

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

| | | | | | |
|---|-------------|------------------------------------|-------------------------------|---|---|
| 1. REPORT DATE (DD-MM-YYYY) 18 November 2016 | | 2. REPORT TYPE Technical Report | | 3. DATES COVERED (From - To) | |
| 4. TITLE AND SUBTITLE Responses to Three USARIEM Job Analysis Questionnaires (JAQs) Conducted with Cavalry Scouts and Armor Crewmen (MOSs 19D & 19K) | | | | 5a. CONTRACT NUMBER | |
| | | | | 5b. GRANT NUMBER | |
| | | | | 5c. PROGRAM ELEMENT NUMBER | |
| 6. AUTHOR(S) LTC Michael W. Boye, Ph.D., Bruce S. Cohen, Ph.D., Marilyn A. Sharp, M.S., Maria C. Canino, M.S. | | | | 5d. PROJECT NUMBER | |
| | | | | 5e. TASK NUMBER | |
| | | | | 5f. WORK UNIT NUMBER | |
| 7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Research Institute of Environmental Medicine 10 General Greene Avenue Natick, MA 01760-5007 | | | | 8. PERFORMING ORGANIZATION REPORT NUMBER | |
| 9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Medical Research and Materiel Command Fort Detrick Frederick, MD 21702-5012 | | | | 10. SPONSOR/MONITOR'S ACRONYM(S) | |
| | | | | 11. SPONSOR/MONITOR'S REPORT NUMBER(S) | |
| 12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for Public Release; unlimited distribution | | | | | |
| 13. SUPPLEMENTARY NOTES | | | | | |
| 14. ABSTRACT Researchers conducted 3 web-administered job analysis questionnaires (JAQs) among Army cavalry scouts and armor crewmen (i.e., Army jobs, or MOSs, 19D and 19K). Two JAQs addressed MOS-specific tasks; the other common soldiering tasks. Tasks were ranked in categories of most frequently done, most important to job, most time consuming, uniform most often worn and perceived expectations to perform task. Tasks rated most critical to the job corresponded only moderately to those reported as most often performed. Each task included a small to significant percentage of respondents reporting not having performed task in the past 2 years. Across surveys, percentages reporting performing less than half the tasks in the last two years ranged from 3 to 19 percent. Expectations and task performance were substantially related. 19Ds reported performing MOS-specific tasks 19% more often during combat deployments than in garrison settings. Notable differences were found in the tasks job incumbents rated as important and those rated as such by subject matter experts. Soldiers also identified many tasks not previously addressed. | | | | | |
| 15. SUBJECT TERMS Occupational Physical Demands, Army Job Task Analyses, Job Analysis Questionnaire, Army Cavalry Scout (19D) Armor Crewman (19K) | | | | | |
| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON |
| a. REPORT | b. ABSTRACT | c. THIS PAGE | | | Michael W. Boye |
| UNCL | UNCL | UNCL | UL | 109 | 19b. TELEPHONE NUMBER (Include area code) 508-233-4800 |

USARIEM TECHNICAL REPORT T17-04

**RESPONSES TO THREE USARIEM JOB ANALYSIS QUESTIONNAIRES (JAQs)
CONDUCTED WITH CAVALRY SCOUTS AND ARMOR CREWMEN
(MOSs 19D & 19K)**

LTC Michael W. Boye, Ph.D.
Bruce S. Cohen, Ph.D.
Marilyn A. Sharp, M.S.
Maria C. Canino, M.S.

Military Performance Division
U.S. Army Research Institute of Environmental Medicine
Natick, MA

18 November 2016

U.S. Army Research Institute of Environmental Medicine
Natick, MA 01760-5007

Table of Contents

| | |
|---|-----------|
| List of Tables | 3 |
| List of Figures | 6 |
| Acknowledgements | 7 |
| Disclaimers | 7 |
| Acronym List | 8 |
| Executive Summary | 9 |
| Introduction | 16 |
| Methods | 16 |
| Results | 21 |
| Section 1: Background Information (i.e., Demographics) | 21 |
| Section 2: Common and 19D-specific Task Ratings | 24 |
| Section 3: Common and 19D-specific Task Supplemental Information | 34 |
| Section 4: 19K-specific Task Ratings | 43 |
| Section 5: 19K-specific Task Supplemental Information | 52 |
| Section 6: Contrasting Time Spent Performing Tasks in Garrison and in Deployment Settings | 57 |
| Section 7: Comparing Subjects Who Had Been Deployed to Those Who Had Not Deployed | 60 |
| Section 8: The Effect of Task Completion Expectations on Task Performance Frequency | 71 |
| Section 9: The Number of Tasks Performed in the Last Two Years | 72 |
| Section 10: Deployed Soldiers Who Performed MOS-specific Tasks in the Field but Not in Garrison | 75 |

| | |
|--|-----------|
| Section 11: Comparisons of JAQ Ratings to Judgments of Subject Matter Experts..... | 77 |
| Section 12: Comments Provided on the JAQ..... | 80 |
| Discussion..... | 85 |
| Appendix A..... | 95 |

LIST OF TABLES

| <u>Table</u> | <u>Page</u> |
|---|-------------|
| 1 Tasks included in the 19D JAQ | 19 |
| 2 Tasks included in the 19K-specific JAQ | 20 |
| 3 Demographic data for the sample completing the 19D JAQ | 22 |
| 4 Demographic data for the samples completing the 19K-specific and Common Task | 23 |
| 5 The extent to which each common and 19D-specific task was expected to be performed | 27 |
| 6 Number of 25mm ammo cans subjects carried from a supply point to a BFV | 35 |
| 7 Distance (yards) subjects carried 25mm ammo cans from a supply point to a BFV | 36 |
| 8 Time (minutes) spent by respondents to fill enough sandbags for a fighting position | 37 |
| 9 Time (minutes) spent by respondents to carry sandbags for and build a fighting position | 37 |
| 10 Number of Soldiers helping the subject to change a vehicle track section | 38 |
| 11 Number of Soldiers helping the subject to change a vehicle tire | 39 |
| 12 Percentage of times the subject loosened lug nuts manually with a wrench or by using an air-operated impact wrench | 39 |
| 13 Distances covered by subjects during a dismounted tactical movement | 40 |
| 14 Loads (pounds) carried by subjects during a dismounted tactical movement | 40 |
| 15 Loads (pounds) carried by subjects during dismounted tactical movements of six miles or more | 41 |
| 16 Time (hours) taken by subjects during dismounted tactical movements of six miles or more | 41 |
| 17 Time (minutes) taken by respondents to carry sandbags and build a bunker | 41 |
| 18 Percentage of times a casualty was dragged under fire by one or by two people | 43 |
| 19 The extent to which each 19K-specific task was expected to be performed | 46 |

