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JOB TASK CHARACTERISTICS OF AUSTRALIAN EMERGENCY SERVICES VOLUNTEERS DURING SEARCH AND RESCUE OPERATIONS

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Abstract

Search and rescue operations are necessary in locating, assisting and recovering individuals lost or in distress. In Australia, land-based search and rescue roles require a range of physically demanding tasks undertaken in dynamic and challenging environments. The aim of the current research was to identify and characterise the physically demanding tasks inherent to search and rescue operation personnel within Australia. These aims were met through a subjective job task analysis approach. In total, 11 criterion tasks were identified by personnel. These tasks were the most physically demanding, frequently occurring and operationally important tasks to these specialist roles. Muscular strength was the dominant fitness component for seven of the 11 tasks. In addition to the discrete criterion tasks, an operational scenario, was established. With the tasks and operational scenario identified, objective task analysis procedures can be undertaken so that practitioners can implement evidence-based strategies, such as physical selection procedures and task-based physical training programs, commensurate with the physical demands of search and rescue job roles.

Practitioner Summary: The identification of physically demanding tasks amongst specialist emergency service roles predicates health and safety strategies which can be incorporated into organizations. Knowledge of physical task parameters allows employers to mitigate injury risk through the implementation of strategies modelled on the precise physical demands of the role.

Keywords: Job Task Analysis, Search and Rescue, Emergency Services, Physical Demands

Word count: 3075

1. Introduction

Search and rescue describes the response of emergency service personnel in locating and assisting individuals believed to be lost and/or in distress (Boore and Bock 2013; Heggie and Amundson 2009; Richmond et al. 2008; Carter et al. 2012). Globally, search and rescue spans a host of operational environments, including mining (Stewart, 2008), mountaineering (Callender 2012), marine (Breivik and Allen 2008) and urban (Davids 2002) environments. The significance of such practices is illustrated by statistics regarding preservation of human life. For example, Heggie and Amundson (2009) recently reported that 20% of the almost 25,000 people who were discovered injured in US National parks between 1992 and 2007 would have perished without the timely intervention of search and rescue personnel. In Australia, volunteer search and rescue teams within the State Emergency Services (SES) during a recent calendar year have dedicated more than 50,000 hours to performing search and rescue operations (ACSES 2012). In addition to technical and skill proficiencies, and necessary qualifications, personnel operating in search and rescue must demonstrate a minimal physical competency, since job tasks are physically arduous and stressful (Adams et al. 2007; Hung et al. 2007). Identifying and characterising the physical job demands of search and rescue roles establishes a platform on which organizations can screen personnel on their physical capacity to meet job demands, which can help improve the health and safety of the workforce.

Few studies have documented the physical demands of search and rescue operations, however, some insights can be gleaned from the small pool of available literature. Search teams are often required to cover large distances and traverse challenging terrain for durations of 8-12 hours in a typical search day (Denver et al. 2007; Adams et al. 2007; Hung et al. 2007), highlighting the need for a high level of cardiovascular fitness. Upon location of a person, task performance is then seemingly dependent on a workers' muscular strength and strength endurance capacity, since stretcher carries are typical amongst the majority of rescues (Richmond et al. 2003). As reported by Callender et al. (2012), several callouts during a year required horizontal travel distances in excess of 1500 meters on foot, including 750 meters while carrying a casualty-laden stretcher. The consequences of these prolonged and sustained efforts can augment the risk of injury due to fatigue (Rodriguez-Marroyo et al. 2012), providing a compelling reason to identify and characterise search and rescue job demands, to ensure personnel are physically capable of meeting such demands.

Characterising physically demanding tasks for any workplace requires a detailed job task analysis, which establishes the parameters of the critical and physically demanding tasks performed by personnel (Payne and Harvey 2010; Peterson et al. 2016). Subjective analysis is important in the preliminary efforts to identify and evaluate the operational demands of physically demanding occupations, where psychometric data are collected from current employees and subject matter experts (SMEs) (Tipton et al. 2012). This information usually includes perceived physical demand, frequency of completion, operational importance and predominant fitness component (Larsen and Aisbett 2012). Subjective job task analysis is common when characterising jobs tasks that occur infrequently, or unpredictably, and thus limit direct observation (Larsen and Aisbett 2012). The remote nature of search and rescue operations, limits the practicality of direct observations and lends itself to such analysis procedures. In addition to the identification of discrete tasks, it is important to establish operational scenarios which represent the sequence of tasks that would materialise during search and rescue missions. Determining such scenarios furthers our understanding of job roles, since the use of job task analyses in previous research often does not account for the integration of tasks in an operational context. Since search and rescue is critically important in the Australian landscape, and the evidence detailing the precise demands of these roles is scarce, the aim of the current study was to identify and characterise such demands amongst Australian search and rescue personnel for land search operations. The outcomes of profiling these demands establishes the information necessary for the subsequent research phase, the objective analysis of tasks. Together with the subjective analysis, this forms the foundation for physical test development. These tasks analysis phases will direct strategies relating to personnel selection, task-based physical training programs and return-to-work policies, all of which should be founded upon the inherent physical demands of the job.

