57.60	00:09.54
4	35	3B	00:59.04	00:10.98
5	43	2E	01:00.04	00:11.98
6	15	3D	01:01.74	00:13.68
7	40	3F	01:02.82	00:14.76
8	16	2F	01:04.00	00:15.94
9	8	5D	01:05.92	00:17.86
10	51	4C	01:07.64	00:19.58
11	21	4B	01:09.44	00:21.38
12	52	4E	01:10.26	00:22.20
13	18	4A	01:11.14	00:23.08
14	17	5F	01:12.44	00:24.38
15	39	5B	01:13.22	00:25.16
16	25	4F	01:14.80	00:26.74
17	29	6D	01:16.40	00:28.34
18	13	7B	01:17.80	00:29.74
19	6	7D	01:18.69	00:30.63
20	46	8C	01:20.00	00:31.94
21	45	7E	01:21.49	00:33.43
22	41	10C	01:23.49	00:35.43
23	14	7F	01:23.96	00:35.90
24	3	9D	01:25.32	00:37.26
25	49	8A	01:27.47	00:39.41
26	26	9F	01:28.42	00:40.36
27	1	10E	01:29.60	00:41.54

28						28	33	9A	01:30.79	00:42.73

Trial Day Number: Two
Evacuation: Three
Variables: Light Straight

Undo: 00:03.69

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	34	1C	00:08.77	00:05.08
2	10	1A	00:09.45	00:05.76
3	38	1D	00:11.47	00:07.78
4	2	2B	00:13.31	00:09.62
5	31	1F	00:14.37	00:10.68
6	42	2E	00:15.27	00:11.58
7	1	4C	00:16.65	00:12.96
8	13	3A	00:17.89	00:14.20
9	7	5C	00:19.69	00:16.00
10	20	4B	00:22.05	00:18.36
11	28	5E	00:23.45	00:19.76
12	41	5A	00:24.55	00:20.86
13	19	5D	00:26.17	00:22.48
14	32	6D	00:27.77	00:24.08
15	5	6B	00:28.27	00:24.58
16	37	6F	00:29.55	00:25.86
17	30	7B	00:31.33	00:27.64
18	52	6E	00:32.21	00:28.52
19	25	7A	00:33.69	00:30.00
20	51	9B	00:34.95	00:31.26
21	6	9E	00:37.97	00:34.28
22	45	9A	00:39.85	00:36.16
23	46	10E	00:41.17	00:37.48
24				
25				
26				

Undo: 00:24.56

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	35	2C	00:30.54	00:05.98
2	40	1B	00:31.82	00:07.26
3	23	3C	00:32.96	00:08.40
4	11	2D	00:33.80	00:09.24
5	8	1E	00:35.14	00:10.58
6	48	3D	00:36.06	00:11.50
7	24	2A	00:37.10	00:12.54
8	54	2F	00:38.18	00:13.62
9	26	3B	00:40.30	00:15.74
10	3	4E	00:41.92	00:17.36
11	9	3E	00:42.68	00:18.12
12	49	5F	00:43.96	00:19.40
13	4	4F	00:44.62	00:20.06
14	44	4A	00:45.92	00:21.36
15	12	5B	00:47.58	00:23.02
16	21	6C	00:48.62	00:24.06
17	50	8B	00:49.68	00:25.12
18	53	6A	00:51.62	00:27.06
19	22	10B	00:52.82	00:28.26
20	27	5E	00:53.76	00:29.20
21	47	8A	00:55.30	00:30.74
22	33	7E	00:56.57	00:32.01
23	36	7F	00:57.42	00:32.86
24	43	8F	00:58.86	00:34.30
25	39	9F	00:59.92	00:35.36
26	29	10D	01:02.38	00:37.82

Trial Day Number: Two
Evacuation: Four
Variables: Light Jog

Undo: 00:06.63

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	00:11.15	00:04.52
2	3	2C	00:13.57	00:06.94
3	32	3C	00:14.95	00:08.32
4	37	4C	00:16.49	00:09.86
5	51	3A	00:18.43	00:11.80
6	46	2A	00:20.63	00:14.00
7	52	3D	00:22.03	00:15.40
8	29	4A	00:23.47	00:16.84
9	40	6B	00:24.71	00:18.08
10	41	8C	00:26.95	00:20.32
11	54	5D	00:28.39	00:21.76
12	36	5E	00:29.43	00:22.80
13	26	6D	00:31.71	00:25.08
14	48	6E	00:32.71	00:26.08
15	21	8A	00:34.63	00:28.00
16	13	10C	00:35.63	00:29.00
17	49	9B	00:38.49	00:31.86
18	2	9E	00:39.51	00:32.88
19	35	10D	00:40.31	00:33.68
20	7	9A	00:41.99	00:35.36
21	31	10E	00:43.35	00:36.72
22	27	9F	00:44.29	00:37.66
23	19	10A	00:46.35	00:39.72
24				
25				

Undo: 00'11.56

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	30	2D	00'17.48	00:05.92
2	6	1B	00'18.76	00:07.20
3	50	1F	00'20.04	00:08.48
4	53	2B	00'21.40	00:09.84
5	43	4D	00'22.48	00:10.92
6	47	2E	00'23.56	00:12.00
7	22	3E	00'24.64	00:13.08
8	45	5C	00'26.92	00:15.36
9	24	4E	00'28.36	00:16.80
10	11	4B	00'29.52	00:17.96
11	4	6C	00'30.56	00:19.00
12	8	7C	00'32.00	00:20.44
13	44	7B	00'33.16	00:21.60
14	33	4F	00'33.96	00:22.40
15	42	7D	00'35.28	00:23.72
16	28	8D	00'36.44	00:24.88
17	38	6A	00'37.44	00:25.88
18	20	6F	00'39.22	00:27.66
19	25	9C	00'40.52	00:28.96
20	5	9D	00'41.40	00:29.84
21	12	7E	00'42.84	00:31.28
22	1	8B	00'43.72	00:32.16
23	34	8F	00'45.76	00:34.20
24	9	7F	00'47.00	00:35.44
25	23	10B	00'48.32	00:36.76

26						26	10	10F	00'50.52	00:38.96

Trial Day Number: Three
Evacuation:One
Variables: Dark Straight

Undo: 00:26.39 Cabin crew 1 Undo: 00:22.49 Cabin crew 2

RI Type I Exit					LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**	**Position**	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	20	2D	00:34.23	00:07.84	1	28	1D	00:28.01	00:05.52
2	12	2C	00:36.91	00:10.52	2	4	1B	00:29.01	00:06.52
3	19	1F	00:37.33	00:10.94	3	15	3D	00:30.03	00:07.54
4	7	2B	00:38.19	00:11.80	4	23	1A	00:31.09	00:08.60
5	27	2A	00:39.55	00:13.16	5	32	1E	00:33.33	00:10.84
6	43	2E	00:41.39	00:15.00	6	35	3B	00:35.05	00:12.56
7	31	3A	00:42.27	00:15.88	7	36	3E	00:36.01	00:13.52
8	40	3F	00:43.83	00:17.44	8	21	4B	00:37.17	00:14.68
9	24	6D	00:45.39	00:19.00	9	25	4F	00:38.53	00:16.04
10	34	6A	00:46.47	00:20.08	10	16	2F	00:39.93	00:17.44
11	17	5F	00:47.43	00:21.04	11	18	4A	00:41.47	00:18.98
12	22	7C	00:48.71	00:22.32	12	29	6D	00:42.71	00:20.22
13	30	9C	00:51.51	00:25.12	13	39	5B	00:43.71	00:21.22
14	13	7B	00:52.75	00:26.36	14	14	4D	00:44.89	00:22.40
15	33	9A	00:54.11	00:27.72	15	5	5A	00:47.29	00:24.80
16	44	5E	00:55.67	00:29.28	16	8	5D	00:49.07	00:26.58
17	26	9F	00:56.59	00:30.20	17	42	8F	00:49.74	00:27.25
18	6	7D	00:57.63	00:31.24	18	2	7A	00:51.03	00:28.54
19	1	10E	00:59.83	00:33.44	19	10	8D	00:52.72	00:30.23
20	11	9E	01:01.27	00:34.88	20	3	9D	00:54.29	00:31.80
21	41	10C	01:02.31	00:35.92	21	38	8B	00:55.54	00:33.05
22					22	37	8E	00:56.92	00:34.43
23					23	9	10B	00:58.48	00:35.99

Trial Day Number: Three
Evacuation: Two
Variables: Light Straight

Undo: 00:09.24

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	1		00:17.16	00:07.92
2	17		00:18.88	00:09.64
3	21		00:20.36	00:11.12
4	2		00:22.04	00:12.80
5	26		00:22.74	00:13.50
6	42		00:23.78	00:14.54
7	37		00:24.68	00:15.44
8	10		00:25.82	00:16.58
9	38		00:27.12	00:17.88
10	39		00:28.04	00:18.80
11	7		00:29.00	00:19.76
12	18		00:31.42	00:22.18
13	23		00:32.32	00:23.08
14	43		00:33.96	00:24.72
15	15		00:34.76	00:25.52
16	44		00:36.08	00:26.84
17	19		00:37.66	00:28.42
18	24		00:39.76	00:30.52
19	20		00:41.54	00:32.30
20	12		00:42.76	00:33.52
21	16		00:43.84	00:34.60
22				
23				