| <u>Table</u> | | <u>Page</u> |
|--------------|---|-------------|
| 20 | Number of rounds lifted and carried to load an Abrams Tank | 53 |
| 21 | Distance rounds were carried to load an Abrams Tank | 53 |
| 22 | Number of MPAT rounds reloaded in the turret of an Abrams Tank | 54 |
| 23 | Number of rounds loaded into the 120mm main gun for one fire command | 56 |
| 24 | Boxes of rounds loaded for the .50 Cal Machine Gun on an Abrams Tank | 56 |
| 25 | Mean estimates of time spent by 19Ds performing different types of tasks in both garrison or training settings and combat deployments (n=560) | 58 |
| 26 | Mean estimates of time spent by 19Ks performing different types of tasks in both garrison or training settings and combat deployments (n=54) | 60 |
| 27 | Others' expectations of subject task completion: Statistically significant chi-squared tests with deployed and non-deployed respondents who completed the common or 19D-specific task JAQ | 62 |
| 28 | Deployed vs. non-deployed respondents who completed the common or 19D-specific task JAQ: Task frequencies, task importance, time taken for the task, and supplementary task information | 63 |
| 29 | Deployed vs. non-deployed respondents who completed the common or 19D-specific task JAQ: Supplementary information items with open response formats - Statistically significant t-tests | 65 |
| 30 | Others' expectations of subject task completion: statistically significant chi-squared tests with deployed and non-deployed respondents who completed the 19K-specific JAQ | 67 |
| 31 | Deployed vs. non-deployed respondents who completed the 19K-specific JAQ: Task frequencies, task importance, time taken for the task, and supplementary task information | 68 |
| 32 | Deployed vs. non-deployed respondents who completed the 19K-specific JAQ: Supplementary information items with open response formats - Statistically significant t-tests | 70 |
| 33 | The effects of task completion expectations on task performance frequency: all three JAQs (i.e., the common, 19D-specific and 19K-specific JAQs) | 71 |
| 34 | The number of common and 19D-specific tasks performed by cavalry scouts in the last two years | 73 |

| <u>Table</u> | | <u>Page</u> |
|--------------|---|-------------|
| 35 | The number of 19K-specific tasks performed by armor crewmen in the last two years | 74 |
| 36 | The number of common tasks performed by armor crewmen in the last two years | 75 |
| 37 | Percentage of time spent performing MOS-specific tasks during combat deployments by cavalry scouts who had not performed these tasks in garrison | 76 |
| 38 | Percentage of time spent performing MOS-specific tasks during their last combat deployment by armor crewmen who had not performed these tasks in garrison | 76 |
| 39 | Summary of comments provided on the JAQ completed by cavalry scouts | 83 |
| 40 | Summary of comments provided on the JAQ completed by armor crewmen | 84 |

LIST OF FIGURES

| <u>Figure</u> | | <u>Page</u> |
|----------------------|---|--------------------|
| 1 | Frequencies with which common and 19D-specific tasks were performed in the last two years | 25 |
| 2 | The rated importance of each common and 19D-specific task | 28 |
| 3 | The rated time each common and 19D-specific task takes to perform | 30 |
| 4 | Uniforms worn for each common and 19D-specific task | 32 |
| 5 | Number of 25mm ammo cans carried and the distance traveled to BFV | 35 |
| 6 | Time to fill and carry sandbags to build a fighting position | 36 |
| 7 | Uniform worn when riding in the crew compartment of a BFV | 37 |
| 8 | Number of Soldiers used to change sections of a track and a tire on a vehicle | 38 |
| 9 | The distance traveled and load carried during a dismounted tactical movement | 40 |
| 10 | Loads carried and time to complete dismounted tactical movements over six miles | 41 |
| 11 | Time to complete carrying sandbags to a designated location for a bunker | 42 |
| 12 | Furthest distance a casualty was dragged under fire | 43 |
| 13 | Frequencies of with which 19K-specific task performance in the last two years | 44 |
| 14 | The rated importance of each 19K-specific task | 47 |
| 15 | The rated time each 19K-specific task takes to perform | 48 |
| 16 | Uniforms worn for each 19K-specific task | 50 |
| 17 | Time spent performing armor crewman tasks | 52 |
| 18 | Typical number of rounds carried from stockpile and lifted up to Abrams tank hull | 53 |
| 19 | Number of MPAT rounds handled while reloading an Abrams tank | 54 |
| 20 | Most physically challenging part of stowing rounds in an Abrams tank | 55 |
| 21 | Number of rounds loaded for one fire command | 55 |
| 22 | Total boxes of rounds loaded for .50 cal machine gun on an Abrams tank | 56 |
| 23 | Number of Soldiers working together to remove a casualty from Abrams tank turret | 57 |

ACKNOWLEDGMENTS

The authors would like to thank Dr. Deborah L. Gebhardt and HumRRO Acquires HPS, Inc. for their help in survey preparation, and Dr. Jennifer Jebo for her assistance in preparing this technical report. The authors would also like to thank the many Army and civilian leaders who assisted in administering this survey and completing all other aspects of the performance standards study being conducted with the U.S. Army Training and Doctrine Command.

DISCLAIMERS

The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Army or the Department of Defense.

The investigators have adhered to the policies for protection of human subjects as prescribed in Army Regulation 70-25, and the research was conducted in adherence with the provisions of 32 CFR Part 219. Protocol # 9300.

This research was supported in part by appointments to the Postgraduate Research Participation Program at the U.S. Army Research Institute of Environmental Medicine administered by the Oak Ridge Institute for Science and Education.

Portions of the data presented in this report have been previously reported.