2. Methods

The identification of physically demanding tasks for search and rescue personnel was achieved via a subjective job task analysis, utilising three stages of data extraction and distillation, outlined in this section. Two participant cohorts were included for this study: (1) a subject matter expert (SME) panel comprising three experienced search and rescue personnel, and (2) search and rescue incumbent workers (male = 302, female = 108) who participated in an online survey (descriptive statistics in Table 1). As illustrated in the Table, the incumbents had a large range in their age, years' experience within SES and the number of years they have held qualifications, demonstrating a heterogeneous mix of people providing feedback in the survey. The construction of the SME cohort was resultant on decisions from Australia's largest emergency service body, the SES, who comprise several thousand volunteers who undertake a range of emergency response roles, in addition to search and rescue, such as storm damage, swift water rescue and

road crash rescue. The SES operate at a federal level, however across most Australia states and territories there are separate SES jurisdictions which operate independently of other states and territories. Research methods in the current research were approved by the Deakin University Human Research Ethics Committee prior to the study commencing.

INSERT TABLE 1 HERE

2.1 Literature Interrogation and Industry Engagement

To first develop an understanding of search and rescue job roles, the investigators interrogated internal national search and rescue literature, including training manuals, standard operating procedures, emergency activity procedures, policy documents and any other supporting material (Larsen and Aisbett 2012; Payne and Harvey 2010). Using this information, a job inventory was established, detailing all search and rescue job tasks. This task inventory was subsequently presented to the SME panel to assist in the identification of tasks performed during search and rescue operations. Once the inventory was established, a group discussion was held between investigators and the SME panel to identify and remove subordinate tasks, streamlining the list for use in a subsequent online survey process. This procedure was undertaken via round-table discussions, where individual tasks were presented to SMEs, who were subsequently prompted by investigators, to verify the inclusion and exclusion of tasks. Investigators prompted SMEs to only consider physical demand of each tasks, since other task characteristics (e.g. task frequency and task importance) would be addressed further in the research process. If there was consensus between the SMEs for the exclusion of a task then it was eliminated; however if there was not consensus, the task was not excluded to ensure no important tasks were missed in the online survey presented to incumbents.

2.2 Online Survey

Using the refined job task inventory, an online survey was created and distributed (Survey Monkey, www.surveymonkey.com) amongst search and rescue personnel. Upon consideration of each task included in the survey, participants were asked to provide a rating for three task domains: frequency, physical demand, and

operational importance. For each domain, a series of Likert-type responses were provided, assigned with numerical indices (Table 2). The inclusion of these domains and the interaction between each domain, provides necessary information to characterise job tasks (Larsen and Aisbett 2012). The terminology for each response has been adopted from previous job task analyses surveys (Jamnik et al. 2010; Larsen and Aisbett 2013). The final section of the survey for participants to provide a response, was related to the fitness component inherent each task. Categorical responses were provided for this section of the survey (Table 2), and a definition for each fitness component (Baechle and Earle 2008), along with a working example, was included to assist respondents understanding (Appendix A).

INSERT TABLE 2 HERE

All raw survey data were exported to SPSS version 21 for analyses (IBM Corp. Armonk, NY). To reduce the effect of extreme values, data from each domain were expressed as the mode, and percentage of respondents who selected that mode response (Larsen and Aisbett 2012). Inclusion criteria were then established by examining the number of responses which fell into particular categories for each task domain (Table 2). For 'Frequency' inclusion criteria included the responses 'I rarely perform this task' or 'I regularly perform this task'. For 'Physical Demand' inclusion criteria included the responses 'moderate exertion', 'heavy exertion', 'very heavy exertion' or 'maximal exertion'. For 'Importance' inclusion criteria included the responses 'very important' or 'extremely important'. Fitness component data were analysed only after the final task list (criterion task list) was established. Finally, if a survey respondent reported having not performed a task, (in both operations and training) then any response relating to physical demand and fitness component from that respondent was disregarded.