Undo: 00:57.42

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	9	1C	01:02.70	00:05.28
2	33	1D	01:03.82	00:06.40
3	41	1E	01:05.06	00:07.64
4	13	2D	01:06.06	00:08.64
5	25	2E	01:08.58	00:11.16
6	29	2B	01:10.10	00:12.68
7	14	4B	01:10.78	00:13.36
8	34	4E	01:11.62	00:14.20
9	5	3E	01:13.34	00:15.92
10	22	4A	01:14.46	00:17.04
11	30	5F	01:15.42	00:18.00
12	11	6A	01:16.54	00:19.12
13	31	8E	01:18.26	00:20.84
14	35	6F	01:20.30	00:22.88
15	27	8D	01:21.38	00:23.96
16	6	5A	01:23.18	00:25.76
17	40	9D	01:24.02	00:26.60
18	3	7A	01:25.50	00:28.08
19	28	9E	01:26.66	00:29.24
20	36	10C	01:27.38	00:29.96
21	4	10D	01:28.90	00:31.48
22	8	9A	01:30.50	00:33.08
23	32	10F	01:32.30	00:34.88

Trial Day Number: Three
Evacuation: Three
Variables: Light Jog

Undo: 00:25.77

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	40	1B	00:32.33	00:06.56
2	38	1D	00:32.85	00:07.08
3	11	2D	00:34.01	00:08.24
4	28	3D	00:35.17	00:09.40
5	26	3B	00:36.05	00:10.28
6	2	2B	00:36.89	00:11.12
7	42	2E	00:38.37	00:12.60
8	1	4C	00:39.97	00:14.20
9	21	6C	00:42.81	00:17.04
10	19	5D	00:43.43	00:17.66
11	14	9C	00:45.65	00:19.88
12	27	5E	00:47.45	00:21.68
13	32	6D	00:50.29	00:24.52
14	44	4A	00:51.93	00:26.16
15	37	6F	00:52.37	00:26.60
16	17	9D	00:55.45	00:29.68
17	25	7A	00:56.77	00:31.00
18	18	8E	00:58.45	00:32.68
19	6	9E	01:00.95	00:35.18
20	15	10C	01:01.73	00:35.96
21				
22				
23				
24				

Undo: 00:19.88

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	34	1C	00:25.48	00:05.60
2	23	3C	00:26.52	00:06.64
3	35	2C	00:27.84	00:07.96
4	10	1A	00:29.00	00:09.12
5	8	1E	00:30.24	00:10.36
6	31	1F	00:31.36	00:11.48
7	24	2A	00:32.84	00:12.96
8	9	3E	00:33.76	00:13.88
9	13	3A	00:34.84	00:14.96
10	41	5A	00:35.96	00:16.08
11	20	4B	00:37.08	00:17.20
12	39	9F	00:37.76	00:17.88
13	3	4E	00:39.68	00:19.80
14	4	4F	00:40.52	00:20.64
15	7	5C	00:41.68	00:21.80
16	16	7C	00:43.64	00:23.76
17	12	5B	00:44.92	00:25.04
18	5	6B	00:47.04	00:27.16
19	30	7B	00:48.08	00:28.20
20	33	7E	00:49.04	00:29.16
21	36	7F	00:50.28	00:30.40
22	43	8F	00:51.80	00:31.92
23	29	10D	00:53.32	00:33.44
24	22	10B	00:55.00	00:35.12

Trial Day Number: Three

Evacuation: Four
Variables: Dark Jog

Undo: 00:49.31

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	00:54.99	00:05.68
2	18	1D	00:56.47	00:07.16
3	14	1E	00:57.41	00:08.10
4	6	1B	00:58.35	00:09.04
5	37	4C	00:59.29	00:09.98
6	22	3E	01:00.87	00:11.56
7	36	5E	01:01.67	00:12.36
8	11	4B	01:02.99	00:13.68
9	24	4E	01:04.79	00:15.48
10	16	5B	01:06.15	00:16.84
11	15	5A	01:07.13	00:17.82
12	33	4F	01:08.23	00:18.92
13	42	7D	01:09.35	00:20.04
14	28	8D	01:10.15	00:20.84
15	41	8C	01:11.55	00:22.24
16	40	6B	01:12.67	00:23.36
17	44	7B	01:13.73	00:24.42
18	13	10C	01:16.19	00:26.88
19	17	7A	01:20.63	00:31.32
20	12	7E	01:21.71	00:32.40
21	19	10A	01:22.71	00:33.40
22	10	10F	01:24.15	00:34.84
23	2	9E	01:25.47	00:36.16
24	34	8F	01:26.83	00:37.52

Undo: 00:30.44

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	3	2C	00:37.04	00:06.60
2	30	2D	00:38.20	00:07.76
3	32	3C	00:39.76	00:09.32
4	26	6D	00:40.84	00:10.40
5	29	4D	00:42.00	00:11.56
6	43	4A	00:44.20	00:13.76
7	38	6A	00:47.60	00:17.16
8	8	7C	00:49.96	00:19.52
9	4	6C	00:52.08	00:21.64
10	21	8A	00:54.04	00:23.60
11	25	9C	00:55.28	00:24.84
12	1	8B	00:56.32	00:25.88
13	23	6F	00:57.32	00:26.88
14	20	10B	00:58.56	00:28.12
15	31	10E	00:59.60	00:29.16
16	7	9A	01:00.88	00:30.44
17	5	9D	01:02.96	00:32.52
18	9	7F	01:04.40	00:33.96
19	27	10D	01:06.16	00:35.72
20	35	9F	01:07.48	00:37.04
21				
22				
23				
24				

Trial Day Number: Four
Evacuation:One
Variables: Light Jog

Undo: 00:13.32 Cabin crew 2 Undo: 00:17.90 Cabin crew 1

RI Type I Exit					LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**	**Position**	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	9	1C	00:18.70	00:05.38	1	33	1D	00:24.54	00:06.64
2	1	1A	00:23.22	00:09.90	2	17	3B	00:26.62	00:08.72
3	13	2D	00:24.90	00:11.58	3	41	1E	00:27.58	00:09.68
4	49	2C	00:25.42	00:12.10	4	45	1B	00:28.90	00:11.00
5	25	2E	00:26.86	00:13.54	5	21	1F	00:30.38	00:12.48
6	53	3A	00:28.06	00:14.74	6	2	4D	00:31.62	00:13.72
7	37	2A	00:28.74	00:15.42	7	29	2B	00:32.66	00:14.76
8	50	4C	00:29.78	00:16.46	8	5	3E	00:33.70	00:15.80
9	34	4E	00:32.70	00:19.38	9	26	5C	00:34.98	00:17.08
10	54	6C	00:34.50	00:21.18	10	42	5D	00:35.78	00:17.88
11	47	6E	00:35.50	00:22.18	11	14	4B	00:37.06	00:19.16
12	28	9E	00:36.86	00:23.54	12	31	8C	00:38.46	00:20.56
13	20	10E	00:38.38	00:25.06	13	38	4F	00:39.96	00:22.06
14	16	10B	00:39.58	00:26.26	14	18	6D	00:41.10	00:23.20
15	51	6B	00:40.90	00:27.58	15	10	5E	00:42.14	00:24.24
16	15	8E	00:43.54	00:30.22	16	46	5B	00:43.24	00:25.34
17	39	7D	00:45.26	00:31.94	17	32	10F	00:44.78	00:26.88
18	11	6A	00:46.66	00:33.34	18	22	4A	00:45.62	00:27.72
19	30	5F	00:48.34	00:35.02	19	43	7C	00:46.30	00:28.40
20	48	8F	00:49.18	00:35.86	20	27	8D	00:47.06	00:29.16
21	40	9D	00:50.50	00:37.18	21	7	7F	00:49.10	00:31.20
22	24	9B	00:52.34	00:39.02	22	6	5A	00:51.10	00:33.20
23	8	9A	00:53.62	00:40.30	23	35	6F	00:52.06	00:34.16
24	12	9F	00:56.10	00:42.78	24	3	7A	00:53.22	00:35.32
25					25	23	7F	00:54.46	00:36.56
26					26	19	8B	00:55.26	00:37.36
27					27	44	9C	00:56.22	00:38.32
28					28	36	10C	00:57.54	00:39.64

29						29	4	10D	00:58.20	00:40.30
30						30	52	8A	01:00.26	00:42.36

Trial Day Number: Four
Evacuation: Two
Variables: Dark Jog

Undo: 00:53.73

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	3	2C	01:01.45	00:07.72
2	14	1E	01:02.49	00:08.76
3	53	2B	01:05.21	00:11.48
4	30	2D	01:06.49	00:12.76
5	46	2A	01:11.45	00:17.72
6	22	3E	01:12.45	00:18.72
7	20	6F	01:13.53	00:19.80
8	11	4B	01:15.61	00:21.88
9	16	5B	01:17.21	00:23.48
10	9	7F	01:18.61	00:24.88
11	28	8D	01:20.01	00:26.28
12	1	8B	01:22.25	00:28.52
13	44	7B	01:23.25	00:29.52
14	2	9E	01:24.21	00:30.48
15	31	10E	01:25.53	00:31.80
16	35	10D	01:26.85	00:33.12
17	49	9B	01:28.29	00:34.56
18	41	8C	01:30.13	00:36.40
19	21	8A	01:31.69	00:37.96
20	34	8F	01:33.09	00:39.36
21	5	9D	01:34.81	00:41.08
22	25	9C	01:36.33	00:42.60
23	19	10A	01:37.81	00:44.08
24	10	10F	01:39.25	00:45.52
25				
26				
27				

Undo: 00:27.42

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	00:33.06	00:05.64
2	18	1D	00:34.50	00:07.08
3	6	1B	00:37.50	00:10.08
4	32	3C	00:38.82	00:11.40
5	43	4D	00:39.74	00:12.32
6	50	1F	00:40.46	00:13.04
7	47	2E	00:41.42	00:14.00
8	29	4A	00:43.22	00:15.80
9	52	3D	00:44.22	00:16.80
10	51	3A	00:44.90	00:17.48
11	45	5C	00:48.42	00:21.00
12	37	4C	00:49.38	00:21.96
13	24	4E	00:50.38	00:22.96
14	15	5A	00:51.50	00:24.08
15	8	7C	00:52.22	00:24.80
16	26	6D	00:54.42	00:27.00
17	4	6C	00:55.46	00:28.04
18	33	4F	00:56.78	00:29.36
19	54	5D	00:58.14	00:30.72
20	36	5E	01:00.30	00:32.88
21	40	6B	01:01.74	00:34.32
22	38	6A	01:02.90	00:35.48
23	17	7A	01:03.98	00:36.56
24	48	6E	01:05.08	00:37.66
25	13	10C	01:06.12	00:38.70
26	27	9F	01:06.86	00:39.44
27	7	9A	01:07.84	00:40.42