Acronym List

| | |
|---------|--|
| ACE | armored combat earthmover |
| AAR | after action reports |
| BFV | Bradley Fighting Vehicle |
| HEMTT | Heavy expanded mobility tactical truck |
| HMMWV | High mobility multipurpose wheeled vehicle |
| IED | Improvised explosive device |
| IET | Initial entry training |
| JAQ | Job Analysis Questionnaire |
| LRAS3 | Long range advanced scout surveillance system |
| MOS | military occupational specialty |
| MRAP | Mine-resistant ambush protected |
| TOW | Tube-launched, optically tracked, wire-guided |
| TRAC | TRADOC Analysis Center |
| TRADOC | Training and Doctrine Command |
| USARIEM | U.S. Army Research Institute of Environmental Medicine |

Executive Summary

As part of a larger study conducted with the U.S. Army Training and Doctrine Command (TRADOC) to develop physical performance standards for seven of the Army's most physically demanding jobs (i.e., military occupational specifications, or MOSs), researchers from the U.S. Army Research Institute of Environmental Medicine (USARIEM) designed and conducted a total of three web-administered job analysis questionnaires (JAQs) among 19 series respondents – one with cavalry scouts and two with armor crewmen (these occupations are classified as the 19D and 19K MOSs, respectively). A total of 8,580 Army cavalry scouts and 6,613 armor crewmen in the USA Army as of May or June of 2014 were invited to participate in their respective job-specific surveys, which addressed tasks specific to their own MOSs (hereafter referred to as “job-specific tasks”). Totals of 794 cavalry scouts and 464 armor crewmen responded to these surveys, thus yielding response rates of 9.3% and 7.0% respectively.

Of the 794 cavalry scouts all but one were male; 75% had been in the Army for at least seven years, and 89% had achieved the rank of E5 (i.e., Sergeant) or higher. Ten percent were under 25 years of age, and 31% were at least 35 years old. Ninety-five percent had been deployed at least once, and 52% had been deployed three times or more. Of the 464 armor crewmen all (i.e., 100%) were male; 81% had been in the Army for at least seven years, and 92% had achieved the rank of E5 or higher. Eight percent were under 25 years of age, and 42% were at least 35 years old. Ninety-three percent had been deployed at least once, and 49% had been deployed three times or more.

The third JAQ addressed tasks that are generally performed not only by armor crewmen but by enlisted Soldiers in many Army MOSs (hereafter referred to as “common tasks.”). A total of 121 armor crewmen responded to this third questionnaire, for a response rate of 1.8%. Of these 121 armor crewmen, again all were male; 82% had been in the Army for at least seven years, and 93% had achieved the rank of E5 or higher. Seven percent were under 25 years of age, and 50% were at least 35 years old. Ninety-seven percent had been deployed at least once, and 50% had been deployed three times or more.

Among the respondents to the 19K job-specific survey there may be some who also responded to the common task survey; the researchers had no way of knowing how many armor crewmen responded to both these surveys. The respondents to each of these three surveys indicated that they were willing to participate in completing the respective questionnaires as representatives of their branch. By applying an inclusion criterion that required 50% or more of the survey items be completed by each participant, the numbers of respondents in the final datasets of the first, second and third questionnaires were reduced to 560, 370 and 54, respectively (or about 71% of those that responded).

Findings

Most Frequently Conducted Tasks

19D. Of the 16 tasks addressed in the Task Ratings section of the JAQ for the 19D (cavalry scout) MOS (i.e., one 19D job-specific task and 15 common tasks), analyses of variance (ANOVAs) and post-hoc statistics indicated that five tasks were reported as being performed more frequently than others (the complete list of tasks is provided in Tables 1 and 2). These five tasks, ranked in order of descending reported frequency, are:

- i) performing a dismounted foot march or tactical movement
- ii) lifting and dragging a casualty to a safe location as quickly as possible
- iii) lifting and carrying ammunition cans from the supply point (e.g., ammunition center or truck) to the back of a Bradley Fighting Vehicle (BFV)
- iv) with a group of Soldiers, lifting, carrying and connecting a vehicle tow bar for a Buffalo, BFV or Stryker from a towing vehicle to the disabled vehicle
- v) with assistance from another Soldier, lifting, carrying and installing the barrel of a 25mm gun onto a BFV.

19K. Of the 27 tasks addressed in the Task Ratings sections of the job-specific and common task JAQs for the 19K (armor crewman) MOS, seven were reported as being performed more frequently than others. These seven tasks, ranked in order of descending reported frequency, are:

- i) mounting an M2 .50 cal machine gun receiver on an Abrams Tank
- ii) loading ammunition for the M2 .50 Cal Machine Gun on an Abrams Tank
- iii) mounting the M240 weapon on an Abrams
- iv) while standing on the hull of an Abrams, lifting and carrying rounds such as multi-purpose anti-tank (MPAT) rounds from a Soldier on the ground or heavy expanded mobility tactical truck (HEMTT), and handing it to a Soldier inside the tank for resupply
- v) while standing in the turret of an Abrams, receiving rounds (such as MPAT rounds) from a Soldier on the hull and placing them into the ready rack
- vi) performing a dismounted foot march or tactical movement, and
- vii) carrying ammunition such as MPAT rounds from a supply point to the hull of an Abrams.

Most Important Tasks to Job Success

19D. Of the same 16 tasks referred to in the 19D section above, five were reported to be the most important to success as an Army cavalry scout. These five tasks, ranked in order of descending reported importance, are:

- i) performing a dismounted foot march or tactical movement,
- ii) with the assistance of another Soldier, pulling a casualty from a commander's seat and through the top hatch of a vehicle (i.e., a BFV or stryker)
- iii) while seated, removing and lifting/lowering the M242 Feeder Assembly from the 25mm Gun on a BFV during maintenance and/or remedial action misfire procedures

- iv) with assistance from another Soldier, lifting, carrying and installing the barrel of a 25mm gun onto a BFV, and
- v) loading Tube-launched Optically-tracked Wire-guided Missile (TOW) -2B Aero Missiles into a BFV Mounted TOW Weapon System.