2.3 Criterion Task Identification and Development of Operational Scenarios

Upon analysis of the survey results, investigators produced a final list of tasks, identified as criterion tasks, representing those most physically demanding, frequently occurring and critical to operational roles (Peterson et al. 2016; Phillips et al. 2012; Tipton et al. 2012). Tasks were included if they met two criteria. Firstly, 50% or more respondents rated 'physical demand' as moderate or higher. Secondly, 75% or more respondents reported performing it regularly or rarely. However, it was recognised that applying such criteria may exclude some operationally

important rescue tasks and the decision was made to assess these tasks individually and re-include if deemed appropriate. Re-inclusion decisions were based on considerations of importance and physical demand ratings.

Once criterion tasks were identified, SMEs were presented with these tasks during a secondary workshop with investigators. The purpose of this workshop, and follow up online conversations, was to establish typical operational scenarios which put into context the common sequencing of tasks which are relevant to search and rescue teams. Often tasks are performed in succession, rather than in insolation, so it was important in the current study to establish this succession from the criterion tasks which were identified. This provides the context in which tasks can be analyzed in any subsequent objective analyses of task demands.

3. Results

3.1 Literature Interrogation and Industry Engagement

The literature interrogation produced a task inventory containing 33 tasks for search and rescue operations. Following round-table workshops and discussion with SMEs, this list was refined to 17 tasks. These tasks were subsequently presented in the online survey.

3.2 Online Survey

The survey responses for the 17 tasks identified during the literature interrogation and industry engagement are presented in Table 3.

INSERT TABLE 3 HERE

As illustrated in Table 3, the majority of tasks (11 out of 17) were assigned the task frequency label ‘regularly’, with the remaining tasks assigned the label ‘rarely’. Regarding physical demand, the majority of tasks (13 out of 17) were considered ‘moderate’ in exertion, with a further task considered ‘heavy’. When considering the operational

importance of tasks, 12 of the 17 tasks were considered ‘very important’ with the remaining tasks either being of ‘moderately important’ or extremely important’.

3.3 Criterion Task Identification and Development of Operational Scenarios

Beginning with a total of 17 tasks, the task list was reduced to 14 tasks, as three tasks were removed because they didn’t occur frequently enough. This list was further reduced to 11 tasks once those task not requiring at least moderate exertion were removed. All of the 11 remaining tasks, were considered the criterion tasks for search & rescue operations (Table 4).

INSERT TABLE 4 HERE

Muscular strength was selected as the dominant fitness component for seven of the 11 tasks, with aerobic power and agility being the other dominant fitness components cited. Muscular strength was particularly prevalent amongst the tasks requiring some form of manual handling, including tasks such as ‘Clear debris and/or foliage using hand/power tools/chainsaw’, ‘Pull/haul with a rope’ and ‘Erect, climb and take down ladders during urban/building search’. Following the identification of criterion tasks, investigators and SMEs proceeded to construct one operational scenario, indicative of the sequence of tasks undertaken by search and rescue personnel (Table 5).

INSERT TABLE 5 HERE

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4. Discussion

The present study identified and characterised the most physically demanding, frequently occurring and operationally important tasks performed by personnel occupying land search and rescue roles within Australia. In total, 11 tasks exist as criterion tasks, with the most physically demanding tasks including; ‘stretcher carry of injured person/s’, followed by ‘ladder erecting/taking down’, ‘pulling/hauling with a rope’, and ‘clearing debris’. An operational

scenario, comprising walking to locate the person(s), a nearby evidence search followed by stretcher carry, was then constructed to represent a typical task sequence for search and rescue teams.