28						28	42	7D	01:09.36	00:41.94
						29	23	10B	01:10.22	00:42.80

Trial Day Number: Four
Evacuation: Three
Variables: Dark Straight

Undo: 00:55.95

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	35	2C	01:02.83	00:06.88
2	11	2D	01:03.99	00:08.04
3	8	1E	01:05.07	00:09.12
4	23	3C	01:06.23	00:10.28
5	31	1F	01:08.27	00:12.32
6	1	4C	01:09.93	00:13.98
7	28	3F	01:10.87	00:14.92
8	9	3E	01:12.31	00:16.36
9	20	4B	01:13.39	00:17.44
10	13	3A	01:14.75	00:18.80
11	19	5D	01:16.07	00:20.12
12	21	6C	01:17.55	00:21.60
13	37	6F	01:01.99	00:06.04
14	7	5C	01:25.07	00:29.12
15				
16				
17				
18	ABORTED			

Undo: 00:24.03

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	34	1C	00:29.63	00:05.60
2	38	1D	00:31.07	00:07.04
3	40	1B	00:32.63	00:08.60
4	10	1A	00:34.19	00:10.16
5	48	3D	00:35.19	00:11.16
6	2	2B	00:36.15	00:12.12
7	42	2E	00:37.03	00:13.00
8	54	2F	00:38.39	00:14.36
9	24	2A	00:39.23	00:15.20
10	26	3B	00:40.51	00:16.48
11	4	4F	00:42.47	00:18.44
12	3	4E	00:43.79	00:19.76
13	49	5F	00:44.99	00:20.96
14	16	7C	00:46.71	00:22.68
15	44	4A	00:48.19	00:24.16
16	27	5E	00:49.59	00:25.56
17				
18				

Trial Day Number: Four
Evacuation: Four
Variables: Light Straight

Undo: 00:51.53

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	28	1D	00:58.21	00:06.68
2	15	3D	00:59.45	00:07.92
3	20	2D	01:00.65	00:09.12
4	35	3B	01:01.49	00:09.96
5	43	2E	01:02.61	00:11.08
6	47	4D	01:04.69	00:13.16
7	19	1F	01:06.93	00:15.40
8	48	5C	01:08.01	00:16.48
9	21	4B	01:09.08	00:17.55
10	18	4A	01:10.45	00:18.92
11	24	6C	01:11.73	00:20.20
12	29	6D	01:12.61	00:21.08
13	14	7F	01:13.41	00:21.88
14	5	5A	01:15.63	00:24.10
15	50	6E	01:17.01	00:25.48
16	44	5E	01:18.49	00:26.96
17	34	6A	01:19.80	00:28.27
18	30	9C	01:20.93	00:29.40
19	46	8C	01:22.49	00:30.96
20	6	7D	01:24.07	00:32.54
21	1	10E	01:25.89	00:34.36
22	11	9E	01:27.17	00:35.64
23	26	9F	01:28.69	00:37.16
24	41	10C	01:30.49	00:38.96
25	54	9B	01:31.69	00:40.16
26	9	10B	01:32.69	00:41.16
27				

Undo: 00:22.34

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	4	1B	00:28.78	00:06.44
2	23	1A	00:30.14	00:07.80
3	51	4C	00:30.94	00:08.60
4	32	1E	00:32.18	00:09.84
5	7	2B	00:32.94	00:10.60
6	16	2F	00:34.18	00:11.84
7	27	2A	00:34.70	00:12.36
8	36	3E	00:36.14	00:13.80
9	31	3A	00:38.30	00:15.96
10	2	7A	00:39.66	00:17.32
11	40	3F	00:40.78	00:18.44
12	39	5B	00:41.74	00:19.40
13	52	4E	00:43.26	00:20.92
14	25	4F	00:44.18	00:21.84
15	49	8A	00:45.94	00:23.60
16	8	5D	00:46.46	00:24.12
17	17	5F	00:47.62	00:25.28
18	10	8D	00:48.18	00:25.84
19	22	7C	00:49.26	00:26.92
20	53	10D	00:50.94	00:28.60
21	38	8B	00:52.38	00:30.04
22	3	9D	00:53.62	00:31.28
23	13	7B	00:54.38	00:32.04
24	37	8E	00:56.38	00:34.04
25	42	8F	00:57.14	00:34.80
26	45	7E	01:00.06	00:37.72
27	33	9A	01:01.50	00:39.16

Trial Day Number: Five
Evacuation:One
Variables: Light Jog

Undo: 00:50.25 Cabin crew 2 Undo: 00:08.49 Cabin crew 1

RI Type I Exit					LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**	**Position**	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	29	2B	00:59.31	00:09.06	1	9	1C	00:14.21	00:05.72
2	41	1E	01:00.51	00:10.26	2	5	3E	00:15.05	00:06.56
3	1	1A	01:01.43	00:11.18	3	33	1D	00:16.21	00:07.72
4	37	2A	01:02.51	00:12.26	4	45	1B	00:17.77	00:09.28
5	13	2D	01:04.47	00:14.22	5	21	1F	00:19.61	00:11.12
6	14	4B	01:05.47	00:15.22	6	17	3B	00:21.01	00:12.52
7	53	3A	01:06.79	00:16.54	7	50	4C	00:21.85	00:13.36
8	2	4D	01:09.07	00:18.82	8	25	2E	00:23.09	00:14.60
9	46	5B	01:10.39	00:20.14	9	42	5D	00:24.89	00:16.40
10	18	6D	01:12.71	00:22.46	10	22	4A	00:26.41	00:17.92
11	10	5E	01:14.83	00:24.58	11	26	5C	00:28.31	00:19.82
12	43	7C	01:16.27	00:26.02	12	6	5A	00:29.61	00:21.12
13	31	8C	01:16.83	00:26.58	13	34	4E	00:30.61	00:22.12
14	47	6E	01:18.55	00:28.30	14	54	6C	00:31.77	00:23.28
15	39	7D	01:19.99	00:29.74	15	38	4F	00:33.15	00:24.66
16	35	6F	01:21.35	00:31.10	16	30	5F	00:34.57	00:26.08
17	36	10C	01:25.55	00:35.30	17	51	6B	00:36.59	00:28.10
18	16	10B	01:26.59	00:36.34	18	11	6A	00:37.41	00:28.92
19	24	9B	01:28.71	00:38.46	19	3	7A	00:38.45	00:29.96
20	48	8F	01:30.95	00:40.70	20	44	9C	00:40.13	00:31.64
21	20	10E	01:33.15	00:42.90	21	23	7E	00:41.29	00:32.80
22	12	9F	01:34.75	00:44.50	22	7	7F	00:41.85	00:33.36
23					23	27	8D	00:42.69	00:34.20
24					24	19	8B	00:45.01	00:36.52
25					25	52	8A	00:46.25	00:37.76
26					26	15	8E	00:47.37	00:38.88
27					27	40	9D	00:49.37	00:40.88
28					28	8	9A	00:51.13	00:42.64
29					29	4	10D	00:52.41	00:43.92

30						30	32	10F	00:53.81	00:45.32
31						31	28	9E	00:55.01	00:46.52

Trial Day Number: Five
Evacuation: Two
Variables: Dark Jog

Undo: 00:36.65

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	00:41.49	00:04.84
2	18	1D	00:43.73	00:07.08
3	30	2D	00:44.61	00:07.96
4	3	2C	00:45.53	00:08.88
5	50	1F	00:47.13	00:10.48
6	47	2E	00:47.97	00:11.32
7	46	2A	00:49.21	00:12.56
8	37	4C	00:50.65	00:14.00
9	43	4D	00:52.33	00:15.68
10	29	4A	00:53.73	00:17.08
11	16	5B	00:54.97	00:18.32
12	36	5E	00:56.69	00:20.04
13	4	6C	00:58.05	00:21.40
14	40	6B	01:01.65	00:25.00
15	41	8C	01:02.53	00:25.88
16	48	6E	01:03.81	00:27.16
17	42	7D	01:05.49	00:28.84
18	44	7B	01:07.61	00:30.96
19	28	8D	01:09.29	00:32.64
20	9	7F	01:10.90	00:34.25
21	1	8B	01:11.81	00:35.16
22	21	8A	01:13.01	00:36.36
23	7	9A	01:14.25	00:37.60
24	19	10A	01:17.57	00:40.92
25	5	9D	01:18.81	00:42.16
26	2	9E	01:19.77	00:43.12
27	27	9F	01:21.05	00:44.40

Undo: 00:14.58

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	6	1B	00:22.34	00:07.76
2	14	1E	00:23.42	00:08.84
3	32	3C	00:24.46	00:09.88
4	53	2B	00:26.34	00:11.76
5	52	3D	00:27.30	00:12.72
6	22	3E	00:29.92	00:15.34
7	51	3A	00:31.26	00:16.68
8	45	5C	00:32.14	00:17.56
9	11	4B	00:33.60	00:19.02
10	54	5D	00:35.70	00:21.12
11	24	4E	00:36.54	00:21.96
12	33	4F	00:37.54	00:22.96
13	15	5A	00:38.50	00:23.92
14	20	6F	00:39.70	00:25.12
15	38	6A	00:41.70	00:27.12
16	26	6D	00:43.18	00:28.60
17	8	7C	00:45.62	00:31.04
18	17	7A	00:47.42	00:32.84
19	12	7E	00:48.82	00:34.24
20	25	9C	00:51.42	00:36.84
21	34	8F	00:53.10	00:38.52
22	35	10D	00:54.10	00:39.52
23	31	10E	00:55.10	00:40.52
24	13	10C	00:58.78	00:44.20
25	23	10B	01:00.42	00:45.84
26				
27				