19K. Of the same 27 tasks referred to in the 19K section above, seven were reported to be the most important to success as an Army armor crewman. These seven tasks, ranked in order of descending reported importance, are:

- i) loading multiple rounds in the 120mm main gun
- ii) removing a casualty from an Abrams Tank
- iii) repairing broken tracks on a tracked vehicle (i.e., an Abrams)
- iv) loading ammunition for the M2 .50 Cal Machine Gun on an Abrams
- v) mounting the M240 weapon on an Abrams
- vi) while standing in the turret of an Abrams, receiving rounds (such as MPAT rounds) from a Soldier on the hull and placing into the ready rack, and
- vii) while standing on the hull of an Abrams Tank, lifting and carrying rounds such as MPAT rounds from a Soldier on the ground or HEMTT and handing it to a Soldier inside the tank for resupply.

Most Time Consuming Tasks

19D. Of the same 16 tasks addressed by the 19Ds, five were reported to take the most time to complete. These five tasks, ranked in order of descending reported time needed for completion (most time-consuming task first), are:

- i) performing a dismounted foot march or tactical movement
- ii) using a shovel or entrenching tool to fill sandbags when preparing to build a fighting position

- iii) lifting and carrying sandbags to an emplacement location and building a fighting position
- iv) jacking up a vehicle and removing lug nuts from a flat tire, and
- v) with the assistance of another Soldier, removing a spare tire from a HMMWV, rolling it into place, and lifting it onto the axle of the disabled vehicle.

19K. Of the same 27 tasks addressed by the 19Ks, seven were reported to take the most time to complete. These seven tasks, ranked in order of descending reported time needed for completion, are

- i) changing the sprocket on an Abrams Tank
- ii) performing a dismounted foot march or tactical movement
- iii) changing the bra, plow and roller on an Abrams
- iv) repairing broken tracks on a tracked vehicle (i.e., an Abrams)
- v) lifting and lowering Caiman tires from the top of an MRAP
- vi) lifting and carrying sandbags to an emplacement location and building a fighting position, and
- vii) using a shovel or entrenching tool to fill sand bags when preparing to build a fighting position.

Other Notable Findings

As can be seen above, the tasks rated as most important to job success are to a fairly large extent those reported as the most frequently performed. However, for both the cavalry scouts and armor crewmen, certain tasks were indicated as being more important but less frequently done. For cavalry scouts, these tasks were: 1) with the assistance of another Soldier, pulling a casualty from a commander's seat and through the top hatch of a wheeled vehicle (i.e., BFV or Stryker), and 2) loading TOW-2B Aero Missiles into a BFV Mounted TOW Weapon System. For armor crewmen, these tasks were: 1) loading multiple rounds in the 120mm Main Gun, and 2) removing a casualty from an Abrams Tank (Mounted). The data also highlighted one task for each of the two MOSs that respondents reported were less important but more frequently done. For cavalry scouts, this task was using a shovel or entrenching tool to

fill sand bags when preparing a fighting position. For armor crewmen, this task was mounting the M2 .50 Cal Machine Gun Receiver on an Abrams Tank.

Several other findings are also noteworthy and, depending on the extent of their validity, may have important ramifications for training programs. First, each of the 28 tasks represented in this study were not performed by a small to significant percentage of the cavalry scouts and/or armor crewmen during the last two years - not even in their Initial Entry Training (IET). During this same time period, 30% of the 19D sample indicated they had performed only 10 or fewer of the 16 tasks addressed in the common and 19D-specific JAQs within the last two years. Eleven percent of the 19Ks said they had done only eight or fewer of the 12 tasks addressed by the 19K-specific JAQ within the same time period. Second, expectations and the frequency of task performance were related. For all the common and 19D-specific tasks and five of the 12 19K-specific tasks, those who said they were expected to perform a task when the situation arises reported completing the task more often in the last two years. (For the other seven tasks, a statistically significant result was impossible because nearly the entire sample said they were expected to perform the task if the situation arises.) Third, several important tasks inherent to the cavalry scouts and/or armor crewmen (i.e., 19D and 19K) MOSs were performed, as a whole, more often during combat deployments than in garrison or training settings. Fourth, a number of these respondents who had been deployed reported that they had performed MOS-specific tasks in the field but not in garrison. And fifth, there was only moderate agreement between subject matter experts and job incumbents concerning what aspects of the cavalry scout and armor crewman jobs were highly important to job success. Lastly, it appears that within each of the 19D and 19K MOSs there are a number of physically demanding tasks currently being performed by Soldiers that were not addressed by the JAQs used in this study. For cavalry scouts, these include the following two broad task areas: 1) mounting/dismounting, loading/unloading, and transporting equipment and ammunition that were not mentioned (e.g., the long range advanced scout surveillance system [(LRAS3)], various crew-served weapons, missile launchers, improvised explosive device (IED) detection and disabling equipment, and grenade launchers), sometimes to observational

point positions, and 2) navigating and sprinting through obstacles (e.g., climbing over walls, navigating or sprinting across rugged terrain, and climbing up ropes and ladders) in full fighting load, while carrying equipment such as crew-served weapons. For armor crewmen, they include the following task areas: 1) performing manual track maintenance on tracked vehicles (e.g., replacing sections and entire sides of the track, replacing track pads, and replacing a track support chain) and transporting the materials necessary to perform these tasks, 2) installing, removing and transporting tracked vehicle road wheels, and 3) tracked vehicle engine service and maintenance tasks (e.g., checking oil levels, servicing the breech, and servicing v-packs).

Introduction

As part of a larger study conducted with the U.S. Army Training and Doctrine Command (TRADOC) to develop physical performance standards for seven of the Army's most physically demanding jobs, researchers from the U.S. Army Research Institute of Environmental Medicine (USARIEM) and Human Performance Systems, Inc. designed three web-administered job analyses questionnaires JAQs to be completed by Army cavalry scouts and armor crewmen military occupational specialties (MOSs 19D and 19K, respectively). These questionnaires were administered on the Internet by the TRADOC Analysis Center (the point of contact for this mailing was Dr. Jennifer Jebo) over a four week period in the fall of 2014, after which time the questionnaire was closed and taken offline.

Methods

The physically demanding tasks represented in the three JAQs administered in this study were identified by a job analysis, which was guided by a scientific review panel and a senior personnel working group. These two groups oversaw the scientific process of the job analysis and the development of initial task lists, respectively. The process of developing these lists was initiated using the instructions in Department of the Army Pamphlet 611-21. The current physical demands and DA Form 5643 (The Physical Demands Analysis Worksheet) were used to initially define the essential tasks. The concept was to update the existing physical demands based on lessons learned from a decade of conflict. The experts examined the information in DA PAM 611-21, identified the tasks represented therein, determined if the list was current and complete, and created specific standards for each of the tasks. This was an iterative process with oversight provided by TRADOC and experienced senior leaders in the 19D and 19K MOSs.