4.1 Physical Demand and Physical Capacity

For search and rescue teams, the most physically demanding tasks were: 'stretcher carry of injured person/s', followed by 'ladder erecting/taking down', 'pulling/hauling with a rope', and 'clearing debris' (Table 3). These tasks all involve manual handling of objects and equipment during a search operation. As identified amongst military, fire-fighting, and correctional officer professions, manual handling tasks commonly rate highly for physical demand (Richmond et al. 2008, Jamnik et al. 2010; Tofari et al. 2013; Matthews et al. 2007). In such professions, it is often reported that baseline muscular strength is necessary for the completion of tasks (Blacker et al. 2015; Kumar 1991; Lee 2005), so it follows that muscular strength was the most commonly selected physical component selected in the criterion tasks for search and rescue teams in the current study. Aerobic power was also highlighted as an important physical quality for land-based searches, inherent to tasks such as 'carrying a back pack during search activities', and 'performing moderately paced walking over slightly undulating open terrain'. The physical demands of long duration search efforts over arduous terrain has previously been described (Callender et al. 2012). In their work, Callender et.al (2012) observed mean heart rates and oxygen consumption responses of 178 ± beats.min^{-1} and 51.1 ± 3.3 ml.kg^{-1}.min^{-1} respectively, during one hour of simulated mountain rescue searches, levels indicative of vigorous exercise under the guidelines of the American College of Sports Medicine (Norton et al. 2010). Although such objective measures are yet to be captured with an Australian cohort, such values demonstrate that search and rescue operators in Australia could be required to demonstrate a similar cardiovascular capacity. It warrants investigation into the objective demands of these tasks.

4.2 Task Frequency

In the present study, 14 of the 17 tasks were completed by more than 75% of respondents. The two tasks with highest occurrences for task completion were preparing personal protective equipment and operating communications equipment. These tasks are detailed in State Emergency Services (SES) standard operating procedures with all members requiring competency prior to their first operational deployment (ACSES 2012). Tasks inherent to search

and rescue operations such as navigating terrain, carrying a backpack, and clearing debris were also regularly performed (Table 3). This is expected, given the requirement of rescue personnel to navigate over difficult terrain while carrying equipment and rations for anticipated long-duration searches (Denver et al. 2007). Tasks such as stretcher carry of rescued person/s and conducting contact searches, while essential, were selected as rarely performed (Table 3). However, despite lower frequency ratings, tasks such as these have been included in the criterion task list, as they should be classified as exceptions to standard cut-offs when considering their high importance (Zumbo, 2016; Tipton et al. 2012).

The current study used a categorical approach to assess task frequency. Four options were presented from respondents identifying that they had never completed the task through to they regularly complete the task. The inclusion of an option for respondents to identify they had never completed the task is a departure from previous research. Typically, job task analyses studies conclude that once a SME panel has reached consensus on the inclusion of a task, it is (or should be) performed by all incumbents during an operation, (Jamnik et al 2012; Gumieniak et al. 2011). Such an assumption may be incorrect, and SME judgments could be outdated and/or based on ideals (standard operating procedures etc.) rather than fact. Identifying whether a task is actually performed by incumbents can potentially verify the currency of SMEs understandings of operations 'on the ground'. Further, this approach can screen out responses related to physical demand and fitness components from incumbents who have actually never completed said task. This 'screening' procedure may also contribute to higher agreement between respondents who have actually completed the identified tasks. In the current study, 14 of the 17 tasks included in the online survey received a frequency rating with >50% agreement (indicating the majority). This indicates a strong congruence in data responses, which, interestingly, does not reflect previous research, where responses are highly variable (Larsen and Aisbett 2012; Jamnik et al. 2012; Jamnik et al. 2010) due to recall bias in survey responses which becomes increasingly apparent as more time passes since the experience (Podsakoff et al. 2003). A likely explanation for the consistency in the current data was the use of only four categorical options for the frequency component in the survey. With fewer response options, data are less likely to display variability since respondents are constricted in their rating. It is recommended for future survey data, in recognition of the variability that is typically observed with ratings of frequency, more categorial response options are provided and physical measures or activity logs are included in the analysis of frequency data.

4.3 Operational Importance

The tasks rating highest for operational importance (excluding personal protective equipment preparation and operating communication equipment) were; 'Participating in stretcher carry of rescued person/s', and 'Negotiating obstacles including creek beds, fences, and storm drains, and moderately paced walking over undulating terrain' (Table 3). It is unsurprising, and a reflection of previous accounts in emergency service contexts (Larsen et al. 2012), that tasks belonging to the preservation of human life are rated with high importance. It was further observed that three of the criterion tasks did not actually receive a mode response of 'very important' or 'extremely important', which was the criteria for task inclusion. These tasks: 'Lift items of moderate weight to look underneath', 'Pull/haul with a rope', and 'Erect, climb and take down ladders during urban/building search' were, however, amongst the frequently performed and physically demanding (Table 3) and, therefore, included in the final criterion list.