28	10	10F	01:22.93	00:46.28	28				

Trial Day Number: Five
Evacuation: Three
Variables: Dark Straight

Undo: 00:58.46

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	38	1D	01:04.38	00:05.92
2	8	1E	01:06.66	00:08.20
3	48	3D	01:07.94	00:09.48
4	42	2E	01:09.54	00:11.08
5	24	2A	01:11.40	00:12.94
6	23	3C	01:12.90	00:14.44
7	7	5C	01:14.30	00:15.84
8	54	2F	01:15.26	00:16.80
9	19	5D	01:16.70	00:18.24
10	26	3B	01:18.10	00:19.64
11	13	3A	01:19.62	00:21.16
12	32	6D	01:20.94	00:22.48
13	44	4A	01:21.86	00:23.40
14	16	7C	01:22.54	00:24.08
15	4	4F	01:23.98	00:25.52
16	27	5E	01:25.14	00:26.68
17	50	8B	01:26.94	00:28.48
18	33	7E	01:28.70	00:30.24
19	36	7F	01:29.90	00:31.44
20	17	9D	01:32.26	00:33.80
21	15	10C	01:33.98	00:35.52
22	43	8F	01:35.14	00:36.68
23	22	10B	01:35.98	00:37.52
24	46	10E	01:37.46	00:39.00
25	45	9A	01:39.06	00:40.60
26	29	10D	01:40.10	00:41.64

Undo: 00:31.65

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	34	1C	00:36.79	00:05.14
2	11	2D	00:39.15	00:07.50
3	31	1F	00:40.75	00:09.10
4	40	1B	00:42.83	00:11.18
5	10	1A	00:43.83	00:12.18
6	35	2C	00:44.55	00:12.90
7	2	2B	00:45.63	00:13.98
8	9	3E	00:48.35	00:16.70
9	3	4E	00:50.75	00:19.10
10	1	4C	00:52.11	00:20.46
11	28	3F	00:53.55	00:21.90
12	5	6B	00:55.07	00:23.42
13	12	5B	00:56.07	00:24.42
14	41	5A	00:57.79	00:26.14
15	52	6E	00:59.15	00:27.50
16	53	6A	01:00.31	00:28.66
17	30	7B	01:01.59	00:29.94
18	37	6F	01:02.99	00:31.34
19	25	7A	01:04.11	00:32.46
20	14	9C	01:04.71	00:33.06
21	47	8A	01:05.57	00:33.92
22	6	9E	01:09.35	00:37.70
23	18	8E	01:10.55	00:38.90
24	39	9F	01:11.95	00:40.30
25	51	9B	01:13.98	00:42.33
26				

Trial Day Number: Five
Evacuation: Four
Variables: Light Straight

Undo: 00:18.67

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	12	2C	00:24.93	00:06.26
2	32	1E	00:26.51	00:07.84
3	19	1F	00:27.59	00:08.92
4	43	2F	00:28.87	00:10.20
5	27	2A	00:30.15	00:11.48
6	15	3D	00:30.91	00:12.24
7	52	4E	00:31.81	00:13.14
8	40	3F	00:34.81	00:16.14
9	48	5C	00:37.07	00:18.40
10	39	5B	00:38.63	00:19.96
11	5	5A	00:39.31	00:20.64
12	29	6D	00:40.39	00:21.72
13	8	5D	00:41.95	00:23.28
14	17	5F	00:43.63	00:24.96
15	6	7D	00:45.55	00:26.88
16	50	6E	00:47.47	00:28.80
17	30	9C	00:48.79	00:30.12
18	45	7E	00:50.55	00:31.88
19	38	8B	00:52.03	00:33.36
20	3	9D	00:52.87	00:34.20
21	41	10C	00:54.27	00:35.60
22	42	8F	00:55.79	00:37.12
23	53	10D	00:58.19	00:39.52
24	9	10B	01:00.15	00:41.48
25				
26				

Undo: 00:51.69

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	28	1D	00:56.93	00:05.24
2	4	1B	00:58.73	00:07.04
3	7	2B	01:00.17	00:08.48
4	23	1A	01:01.45	00:09.76
5	16	2F	01:02.69	00:11.00
6	47	4D	01:04.13	00:12.44
7	36	3E	01:05.41	00:13.72
8	35	3B	01:06.17	00:14.48
9	31	3A	01:06.77	00:15.08
10	51	4C	01:09.37	00:17.68
11	18	4A	01:10.79	00:19.10
12	25	6C	01:11.89	00:20.20
13	24	4F	01:12.61	00:20.92
14	22	7C	01:15.89	00:24.20
15	44	5E	01:17.33	00:25.64
16	46	8C	01:18.29	00:26.60
17	34	6A	01:19.53	00:27.84
18	13	7B	01:21.75	00:30.06
19	2	7A	01:22.89	00:31.20
20	14	7F	01:23.81	00:32.12
21	10	8D	01:25.21	00:33.52
22	37	8E	01:27.05	00:35.36
23	54	9B	01:28.57	00:36.88
24	33	9A	01:29.49	00:37.80
25	11	9E	01:31.17	00:39.48
26	26	9F	01:32.65	00:40.96

27						27	1	10E	01:33.45	00:41.76

Trial Day Number: Six
Evacuation:One
Variables: Light Straight

Undo: 00:46.55 Cabin crew 3

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	11	2D	00:55.71	00:09.16
2	40	1B	00:56.79	00:10.24
3	8	1E	00:57.71	00:11.16
4	1	4C	00:58.44	00:11.89
5	3	4E	00:59.95	00:13.40
6	19	5D	01:00.95	00:14.40
7	26	3B	01:06.27	00:19.72
8	9	3E	01:08.59	00:22.04
9	4	4F	01:10.19	00:23.64
10	28	3F	01:11.43	00:24.88
11	41	5A	01:13.43	00:26.88
12	52	6E	01:17.11	00:30.56
13	46	10E	01:18.35	00:31.80
14	25	7A	01:22.31	00:35.76
15	36	7F	01:23.35	00:36.80
16	49	5F	01:25.19	00:38.64
17	18	8E	01:26.47	00:39.92
18	17	9D	01:28.15	00:41.60
19	14	9C	01:29.11	00:42.56
20				
21				
22				
23				
24				
25				
26				
27				
28				

Undo: 00:59.51 Cabin crew 1

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	38	1D	01:05.31	00:05.80
2	34	1C	01:06.23	00:06.72
3	10	1A	01:09.55	00:10.04
4	31	1F	01:10.71	00:11.20
5	35	2C	01:12.31	00:12.80
6	48	3D	01:13.31	00:13.80
7	42	2E	01:14.11	00:14.60
8	33	7E	01:14.43	00:14.92
9	2	2B	01:15.91	00:16.40
10	23	3C	01:17.03	00:17.52
11	24	2A	01:18.07	00:18.56
12	13	3A	01:19.55	00:20.04
13	21	6C	01:20.87	00:21.36
14	32	6D	01:21.51	00:22.00
15	20	4B	01:22.39	00:22.88
16	7	5C	01:23.63	00:24.12
17	12	5B	01:24.63	00:25.12
18	39	9F	01:25.59	00:26.08
19	5	6B	01:26.75	00:27.24
20	30	7B	01:27.69	00:28.18
21	51	9B	01:28.43	00:28.92
22	22	10B	01:29.51	00:30.00
23	16	7C	01:30.63	00:31.12
24	37	6F	01:31.55	00:32.04
25	6	9E	01:32.23	00:32.72
26	44	4A	01:32.69	00:33.18
27	50	8B	01:33.81	00:34.30
28	15	10C	01:35.63	00:36.12

29						29	45	9A	01:36.87	00:37.36
30						30	47	8A	01:37.67	00:38.16
31						31	43	8F	01:39.15	00:39.64
						32	28	10D	01:39.95	00:40.44
						33	27	5E	01:41.15	00:41.64

Trial Day Number: Six
Evacuation: Two
Variables: Light Jog

Undo: 00:19.88

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	4	1B	00:25.91	00:06.03
2	28	1D	00:27.07	00:07.19
3	7	2B	00:30.59	00:10.71
4	51	4C	00:31.43	00:11.55
5	47	4D	00:33.23	00:13.35
6	43	2E	00:35.55	00:15.67
7	36	3E	00:36.83	00:16.95
8	52	4E	00:37.39	00:17.51
9	8	5D	00:38.99	00:19.11
10	6	7D	00:39.79	00:19.91
11	35	3B	00:41.71	00:21.83
12	50	6E	00:42.37	00:22.49
13	33	9A	00:43.45	00:23.57
14	3	9D	00:44.27	00:24.39
15	44	5E	00:47.63	00:27.75
16	49	8A	00:48.95	00:29.07
17	17	5F	00:49.95	00:30.07
18	13	7B	00:51.59	00:31.71
19	45	7E	00:53.11	00:33.23
20	37	8E	00:54.21	00:34.33
21	24	6C	00:58.23	00:38.35
22				
23				
24				
25				
26				
27				