Following this process determinations were made concerning whether adjustments to the physical demands of each task were needed. These decisions were based on data from the Center for Army Lessons Learned, after action reports (AARs) from recently deployed brigade combat teams, and

interviews with recently deployed battalion- and company-level leaders and Soldiers. These experts were asked to provide information concerning whether a task was critical, how often it was performed, and any additional quantifiable information. The lists of tasks and standards were then peer-reviewed by selected battalion commanders, command sergeants major, and non-commissioned officers in each MOS who were not affiliated with TRADOC. Each member of this branch peer review panel had been deployed, and many had been recently deployed. The final products were submitted to TRADOC by the senior personnel working group. These products were the task lists, the standards, and the supporting justification for changes (including DA Form 5643), with the changes noted. The final lists of tasks and standards from each proponent branch were approved by both the TRADOC Commanding General and the Command Sergeant Major). These lists were then forwarded to the Sergeant Major of the Army's Board of Directors for review and approval. Upon approval of the tasks and standards, they were verified in the field at the request of the the TRADOC Commanding General. The definition of verification used was that 90% of a randomly selected population of Soldiers in each MOS should be able to successfully complete the task to standard.

The resulting three JAQs administered to cavalry scouts and armor crewmen in this study were designed to determine a wide variety of job-specific (performed only by either cavalry scouts or armor crewmen) and non-job specific (i.e., regularly performed by Soldiers in other MOSs) tasks of the 19D and 19K MOSs. These questionnaires were administered over the internet and responded to anonymously. No attempt was made to identify individual respondents. The first of these three JAQs (i.e., the "19D JAQ") addressed one job-related task specific to the 19D MOS (i.e., "Load TOW-2B Aero Missiles into a BFV Mounted TOW Weapon System") and 15 others which are regularly performed not only by cavalry scouts but by enlisted Soldiers in many Army occupations (the first task is hereafter referred to as a "job-specific task;" the others are hereafter referred to as "common tasks;" see Table 1). The second JAQ (i.e., the "19K-specific" JAQ) addressed job-related tasks specific to the 19K MOS (hereafter referred to as "19K-specific tasks;" see Table 2). And finally, the third JAQ (i.e., the "19K Common Task JAQ," or

“Common Task JAQ”) addressed the same 15 common tasks that were included in the 19D JAQ referred to above. Concerning the Common Task JAQ, only data from Soldiers in the 19K MOS are presented for purposes of this report. The common task JAQ was also completed by Soldiers in several other MOSs, and this data will be presented in other reports being prepared for TRADOC. All three JAQs were divided into three major sections: 1) A section asking for demographic information (e.g., age, race, deployment history), 2) a set of questions addressing individual tasks, asking for (a) the frequency with which the respondent performed each task, (b) the importance of each to job success, (c) the time needed to complete each task, (d) whether the respondent was actually expected to perform each task when the situation required it, and (e) what uniform was typically worn while completing each task, and 3) a section titled “Supplemental Information” that was included to obtain a fuller picture of some of the tasks addressed in the previous section.

A total of 794 of the 8,580 cavalry scouts who were willing to participate as representatives of their branch provided data for the first JAQ, for a response rate of 9.3%. A total of 464 willing armor crewmen – a response rate of 7.0% - provided data for the second JAQ, and 121 willing armor crewmen – a response rate of 1.8% - provided data for the third questionnaire. Among the respondents to the 19K job-specific survey there may be some who also responded to the common task survey; the researchers had no way of knowing how many armor crewmen responded to both these surveys. By applying an inclusion criterion that 50% or more of the survey items would be completed by each included participant (excluding questions asking for some type of demographic data such as gender or ethnic group), the numbers of respondents in the final datasets were reduced to 560, 370 and 54, respectively.

Table 1. Tasks included in the 19D JAQ

Common Tasks

- 1) Lift and drag a casualty to a safe location as quickly as possible
- 2) With assistance from another Soldier, lift, carry, and install the barrel of a 25mm gun onto a BFV
- 3) Lift and carry ammunition cans from the supply point (e.g., ammunition center or truck) to the back of a BFV
- 4) Throw a hand grenade
- 5) Use a shovel or entrenching tool to fill sand bags when preparing to build a fighting position
- 6) Lift and carry sandbags to an emplacement location and build a fighting position
- 7) With the assistance of another Soldier, pull a casualty from a commander's seat and through the top hatch of a wheeled vehicle (i.e., BFV or Stryker)
- 8) Climb over, through, or around barbed wire obstacles
- 9) With a group of Soldiers, lift, carry and connect a vehicle tow bar for a Buffalo, BFV or Stryker from a towing vehicle to the disabled vehicle
- 10) Jack up a vehicle and remove lug nuts from a flat tire
- 11) With the assistance of another Soldier, remove a spare tire from a HMMWV, roll into place, and lift onto the axle of the disabled vehicle
- 12) Manually tighten the lug nuts on a tire with a lug or torque wrench
- 13) As part of a group of four Soldiers, remove the flat tire from a HMMWV, then roll and lift it into the back of a vehicle
- 14) Perform a dismounted foot march or tactical movement
- 15) While seated, remove and lift/lower the M242 Feeder assembly from the 25mm gun on a BFV during maintenance and/or remedial action misfire procedures

19D Job-specific Task

- 16) Load TOW-2B Aero Missiles into a BFV Mounted TOW Weapon System

Table 2. Tasks included in the 19K-specific JAQ

- 1) Mount the M2 .50 Cal Machine Gun Receiver on an Abrams Tank
- 2) Load ammunition for the M2 .50 Cal Machine Gun on an Abrams Tank
- 3a) Carry ammunition such as MPAT rounds from a supply point to the hull of an Abrams Tank
- 3b) While standing on the hull of an Abrams Tank, lift and carry rounds such as MPAT rounds from a Soldier on the ground or HEMTT, and hand it to a Soldier inside the tank for resupply
- 3c) While standing in the turret of an Abrams Tank, receive rounds (such as MPAT rounds) from a Soldier on the hull and place into the ready rack
- 4) Load multiple rounds in the 120mm Main Gun
- 5) Remove a casualty from an Abrams Tank (mounted)
- 6) Repair broken tracks on a tracked vehicle (i.e., an Abrams Tank)
- 7) Mount the M240 weapon on an Abrams Tank
- 8) Lift and lower Caiman tires from the top of an MRAP vehicle
- 9) Change the bra, plow and roller on an Abrams Tank
- 10) Change the sprocket on an Abrams Tank