4.4 Development of Operational Scenarios

Following the identification of discrete criterion tasks, investigators and SME personnel developed a single operational scenario, reflective of a typical sequence of search and rescue tasks. The three phases belonging to the scenario involved a walking component to locate the person(s), a searching component to look for evidence, and a transport component, involving the re-location of a person(s) via a stretcher. Revisiting feedback from the survey, the interplay between tasks of high muscular strength demands and aerobic power demands demonstrates the need for tasks to be contextualised in a scenario, since fatigue accumulates across a working shift and exertion in one task could impair performance in subsequent tasks. The development of this operational scenario can be used to create staged simulations which enable the collection of physical and physiological task performance data. This could allow the development of physical capacity assessments used to screen personnel on their physically competency relative to the inherent demands of search and rescue tasks. In addition to selection strategies, such approaches may have benefits to task-based physical training programs, injury mitigation strategies and return-to-work procedures for personnel operating in search and rescue roles.

5. Conclusion

The present study describes the physically demanding, frequently occurring and operationally important tasks performed by State Emergency Services (SES) volunteers operating in land-based search and rescue roles. Using a subjective job task analysis, 11 criterion tasks were identified. In a step forward for the job task analysis space, only the responses from incumbent personnel who have actually completed the task were included to increase the veracity of their perceptions of the task physical demands and dominant fitness components. After the criterion task list was compiled, an operational scenario, comprising walking to locate a person(s), a nearby evidence search, and stretcher carry was established. The operational scenario contextualizes the typical sequence of tasks which would be common to search and rescue operations. Such findings describe the physical demands of search and rescue roles, previously undefined in an emergency service context. Having identified the physically demanding tasks through subjective processes, subsequent research can measure these demands objectively, promoting organizational strategies and decisions regarding personnel selection and physical training, to be developed on a robust evidence-base.

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APPENDIX A – FITNESS COMPONENT DEFENITIONS

FITNESS COMPONENT	DEFINITION	WORKING EXAMPLE
Aerobic Power	Moderate to long duration sustained effort activities.	Walking 5 km over undulating terrain.
Anaerobic Power	Short duration high intensity activities.	Having to sprint 30 m to get a piece of equipment.
Muscular Strength	Activities that require high levels of muscular effort.	Lifting a 30 kg object from the ground and placing it into a vehicle or trailer.
Muscular Endurance	Activities that require repeated muscular efforts at a low-moderate level of muscular effort.	Moving relatively light objects multiple times, or sustained holding of an object for a prolonged period of time.
Agility	Activities requiring acute changes in direction or changes in body orientation.	Manoeuvring around (or over) a fallen tree or into (or within) a tight space.

Table 1: Descriptive statistics of search and rescue personnel (male = 302, female = 108) who participated in an online survey. Respondents were representative of a range of Australian states and territories where search and rescue operations are performed.

Characteristic	**Mean ± SD**	**Range**
Age (years)	45 ± 9	18-73
Years in SES (years)	12 ± 10	1-58
Qualification (years)	9 ± 8	1-40

Table 2: Task domains and the corresponding responses included in an online survey, distributed amongst search and rescue personnel. Respondents were asked to select the most appropriate response for each of the task domain (frequency, physical demand, operational importance, fitness component) for a list of tasks which had been developed during earlier workshops with subject matter experts.

Rating	Task Frequency	Physical Demand	Operational Importance	Fitness Components*
1	I regularly perform this task	No exertion	Not at all important	Aerobic power
2	I rarely perform this task	Very light exertion	Low importance	Anaerobic power
3	I have only witnessed others perform this task	Light exertion	Slightly important	Agility
4	I have neither performed nor witnessed this task performed	Moderate exertion	Somewhat important	Muscular strength
5		Heavy exertion	Moderately important	Muscular endurance
6		Very heavy exertion	Very important	None
7		Maximal exertion	Extremely important	

* Respondents asked to provide the dominant fitness component for each task.

Table 3: Online survey responses for task frequency, physical demand, and operational importance, for 17 tasks identified for search and rescue tasks. Mode responses are shown (including the percentage of responses this encapsulated) along with the percentage of responses that met the inclusion criteria.