Undo: 00:49.01

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	16	1C	00:54.17	00:05.16
2	32	1E	00:55.77	00:06.76
3	19	1F	00:57.33	00:08.32
4	12	2C	00:58.05	00:09.04
5	40	3F	00:58.93	00:09.92
6	20	2D	01:00.09	00:11.08
7	23	1A	01:01.17	00:12.16
8	15	3A	01:02.25	00:13.24
9	21	3D	01:03.05	00:14.04
10	48	4B	01:04.33	00:15.32
11	31	5C	01:05.33	00:16.32
12	29	6D	01:07.41	00:18.40
13	22	7C	01:08.37	00:19.36
14	18	4A	01:10.73	00:21.72
15	14	7F	01:11.93	00:22.92
16	5	5A	01:12.57	00:23.56
17	6	8C	01:13.53	00:24.52
18	39	5B	01:14.49	00:25.48
19	9	10B	01:15.89	00:26.88
20	25	4F	01:17.09	00:28.08
21	38	8B	01:18.21	00:29.20
22	10	8D	01:19.01	00:30.00
23	30	9C	01:20.29	00:31.28
24	3	6A	01:21.09	00:32.08
25	1	10E	01:21.89	00:32.88
26	42	10C	01:23.01	00:34.00
27	41	8F	01:23.97	00:34.96

28						28	2	7A	01:24.89	00:35.88
						29	11	9E	01:26.73	00:37.72
						30	26	9F	01:27.65	00:38.64

Trial Day Number: Six
Evacuation: Three
Variables: Dark Jog

Undo: 00:57.91

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	33	1D	01:02.79	00:04.88
2	49	2C	01:04.15	00:06.24
3	1	1A	01:07.15	00:09.24
4	29	2B	01:08.51	00:10.60
5	21	1F	01:10.51	00:12.60
6	50	4C	01:11.23	00:13.32
7	25	2E	01:13.51	00:15.60
8	17	3B	01:15.55	00:17.64
9	22	4A	01:16.91	00:19.00
10	5	3E	01:17.83	00:19.92
11	34	4E	01:18.79	00:20.88
12	2	4D	01:20.63	00:22.72
13	30	5F	01:21.55	00:23.64
14	47	6E	01:22.15	00:24.24
15	39	7D	01:23.91	00:26.00
16	10	5E	01:24.87	00:26.96
17	19	8B	01:25.69	00:27.78
18	46	5B	01:26.63	00:28.72
19	3	7A	01:27.55	00:29.64
20	8	9A	01:28.51	00:30.60
21	52	8A	01:29.75	00:31.84
22	28	9E	01:30.75	00:32.84
23	40	9D	01:32.65	00:34.74
24	23	7E	01:33.41	00:35.50
25	48	8F	01:36.83	00:38.92
26	24	9B	01:38.23	00:40.32
27	20	10E	01:39.87	00:41.96

Undo: 00:24.00

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	9	1C	00:29.48	00:05.48
2	45	1B	00:31.08	00:07.08
3	41	1E	00:33.40	00:09.40
4	37	2A	00:35.32	00:11.32
5	13	2D	00:36.64	00:12.64
6	6	5A	00:40.80	00:16.80
7	38	4F	00:42.64	00:18.64
8	14	4B	00:43.72	00:19.72
9	51	6B	00:44.64	00:20.64
10	42	5D	00:45.96	00:21.96
11	26	5C	00:46.76	00:22.76
12	18	6D	00:48.44	00:24.44
13	35	6F	00:49.36	00:25.36
14	12	9F	00:50.40	00:26.40
15	31	8C	00:51.40	00:27.40
16	15	8E	00:52.36	00:28.36
17	4	10D	00:54.36	00:30.36
18	11	6A	00:55.56	00:31.56
19	32	10F	00:56.24	00:32.24
20	36	10C	00:57.20	00:33.20
21	16	10B	00:59.80	00:35.80
22	7	7F	01:01.32	00:37.32
23	43	7C	01:03.04	00:39.04
24	44	9C	01:04.28	00:40.28
25				
26				

Trial Day Number: Six
Evacuation: Four
Variables: Dark Straight

Undo: 00:21.22

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	3	2C	00:26.66	00:05.44
2	50	1F	00:29.18	00:07.96
3	37	2B	00:30.50	00:09.28
4	46	2A	00:31.62	00:10.40
5	47	2E	00:32.42	00:11.20
6	51	3A	00:33.52	00:12.30
7	33	4F	00:34.12	00:12.90
8	4	6C	00:35.46	00:14.24
9	29	4A	00:37.22	00:16.00
10	24	4E	00:38.50	00:17.28
11	38	6A	00:40.14	00:18.92
12	40	6B	00:41.62	00:20.40
13	41	8C	00:42.90	00:21.68
14	1	8B	00:44.86	00:23.64
15	15	5A	00:46.34	00:25.12
16	44	7B	00:47.74	00:26.52
17	19	10A	00:48.86	00:27.64
18	17	7A	00:50.10	00:28.88
19	12	7E	00:51.22	00:30.00
20	10	10F	00:52.30	00:31.08
21	49	9B	00:53.26	00:32.04
22	13	10C	00:55.26	00:34.04
23	25	2E	00:58.10	00:36.88
24				
25				
26				

Undo: 00:34.82

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	00:40.09	00:05.27
2	6	1B	00:40.97	00:06.15
3	18	1D	00:42.01	00:07.19
4	30	2D	00:42.97	00:08.15
5	14	1E	00:44.05	00:09.23
6	32	3C	00:45.05	00:10.23
7	52	3D	00:46.13	00:11.31
8	43	4D	00:48.01	00:13.19
9	22	3E	00:49.65	00:14.83
10	11	4B	00:51.01	00:16.19
11	45	5C	00:51.93	00:17.11
12	36	5E	00:52.97	00:18.15
13	48	6E	00:53.93	00:19.11
14	8	7C	00:54.85	00:20.03
15	16	5B	00:55.85	00:21.03
16	20	10F	00:57.26	00:22.44
17	21	8A	00:58.37	00:23.55
18	26	6D	00:59.69	00:24.87
19	42	7D	01:00.05	00:25.23
20	9	7F	01:01.89	00:27.07
21	28	8D	01:02.73	00:27.91
22	34	8F	01:03.65	00:28.83
23	5	9D	01:04.49	00:29.67
24	23	10B	01:05.77	00:30.95
25	31	10E	01:06.90	00:32.08
26	35	10D	01:07.89	00:33.07

27						27	2	9E	01:08.97	00:34.15
28						28	7	9A	01:10.93	00:36.11

Trial Day Number: Seven
Evacuation:One
Variables: Light Straight

Undo: 00:29.21 Cabin crew 1 Undo: 00:34.12 Cabin crew 2

RI Type I Exit						LI Type I Exit			
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**	**Position**	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	28	1D	00:35.21	00:06.00	1	12	2C	00:42.06	00:07.94
2	4	1B	00:36.17	00:06.96	2	20	2D	00:42.76	00:08.64
3	23	1A	00:38.33	00:09.12	3	43	2E	00:44.08	00:09.96
4	47	4D	00:40.29	00:11.08	4	7	2B	00:44.96	00:10.84
5	21	4B	00:41.97	00:12.76	5	32	1E	00:45.96	00:11.84
6	19	1F	00:45.37	00:16.16	6	15	3D	00:46.96	00:12.84
7	25	4F	00:46.81	00:17.60	7	27	2A	00:48.48	00:14.36
8	16	2F	00:48.09	00:18.88	8	24	6C	00:49.52	00:15.40
9	36	3E	00:49.57	00:20.36	9	40	3F	00:50.72	00:16.60
10	31	3A	00:50.43	00:21.22	10	48	5C	00:51.92	00:17.80
11	18	4A	00:51.13	00:21.92	11	35	3B	00:53.04	00:18.92
12	39	5B	00:52.61	00:23.40	12	34	6A	00:53.92	00:19.80
13	44	5E	00:54.33	00:25.12	13	8	5D	00:54.04	00:19.92
14	6	7D	00:54.77	00:25.56	14	22	7C	00:56.36	00:22.24
15	13	7B	00:55.73	00:26.52	15	5	5A	00:58.44	00:24.32
16	14	7F	00:56.23	00:27.02	16	46	8C	00:59.44	00:25.32
17	42	8F	00:57.69	00:28.48	17	41	10C	01:00.60	00:26.48
18	29	6D	00:59.69	00:30.48	18	26	9F	01:01.52	00:27.40
19	9	10B	01:00.91	00:31.70	19	33	9A	01:02.52	00:28.40
20	38	8B	01:01.51	00:32.30	20	10	8D	01:03.60	00:29.48
21	3	9D	01:02.31	00:33.10	21	45	7E	01:04.44	00:30.32
22	37	8E	01:03.93	00:34.72	22	30	9C	01:05.60	00:31.48
23	1	10E	01:05.67	00:36.46	23	11	9E	01:06.88	00:32.76
24					24	2	7A	01:09.80	00:35.68

Trial Day Number: Seven
Evacuation: Two
Variables: Light Jog

Undo: 00:01.63

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	33	1D	00:08.31	00:06.68
2	41	1E	00:09.03	00:07.40
3	25	2E	00:12.15	00:10.52
4	2	4D	00:13.91	00:12.28
5	5	3E	00:15.63	00:14.00
6	34	4E	00:16.41	00:14.78
7	42	5D	00:17.91	00:16.28
8	11	6A	00:18.91	00:17.28
9	38	4F	00:19.75	00:18.12
10	31	8C	00:21.31	00:19.68
11	22	4A	00:22.61	00:20.98
12	43	7C	00:24.35	00:22.72
13	39	7D	00:25.31	00:23.68
14	23	7E	00:26.79	00:25.16
15	19	8B	00:28.47	00:26.84
16	3	7A	00:29.63	00:28.00
17	27	8D	00:32.01	00:30.38
18	48	8F	00:34.40	00:32.77
19	8	9A	00:35.47	00:33.84
20	28	9E	00:36.27	00:34.64
21	36	10C	00:37.11	00:35.48
22	16	10B	00:38.79	00:37.16
23				
24				
25				