Analysis

The analysis plan for this study was to use the simplest and most straightforward analyses available that would provide decision makers with helpful information. A central tenet of this plan was to display all the data rather than selected subportions of it. So for example, when highlighting a particular feature of any set of variables (e.g., those tasks rated as most frequently performed or most important to job success), the ratings (e.g., the frequency or importance ratings) are provided for all the variables in that set along with specifying the particular highlighted rankings or features. Frequency analysis was used to obtain descriptive information, and chi-square tests and phi-coefficients, t-tests, Mann-Whitney U tests, and analyses of variance (i.e., ANOVAs) with accompanying Duncan post-hoc tests were used for group comparisons. Mann-Whitney U tests were used specifically when one or more distributions of variables being compared were highly aberrant (i.e., deviated to a large extent from normal) or when this type of test was more suitable based on the item response categories.

Results

Section 1: Background Information (i.e., Demographics)

Demographic data for the sample completing the 19D JAQ (i.e., the 560 cavalry scouts who responded to the JAQ addressing one 19D-specific task and 15 common tasks performed by both cavalry scouts and Soldiers in other MOSs) are displayed in Table 3. Demographic data for the samples completing the 19K job-specific and common task surveys (370 and 54 armor crewmen, respectively) are shown in Table 4. Considering the combined sample from all three surveys, nearly 100% (all but one) were male. Eighty-six percent were Caucasian, 10% were African-American, 3% were Asian, and 1% indicated being native Hawaiian or another type of Pacific Islander. Fifteen percent indicated that they were of Hispanic or Latino descent, a demographic item that was separate from the item addressing racial background. Eight percent of the sample were under 25 years of age, and 38% were 35 or older. Nearly the entire sample (94%) indicated that they had deployed to a foreign country, and 51% said they had

been deployed three times or more. Fifty-one percent had deployed to Afghanistan, and 88% had deployed to Iraq. Thirty-eight percent of the combined sample reported they had served in both these theaters of operation.

Table 3. Demographic data for the sample completing the 19D JAQ

| <u>Variable¹</u> | <u>19D JAQ Sample</u> | |
|---|-----------------------|--------------|
| <u>Gender</u> | | |
| Male | n=559 | 558 (99.8%) |
| Female | | 1 (0.2%) |
| <u>Ethnic Background</u> | | |
| Hispanic or Latino | n=498 | 72 (14.5%) |
| Not Hispanic or Latino | | 426 (85.5 %) |
| <u>Race</u> | | |
| Caucasian | n=485 | 429 (88.5%) |
| African American | | 37 (7.6%) |
| Asian (Chinese, Philippino, Japanese, Korean, etc.) | | 11 (2.3%) |
| Native Hawaiian or other Pacific Islander | | 8 (1.6%) |
| <u>Age</u> | | |
| Under 25 | n=398 | 34 (8.7%) |
| 25 to 30 | | 121 (30.4%) |
| 31 to 40 | | 205 (51.6%) |
| Over 40 | | 38 (9.5%) |
| <u>Rank</u> | | |
| PVT, PV2, & PFC (E1-E3) | n=556 | 6 (1.1%) |
| SPC or CPL (E4) | | 42 (7.6%) |
| SGT (E5) | | 127 (22.8%) |
| SSG (E6) | | 219 (39.4%) |
| SFC (E7) | | 162 (29.1%) |
| <u>Tenure in the Army</u> | | |
| Less than 18 months | n=557 | 6 (1.1%) |
| 18 months to 3 years | | 29 (5.2%) |
| 4 to 6 years | | 93 (16.7%) |
| 7 to 10 years | | 157 (28.2%) |
| 11 or more years | | 272 (48.6%) |
| <u>Times Deployed Since 11 SEP 2001</u> | | |
| Zero | n=558 | 32 (5.7%) |
| One | | 71 (12.7%) |
| Two | | 162 (29.0%) |
| Three | | 186 (33.3%) |
| Four or more | | 107 (19.2%) |
| <u>Component</u> | | |
| Active Army | n=560 | 559 (99.8%) |
| Army National Guard | | 1 (0.2%) |

¹ Percentages for some of the demographic variables do not sum exactly to 100% due to rounding.

Table 4. Demographic data for the samples completing the 19K-specific and Common Task JAQs

| <u>Variable¹</u> | | <u>19K-specific JAQ Sample</u> | | <u>Common Task JAQ Sample</u> |
|--|-------|------------------------------------|------|-----------------------------------|
| <u>Gender</u> | | | | |
| Male | n=368 | 368 (100%) | n=54 | 54 (100%) |
| Female | | ----- | | ----- |
| <u>Ethnic Background</u> | | | | |
| Hispanic or Latino | n=343 | 54 (15.7%) | n=49 | 5 (10.2%) |
| Not Hispanic or Latino | | 289 (84.3 %) | | 44 (89.8 %) |
| <u>Race</u> | | | | |
| Caucasian | n=320 | 263 (82.2%) | n=46 | 42 (91.3%) |
| African American | | 44 (13.8%) | | 2 (4.3%) |
| Asian (Chinese, Philippino, Japanese, Korean, etc.) | | 10 (3.1%) | | 2 (4.3%) |
| Native Hawaiian or other Pacific Islander | | 3 (0.9%) | | ----- |
| <u>Age</u> | | | | |
| Under 25 | n=370 | 26 (7.1%) | n=50 | 1 (2.0%) |
| 25 to 30 | | 102 (27.5%) | | 17 (34.0%) |
| 31 to 40 | | 196 (52.9%) | | 21 (42.0%) |
| Over 40 | | 46 (12.4%) | | 11 (22.0%) |
| <u>Rank</u> | | | | |
| PV2 & PFC (E3) | n=370 | 10 (2.7%) | n=54 | 2 (3.7%) |
| SPC or CPL (E4) | | 13 (3.5%) | | 2 (3.7%) |
| SGT (E5) | | 79 (21.4%) | | 10 (18.5%) |
| SSG (E6) | | 144 (38.9%) | | 21 (38.9%) |
| SFC (E7) | | 124 (33.5%) | | 19 (35.2%) |
| <u>Tenure in the Army</u> | | | | |
| Less than 18 months | n=370 | 10 (2.7%) | n=54 | 2 (3.7%) |
| 18 months to 3 years | | 15 (4.1%) | | 3 (5.6%) |
| 4 to 6 years | | 40 (10.8%) | | 4 (7.4%) |
| 7 to 10 years | | 86 (23.2%) | | 15 (27.8%) |
| 11 or more years | | 219 (59.2%) | | 30 (55.6%) |
| <u>Times Deployed Since 11 SEP 2001</u> | | | | |
| Zero | n=370 | 22 (5.9%) | n=54 | 2 (3.7%) |
| One | | 55 (14.9%) | | 10 (18.5%) |
| Two | | 108 (29.2%) | | 17 (31.5%) |
| Three | | 111 (30.0%) | | 16 (29.6%) |
| Four or more | | 74 (20.0%) | | 9 (16.7%) |