Task Description	Frequency		Physical Demand		Importance	
	Mode (%)	% INC[†]	Mode (%)	% INC[*]	Mode (%)	% INC[^]
Prepare personal equipment (includes PPE/PPC, backpack, etc.)	1 (95)	100	1 (41)	4	6 (32)	96
Load/unload stores and/or equipment to/from vehicle/trailer	1 (90)	99	4 (55)	68	6 (38)	56
Change a flat/damaged tyre on service vehicle	2 (46)	55	4 (46)	70	6 (24)	37
Establish base camp/staging area	2 (46)	69	4 (48)	58	6 (27)	48
Carry a backpack (of between 7-15 kg) during search activities	1 (55)	92	4 (55)	83	6 (30)	47
Perform moderately paced walking (including urban and bush) over slightly undulating open terrain	1 (83)	100	4 (66)	82	6 (43)	77
Conduct contact search activities (e.g. on hands and knees to locate small object)	2 (62)	93	4 (49)	66	6 (34)	53
Sit for extended periods as an observer (e.g. in a vehicle/boat)	1 (61)	80	3 (29)	46	5 (32)	2
Participate in stretcher carry of rescued person(s)	2 (50)	83	5 (39)	95	6 (35)	62
Clear debris and/or foliage using hand/power tools/chainsaw	2 (51)	89	4 (42)	86	6 (27)	40
Lift items of moderate weight to look underneath	1 (46)	90	4 (64)	83	5 (18)	35
Pull/haul with a rope	1 (52)	90	4 (49)	89	5 (15)	33
Erect, climb and take down ladders during urban/building search	1 (38)	75	4 (51)	90	5 (29)	41
Participate in Flood Boat/Water Operations (including load/unload equipment and access/egress)	2 (31)	53	4 (40)	72	6 (15)	36
Operate communications equipment	1 (81)	89	1 (57)	1	7 (40)	86
Negotiate obstacles including creek beds, fences, storm drains	1 (68)	96	4 (56)	79	6 (41)	73
Recondition/refurbish vehicle/trailer/equipment	1 (58)	79	4 (41)	82	6 (27)	50

*PPC = personal protective clothing. PPE = personal protective equipment.
%INC = percentage of responses within the inclusion criteria
[†]For 'Frequency' inclusion criteria is 'I rarely perform this task' or 'I regularly perform this task'
*For 'Physical Demand' inclusion criteria is 'moderate exertion', 'heavy exertion', 'very heavy exertion' or 'maximal exertion'
^For 'Importance' inclusion criteria is 'very important' or 'extremely important'.

Table 4: Search and rescue criterion tasks. The table illustrates the 11 criterion task identified for search and rescue roles, in addition to the dominant fitness component (mode response) cited for each task. (The letter 'C' denotes Criterion Task, e.g., C1 = Criterion Task 1).

Task Description	**Fitness Component**
C1: Load/unload stores and/or equipment to/from vehicle/trailer	Muscular Strength
C2: Carry a backpack (7-15 kg) during search activities	Aerobic Power
C3: Perform moderately paced walking (including urban and bush) over slightly undulating open terrain	Aerobic Power
C4: Conduct contact search activities (e.g. on hands and knees to locate small object)	Agility
C5: Participate in stretcher carry of rescued person(s)	Muscular Strength
C6: Clear debris and/or foliage using hand/power tools/chainsaw	Muscular Strength
C7: Lift items of moderate weight to look underneath	Muscular Strength
C8: Pull/haul with a rope	Muscular Strength
C9: Erect, climb and take down ladders during urban/building search	Muscular Strength
C10: Negotiate obstacles including creek beds, fences, storm drains	Agility
C11: Recondition/refurbish vehicle/trailer/equipment	Muscular Strength

Table 5: Operational scenario developed for search and rescue scenarios. The scenario was developed in consultation with State Emergency Services search and rescue subject matter experts following the identification of 11 criterion tasks.

Task Sequence	**Description**
1. Perform moderately paced walking over terrain to destination	Carrying a backpack loaded with consumables, walk to search destination at a moderate pace and negotiate obstacles when required (over and under debris). (Tasks C2, C3, C4, C6, C7, and C10).
2. Contact search	Upon reaching destination remove backpack and proceed to search the target area for evidence. (Tasks C3, C4, C6, C7, C10).
3. Transport casualty (stretcher carry)	Once contact search is completed, participants don their backpacks, lift the stretcher, and transport casualty to the starting area. (Tasks C5, and C8).