Undo: 00:08.82

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	9	1C	00:16.58	00:07.76
2	13	2D	00:17.58	00:08.76
3	21	1F	00:18.78	00:09.96
4	45	1B	00:19.82	00:11.00
5	1	1A	00:21.34	00:12.52
6	29	2A	00:22.62	00:13.80
7	37	2B	00:23.50	00:14.68
8	14	4B	00:24.74	00:15.92
9	6	5A	00:25.74	00:16.92
10	10	5E	00:26.94	00:18.12
11	26	5C	00:27.70	00:18.88
12	46	5B	00:29.26	00:20.44
13	30	5F	00:30.18	00:21.36
14	18	6D	00:30.98	00:22.16
15	47	6E	00:33.50	00:24.68
16	35	6F	00:35.30	00:26.48
17	44	9C	00:36.42	00:27.60
18	7	7F	00:37.26	00:28.44
19	24	9B	00:37.98	00:29.16
20	40	9D	00:39.74	00:30.92
21	15	8E	00:41.22	00:32.40
22	4	10D	00:42.82	00:34.00
23	20	10E	00:44.62	00:35.80
24	12	9F	00:45.59	00:36.77
25	32	10F	00:46.30	00:37.48

Trial Day Number: Seven
Evacuation: Three
Variables: Dark Jog

Undo: 00:55.86

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	30	2D	01:04.78	00:08.92
2	14	1E	01:06.10	00:10.24
3	32	3C	01:06.90	00:11.04
4	22	3E	01:08.34	00:12.48
5	37	4C	01:09.34	00:13.48
6	29	4A	01:13.14	00:17.28
7	26	6D	01:13.94	00:18.08
8	45	5C	01:15.06	00:19.20
9	8	7C	01:16.06	00:20.20
10	16	5B	01:01.50	00:05.64
11	9	7F	01:19.30	00:23.44
12	21	8A	01:19.98	00:24.12
13	25	9C	01:21.02	00:25.16
14	36	5E	01:22.54	00:26.68
15	38	6A	01:23.90	00:28.04
16	48	6E	01:25.66	00:29.80
17	28	8D	01:26.74	00:30.88
18	13	10C	01:28.06	00:32.20
19	19	10A	01:30.66	00:34.80
20	7	9A	01:31.38	00:35.52
21	12	7E	01:32.46	00:36.60
22	10	10F	01:36.26	00:40.40
23				
24				
25				

Undo: 00:59.23

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	01:04.43	00:05.20
2	3	2C	01:05.51	00:06.28
3	6	1B	01:07.71	00:08.48
4	46	2A	01:09.23	00:10.00
5	18	1D	01:10.19	00:10.96
6	47	2E	01:11.71	00:12.48
7	43	4D	01:12.75	00:13.52
8	24	4B	01:13.63	00:14.40
9	11	4E	01:14.79	00:15.56
10	4	6C	01:15.59	00:16.36
11	33	4F	01:16.91	00:17.68
12	40	6B	01:18.11	00:18.88
13	41	8C	01:19.27	00:20.04
14	42	7D	01:20.43	00:21.20
15	34	8F	01:23.99	00:24.76
16	15	5A	01:25.75	00:26.52
17	44	7B	01:27.55	00:28.32
18	1	8B	01:28.43	00:29.20
19	20	6F	01:29.91	00:30.68
20	23	10B	01:31.87	00:32.64
21	35	10D	01:32.83	00:33.60
22	2	9E	01:34.55	00:35.32
23	5	9D	01:37.03	00:37.80
24	31	10E	01:38.23	00:39.00
25	27	9F	01:40.03	00:40.80

Trial Day Number: Seven
Evacuation: Four
Variables: Dark Straight

Undo: 00:17.15

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	38	1D	00:23.83	00:06.68
2	42	2E	00:28.67	00:11.52
3	7	5C	00:29.99	00:12.84
4	1	4C	00:31.03	00:13.88
5	21	6C	00:32.13	00:14.98
6	35	2C	00:32.79	00:15.64
7	20	4B	00:34.07	00:16.92
8	9	3E	00:35.03	00:17.88
9	19	5D	00:36.35	00:19.20
10	44	4A	00:37.35	00:20.20
11	28	3F	00:38.19	00:21.04
12	32	6D	00:39.07	00:21.92
13	14	9C	00:39.95	00:22.80
14	45	9A	00:41.03	00:23.88
15	27	5E	00:42.07	00:24.92
16	16	7C	00:43.47	00:26.32
17	41	5A	00:44.43	00:27.28
18	30	7B	00:45.35	00:28.20
19	6	9E	00:46.27	00:29.12
20	18	8E	00:47.03	00:29.88
21	29	10D	00:48.31	00:31.16
22	33	7E	00:49.47	00:32.32
23	36	7F	00:50.51	00:33.36
24	22	10B	00:51.67	00:34.52

Undo: 00:33.75

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	34	1C	00:38.31	00:04.56
2	40	1B	00:39.59	00:05.84
3	11	2D	00:41.03	00:07.28
4	10	1A	00:41.87	00:08.12
5	23	3C	00:43.89	00:10.14
6	8	1E	00:44.43	00:10.68
7	31	1F	00:45.87	00:12.12
8	24	2A	00:46.37	00:12.62
9	48	3D	00:48.31	00:14.56
10	26	3B	00:49.39	00:15.64
11	13	3A	00:51.11	00:17.36
12	2	2B	00:54.15	00:20.40
13	25	7A	00:55.55	00:21.80
14	5	7E	00:57.07	00:23.32
15	12	5B	00:58.83	00:25.08
16	37	6F	01:00.45	00:26.70
17	47	8A	01:01.95	00:28.20
18	43	8F	01:03.39	00:29.64
19	15	10C	01:04.31	00:30.56
20	39	9F	01:06.35	00:32.60
21	46	10E	01:08.23	00:34.48
22				
23				
24				

Trial Day Number: Eight
Evacuation:One
Variables: Light Jog

Undo: 00:00.72 Cabin crew 2 Undo: 00:54.85 Cabin crew 1

RI Type I Exit					LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**	**Position**	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	9	1C	00:05.36	00:04.64	1	45	1B	01:00.61	00:05.76
2	13	2D	00:06.32	00:05.60	2	49	2C	01:01.45	00:06.60
3	5	3E	00:10.28	00:09.56	3	41	1E	01:02.29	00:07.44
4	1	1A	00:11.32	00:10.60	4	17	3B	01:03.37	00:08.52
5	26	5C	00:12.76	00:12.04	5	29	2B	01:04.29	00:09.44
6	37	2A	00:14.42	00:13.70	6	21	1F	01:05.41	00:10.56
7	18	6D	00:15.68	00:14.96	7	2	4D	01:06.29	00:11.44
8	50	4C	00:16.68	00:15.96	8	25	2E	01:06.93	00:12.08
9	34	4E	00:19.76	00:19.04	9	42	5D	01:08.45	00:13.60
10	10	5E	00:28.46	00:27.74	10	43	7C	01:10.17	00:15.32
11	44	9C	00:33.76	00:33.04	11	3	7A	01:10.93	00:16.08
12	24	9B	00:35.32	00:34.60	12	6	5A	01:12.29	00:17.44
13	51	6B	00:37.20	00:36.48	13	38	4F	01:13.85	00:19.00
14	22	4A	00:38.84	00:38.12	14	46	5B	01:16.89	00:22.04
15	31	8C	00:40.96	00:40.24	15	48	8F	01:17.69	00:22.84
16	40	9D	00:42.60	00:41.88	16	7	7F	01:18.37	00:23.52
17	20	10E	00:45.20	00:44.48	17	27	8D	01:19.41	00:24.56
18	4	10D	00:46.60	00:45.88	18	23	7E	01:20.65	00:25.80
19	32	10F	00:47.72	00:47.00	19	8	9A	01:21.85	00:27.00
20					20	30	5F	01:25.25	00:30.40
21					21	39	7D	01:26.57	00:31.72
22					22	11	6A	01:31.53	00:36.68
23					23	14	4B	01:32.29	00:37.44
24					24	47	6E	01:33.25	00:38.40
25					25	35	6F	01:34.41	00:39.56
26					26	15	8E	01:35.45	00:40.60
27					27	12	9F	01:36.53	00:41.68
28					28	28	9E	01:37.57	00:42.72
29					29	19	8B	01:38.61	00:43.76

30						30	36	10C	01:39.77	00:44.92
31						31	16	10B	01:40.61	00:45.76

Trial Day Number: Eight
Evacuation: Two
Variables: Light Straight

Undo: 00:53.08

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	7	2B	01:01.08	00:08.00
2	4	1B	01:02.20	00:09.12
3	43	2E	01:07.28	00:14.20
4	51	4C	01:09.04	00:15.96
5	16	2F	01:10.24	00:17.16
6	25	4F	01:11.32	00:18.24
7	36	3E	01:13.24	00:20.16
8	4	5C	01:15.24	00:22.16
9	39	5B	01:16.40	00:23.32
10	37	8E	01:17.84	00:24.76
11	5	5A	01:18.80	00:25.72
12	6	7D	01:20.20	00:27.12
13	46	8C	01:21.44	00:28.36
14	26	9F	01:22.32	00:29.24
15	3	9D	01:23.12	00:30.04
16	47	4D	01:24.92	00:31.84
17	34	6A	01:26.72	00:33.64
18	42	8F	01:27.54	00:34.46
19	41	10C	01:28.40	00:35.32
20	1	10E	01:29.08	00:36.00
21	50	6E	01:30.68	00:37.60
22	38	8B	01:31.68	00:38.60
23	14	7F	01:33.52	00:40.44
24				
25				
26				
27				