¹ Percentages for some of the demographic variables do not sum exactly to 100% due to rounding.

Table 4. Continued

| <u>Variable</u> ¹ | | <u>19K-specific JAQ Sample</u> | | <u>Common Task JAQ Sample</u> |
|--|-------|---|------|--|
| <u>Tenure in current MOS (n = 369)</u> | | | | |
| Less than 18 months | n=369 | 11 (3.0%) | | |
| 18 months to 3 years | | 14 (3.8%) | | |
| 4 to 6 years | | 44 (11.9%) | | |
| 7 to 10 years | | 93 (25.2%) | | |
| 11 or more years | | 207 (56.1%) | | |
| <u>Component (n's = 370 & 54)</u> | | | | |
| Active Army | n=370 | 368 (99.5%) | n=54 | 54 (100%) |
| Army National Guard | | 2 (0.5%) | | ----- |

¹ Percentages for some of the demographic variables do not sum exactly to 100% due to rounding.

Section 2: Common and 19D-specific Task Ratings

In the following pages, the results are summarized in terms of

- how often each common and 19D-specific task was performed in the last two years,
- extent to which each common and 19D-specific task was expected to be performed,
- rated importance of each common and 19D-specific task,
- rated time each common and 19D-specific task takes to perform, and
- uniforms worn for each common and 19D-specific task.

2.1. How Often Each Common and 19D-specific Task Was Performed in the Last Two Years

Tasks with the same ranking numbers (i.e., with the same number on the far left in the chart title) do not differ statistically from each other. So for example, referring to Figure 1, both the tasks numbered “2” were reported to have been performed at about the same rate of frequency.

Figure 1. Frequencies with which common and 19D-specific tasks were performed in the last two years

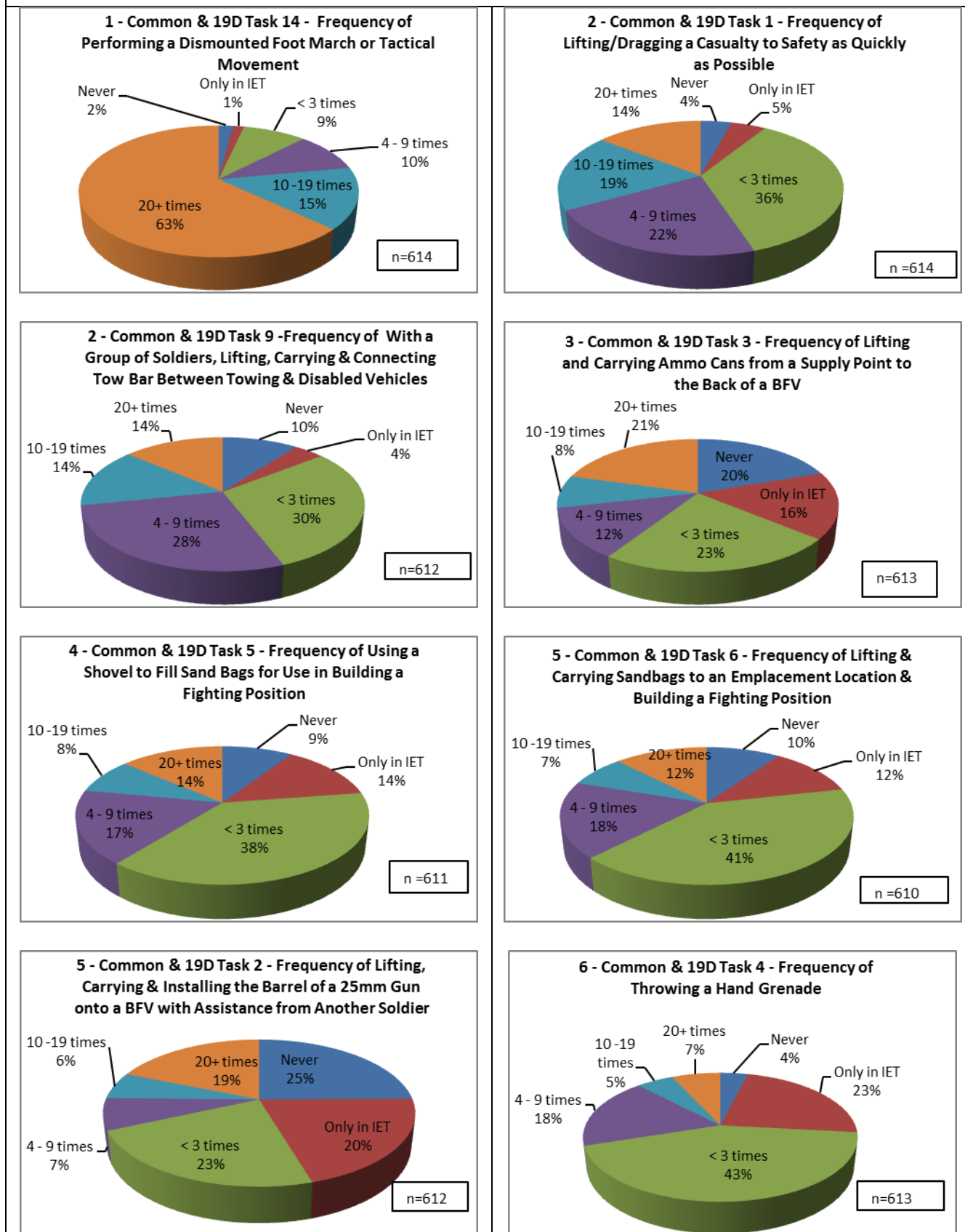
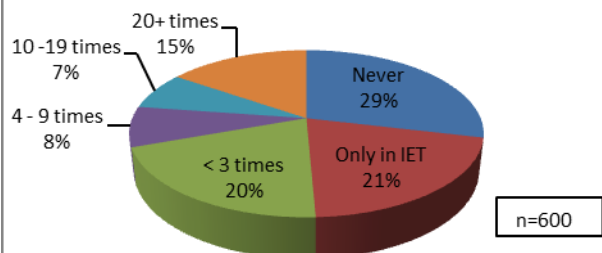
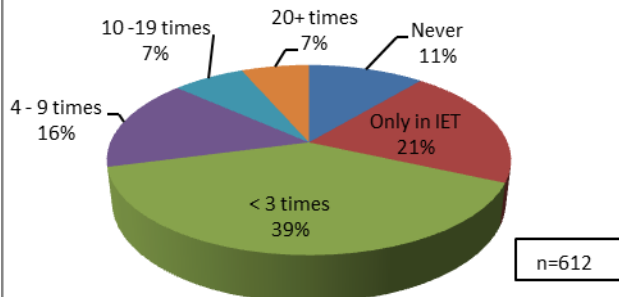