Undo: 00:51.43

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	28	1D	00:56.39	00:04.96
2	32	1E	00:57.23	00:05.80
3	12	2C	00:58.11	00:06.68
4	20	2D	01:00.23	00:08.80
5	23	1A	01:02.51	00:11.08
6	27	2A	01:03.19	00:11.76
7	15	3D	01:03.87	00:12.44
8	19	1F	01:04.67	00:13.24
9	8	5D	01:05.75	00:14.32
10	35	3B	01:08.99	00:17.56
11	21	4B	01:10.23	00:18.80
12	31	3A	01:11.19	00:19.76
13	40	3F	01:12.59	00:21.16
14	18	4A	01:13.27	00:21.84
15	24	6C	01:14.31	00:22.88
16	2	7A	01:15.31	00:23.88
17	4	5E	01:16.31	00:24.88
18	29	6D	01:17.07	00:25.64
19	22	7C	01:18.07	00:26.64
20	13	7B	01:18.91	00:27.48
21	45	7E	01:19.75	00:28.32
22	9	10B	01:20.75	00:29.32
23	17	5F	01:21.95	00:30.52
24	10	8D	01:23.55	00:32.12
25	11	9E	01:24.43	00:33.00
26	49	8A	01:25.07	00:33.64
27	30	9C	01:27.43	00:36.00

Trial Day Number: Eight
Evacuation: Three
Variables: Dark Straight

Undo: 00:21.15

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	34	1C	00:28.75	00:07.60
2	2	2B	00:29.55	00:08.40
3	1	4C	00:30.75	00:09.60
4	7	5C	00:31.75	00:10.60
5	31	1F	00:35.83	00:14.68
6	3	4E	00:36.91	00:15.76
7	13	3A	00:38.11	00:16.96
8	44	3D	00:39.51	00:18.36
9	37	6F	00:41.43	00:20.28
10	28	3F	00:42.27	00:21.12
11	19	5D	00:44.11	00:22.96
12	4	4F	00:45.27	00:24.12
13	27	5E	00:46.35	00:25.20
14	25	7A	00:47.15	00:26.00
15	32	6D	00:48.27	00:27.12
16	39	9F	00:49.21	00:28.06
17	38	6A	00:50.83	00:29.68
18	30	7B	00:52.07	00:30.92
19	14	9C	00:53.87	00:32.72
20	17	9D	00:55.03	00:33.88
21	51	9B	00:56.43	00:35.28
22	36	7F	00:57.79	00:36.64
23	15	10C	00:58.95	00:37.80
24				
25				
26				

Undo: 00:20.05

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	8	1E	00:25.29	00:05.24
2	11	2D	00:26.29	00:06.24
3	35	2C	00:28.49	00:08.44
4	23	3C	00:30.14	00:10.09
5	40	1B	00:31.29	00:11.24
6	42	2E	00:32.29	00:12.24
7	10	1A	00:33.68	00:13.63
8	24	2A	00:34.52	00:14.47
9	9	3E	00:36.09	00:16.04
10	26	3B	00:36.60	00:16.55
11	41	5A	00:37.88	00:17.83
12	20	4B	00:38.72	00:18.67
13	12	5B	00:39.60	00:19.55
14	5	6B	00:39.76	00:19.71
15	44	4A	00:41.64	00:21.59
16	21	6C	00:42.96	00:22.91
17	29	10D	00:45.64	00:25.59
18	49	5F	00:46.52	00:26.47
19	16	7C	00:47.80	00:27.75
20	18	8E	00:48.72	00:28.67
21	6	9E	00:50.96	00:30.91
22	46	10E	00:52.64	00:32.59
23	50	8B	00:53.48	00:33.43
24	45	9A	00:54.36	00:34.31
25	43	8F	00:55.56	00:35.51
26	22	10B	00:56.92	00:36.87

Trial Day Number: Eight
Evacuation: Four
Variables: Dark Jog

Undo: 00:52.76

RI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	3	2C	00:58.32	00:05.56
2	18	1D	00:59.56	00:06.80
3	14	1E	01:02.96	00:10.20
4	32	3C	01:04.12	00:11.36
5	50	1F	01:04.96	00:12.20
6	24	4E	01:08.12	00:15.36
7	29	4A	01:09.08	00:16.32
8	2	9E	01:11.16	00:18.40
9	15	5A	01:14.36	00:21.60
10	16	5B	01:15.48	00:22.72
11	4	6C	01:16.92	00:24.16
12	49	9B	01:18.84	00:26.08
13	7	9A	01:19.92	00:27.16
14				
15				
16				
17	ABORTED			

Undo: 00:52.48

LI Type I Exit				
Position	**Subject Number**	**Seat Number**	**Raw time**	**Actual Time**
1	39	1C	00:57.84	00:05.36
2	6	1B	01:00.08	00:07.60
3	30	2D	01:01.08	00:08.60
4	46	2A	01:02.40	00:09.92
5	22	3E	01:03.60	00:11.12
6	45	5C	01:04.80	00:12.32
7	43	4D	01:05.60	00:13.12
8	8	7C	01:06.32	00:13.84
9	11	4B	01:06.96	00:14.48
10	51	3A	01:07.88	00:15.40
11	26	6D	01:08.88	00:16.40
12	40	6B	01:09.68	00:17.20
13				
14				
15				
16				
17				

APPENDIX J

Cranfield University and the Project Staff

Cranfield University and the Project Staff

The College of Aeronautics at Cranfield University was established in 1946 after the Second World War and has a long history of research and teaching in aviation safety. In 1983, when the Applied Psychology Unit became part of the College, this work was extended to include aspects of Human Factors in Aviation.

The College has extensive facilities for research in this area and operates three fully research-instrumented BAe Jetstreams as flying laboratories/classrooms. A variety of other aircraft types are available on an opportunity basis. A fixed base flight simulator, a cabin mock-up and a Trident III airframe are also available as research facilities.

In 1985, following a serious accident which occurred in the UK, the Civil Aviation Authority was determined to minimise the consequences of any future aviation disasters. Competing against other institutions in the UK, using an innovative methodology, the initial contracts were awarded to Cranfield. These began in 1985 and have run continuously since that date.

The work commissioned by the CAA has included the evaluation of factors influencing passenger behaviour and evacuation rates in an emergency on:

- changes to the motivation and behaviour of passengers
- changes to the seating adjacent to the Type III exits
- changes to the width of the aperture between the bulkheads adjacent to the Type III exits
- the presence of smoke in the cabin
- the presence of an acoustic signal indicating the location of an exit when smoke is present in the cabin
- the operation of a waterspray system in the cabin.

Another important project has been the evaluation of factors influencing the ability of members of the public to operate a Type III overwing hatch. The factors under review have included:

- changes to the weight of the hatch
- the presence of an incapacitated passenger adjacent to the hatch
- the sex and size of the operator
- the seating configuration adjacent to the exit
- the perceived sense of urgency of the passenger
- the presence of a decal indicating the weight of the hatch

This work is to be continued in collaboration with the Joint Airworthiness Authorities.

Other projects have included the influence of changes to the instructions on the safety cards and the ability of members of the public to carry out safety procedures, for example adopting a brace position and donning a life jacket.

Recently students from the department have conducted projects to examine the effect of practice on the ability of members of the public to operate safety equipment and currently the MSc students have been tasked to investigate the best manner to present the information for life jacket donning and adopting the brace position.

Project Manager

Dr. Helen Muir is Professor of Aerospace Psychology and Director of the Applied Psychology Unit in the College of Aeronautics. She is a Chartered Psychologist, a member of the Occupational Division of the British Psychological Society and a Fellow of the Royal Aeronautical Society. She obtained a degree in Psychology from St. Andrews University, a doctorate from the University of London and has a diploma in counselling. She has been involved in applied research in the field of transportation since 1973.

Since joining the College of Aeronautics in 1983 and establishing the MSc Course in Applied Psychology her objective has been to develop and promote research and teaching in programmes in the field of Aviation Psychology. Under her direction, expertise in the field of human factors in aviation was developed and this area is now a significant part of the research and teaching activities of the Unit. Whilst she continues to maintain an interest in pilot performance, the field of cabin safety and aircraft emergencies has been Helen's main area of research activity. This has led to the development of a range of research facilities in which the factors influencing behaviour in emergency situations may be investigated. Recently, her investigations into emergency behaviour together with her training and experience as a counsellor, has enabled her to extend her research and teaching activities into the field of post-traumatic stress and victim counselling.

Research Officers

Ann Cobbett is a Research Assistant at Cranfield University working in the field of cabin safety. She obtained a BA Honours degree in Applied Social Science from Coventry University and recently completed an MSc in Occupational Psychology at Cranfield. Ann has been involved in recent research at Cranfield investigating factors influencing emergency behaviour. She has registered for a PhD which will focus on the area of aviation safety and human performance in aircraft emergencies.

Joel Morley is a Research Assistant at Cranfield University working in the field of aviation safety. He obtained a BA Honours degree in Psychology at Carleton University and recently completed an MSc in Occupational Psychology at Cranfield. Joel has been involved in recent research at Cranfield investigating factors influencing emergency behaviour. He is registered for a PhD which will focus on the area of aviation safety.

Technical Supervisor

Don Harris, PhD, is a Senior Research Fellow in the College of Aeronautics.

His research interests are in the field of human factors in aviation and include pilot workload assessment, cockpit ergonomics and human factors in air traffic control. He manages the hardware aspects of research contracts.

Administrative Assistant

Tricia Forrest-Holden is responsible for administration in the Applied Psychology Unit and PA to the Project Manager. She will be responsible for administrative aspects of the contract and research work. This will include recruitment, organisation and payment of the volunteers.

APPENDIX K

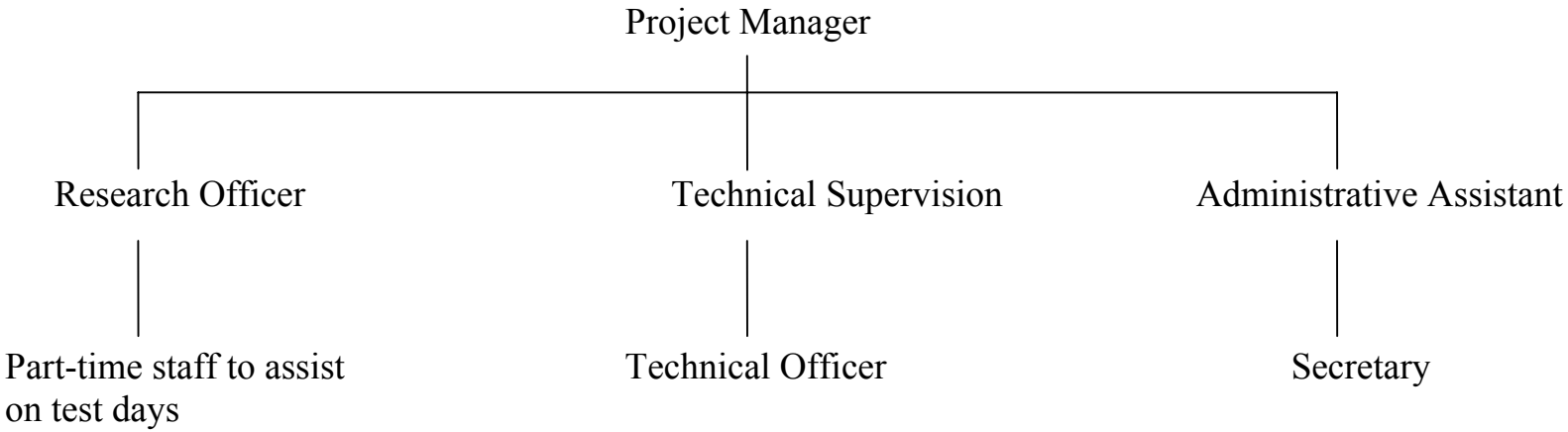
Quality Control Procedures and Organisational Charts

Head of College ***Prof J.L. Stollery***
Academic Co-ordinator *Mr J.D. Parker*
Computer Manager *Dr R.L. Oswald*

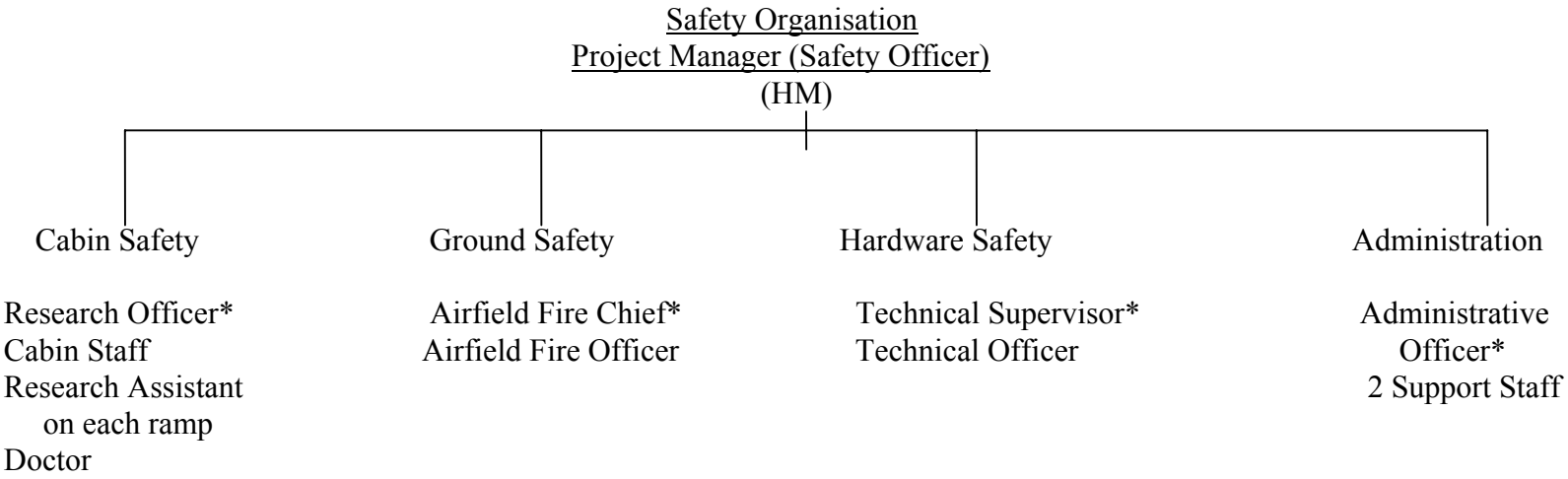
ACADEMIC DEPARTMENTS

AEROSPACE SCIENCE	AEROSPACE TECHNOLOGY	AIR TRANSPORT	APPLIED PSYCHOLOGY	AVIONICS
Academic Staff				
Prof A.J. Morris (Head)	Dr J.P. Fielding (Acting head)	Prof R. Doganis (Head)	Prof H.C. Muir (Head)	Prof D.J. Allerton (Head)
Mr T.S.Bowling	Dr M.E. Eshelby	Mr R.W.J. Anker	Dr R.E. Asch	Dr S.H. Al-Charachafchi
Dr K.P. Garry	Dr J.J. Loughlan	Mr R.J. Golding	Dr P.Brooks	Mr M.V. Cook
Mr R.I. Harris	Mr H. Smith	Mr P.S. Morrell	Dr A. Guppy	Mr M.L. Devine
Prof C.L. Kirk	Mr J.B. Young	Mr A.F. Taylor	Dr J.R. Harris	Dr S.J.M. Fairs
Dr I. Outram			Dr D. Harris	Mr S.J. Handley
Prof M.J. Rycroft				Mr D.J.G. Lewis
Prof J.L. Stollery				Dr D.D. Russell
Dr E.F. Toro				Mr P.G. Thomasson
Research Staff				
Dr K. Bechkoum	Dr R.I.Jones	Dr F.E.N. Almardari	Dr C. Braby	Mr R. Bailey
Mr J.C. Brown		Mr R. Fewings	Ms A.M. Cobbett	Mr C.M. Daggett
Dr S.E. Hobbs		Mr A.D. Lobbenberg	Mr F.J. Morely	Mr D.J. Dyer
Mr R. Jamieson		Mr I. Stockman		
Dr J.S. Saggu		Mr M.A. Thompson		

Project Organisational Chart



Safety Plan
a. Organisational Safety



Note: Prior to any evacuation the Safety Officers indicated (*) have to report to the Safety Officer that they are satisfied that their area is prepared and that the evacuation can proceed.
All of the staff carry emergency stop alarms.

b. Procedural safety.

The safety of volunteers is the primary consideration in any work of this type. Many aspects of the safety of participants have been covered in section 4.2, Test Procedure. The following is a summary of the procedural safeguards to ensure the safety of volunteers during the trials.

Only volunteers who claim to be reasonably fit and are between the ages of 20-50 will be recruited. All volunteers will be given a medical examination on arrival and will also be required to complete a questionnaire indicating that (I) they have fully understood the purpose of the tests, (ii) the medical information which they have supplied is correct and (iii) that they are satisfied with the insurance cover. Cranfield University reserves the right to deny any participant the opportunity to take part whom the doctor deems unfit. Furthermore, the doctor and the airfield fire service will be present at all times.

Prior to commencing each evacuation trial, each safety officer will report to the project manager indicating the safety status of their area of responsibility. This is described in section 8.3(a). The project manager will make a positive decision to proceed (or not) prior to each evacuation.

During the conduct of a trial a system of alarms will be employed to stop any evacuations should a real emergency occur or should there be concern for the safety of any volunteers. All research staff in the immediate vicinity of a trial will be equipped with these alarms and all these staff have the authority to use them immediately should they observe what they consider to be an unsafe situation developing. The evacuation will also be monitored remotely, via closed circuit TV, from a control position. Any participants whom the research staff deem to be conducting themselves in a manner not commensurate with safety will be ejected from the trials.

Before volunteers leave the site they will be given a debriefing in which they are reminded of the safety of air travel and advised that they should get back in touch with Cranfield if they experience any physical or emotional problems as a result of participating in the evacuations.

These procedures have been reviewed and approved by the UK Health and Safety Executive (HSE).

External Audit

Ethical Review

Cranfield University has an Ethics Committee which is required to review all experimental work involving human participants before it is conducted.

The Cranfield University Ethics Committee will review the proposed experimental programme and their recommendations will be forwarded to the sponsors. The constitution of the Ethics Committee is as follows:

CONSTITUTION

1. The Committee shall consist of:

   Head of Applied Psychology Unit
   One other academic staff member from the Applied Psychology Unit
   One academic member of staff from Cranfield University who is not a member of the Applied Psychology Unit
   A Medical Practitioner
   A Lawyer
   Two lay members (1 male, 1 female).

   Other committee members may be co-opted by consensus approval.

2. The term of office of the members who are not part of the Applied Psychology Unit will be for one year in the first instance, renewable by mutual consent.

3. The chairman of the committee shall be elected by the member of the committee annually.

4. The committee shall meet at least twice a year to review proposed research to be carried out by, or under the supervision of members of the Applied Psychology Unit. At each meeting the committee will be entitled to hear a full report on ethical aspects of studies performed since the last meeting.

5. In the interval between full Ethics Committee meetings all committee members will receive an adequate summary of proposed work well in advance of the study (a minimum period of two weeks must be allowed). The member of staff should then contact members by telephone to confirm approval. In the event of any serious objections to a study being raised by any single member of the committee, he/she will be entitled to ask for an ad hoc full committee meeting to consider the study proposal in question.

6. Routine Ethics Committee meetings shall be regarded as adequately constituted if at least two of the University and two other members are present.

7. The Ethics Committee shall be guided by the British Psychological Society Publication "Ethical Principles for Research with Human Subjects" published in 1978.

8. Ethics Committee approval for studies should not be given if more than one member of the Committee wishes to dissent.

9. The primary function of the Ethics Committee is to represent the general interest of volunteers who take part in experiments.

10. The Constitution of the committee should normally be reviewed on an annual basis.