Figure 1. Continued

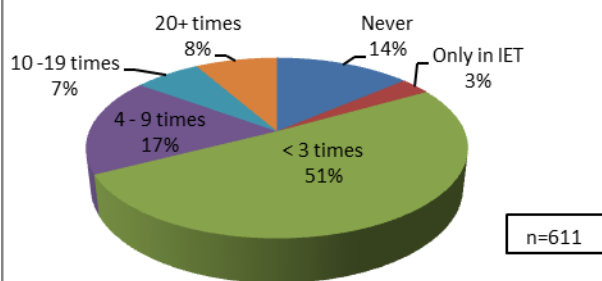
7 - Common & 19D Task 15 - Frequency of Removing & Lifting/Lowering an M242 Feeder Assembly from a 25mm Gun onto a BFV During Maintenance or Remedial Action Procedures



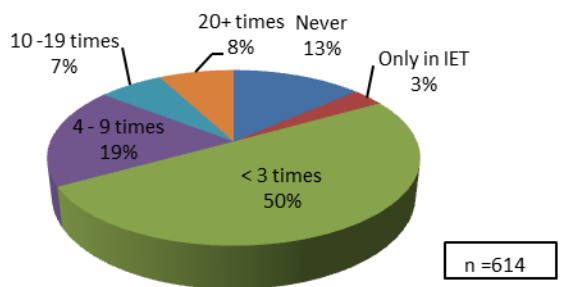
7 - Common & 19D Task 8 - Frequency of Climbing Over, Through, or Around Barbed Wire Obstacles



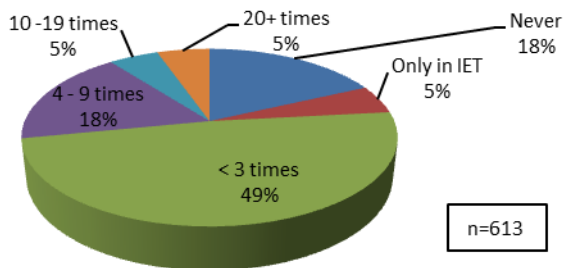
8 - Common & 19D Task 12 - Frequency of Manually Tightening the Lug Nuts on a Tire with a Lug or Torque Wrench



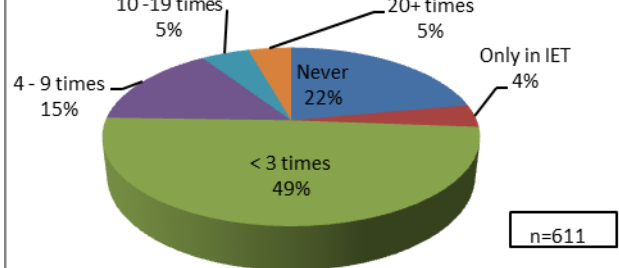
8 - Common & 19D Task 10 - Frequency of Jacking Up a Vehicle & Removing Lug Nuts from a Flat Tire



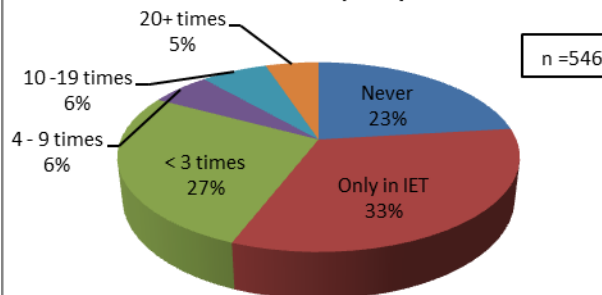
9 - Common & 19D Task 11 - Frequency of Removing a Spare HMMWV Tire, Rolling it into Place, & Lifting it onto the Axle of the Disabled Vehicle with Assistance from Another Soldier



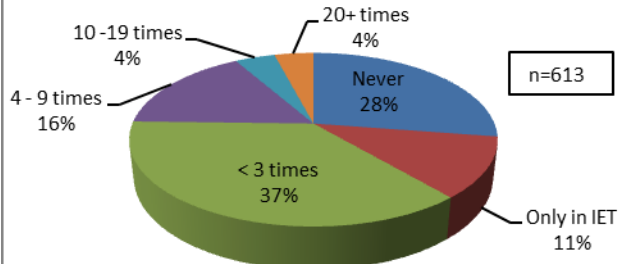
9 - Common & 19D Task 13 - Frequency of Removing a Flat Tire from a HMMWV & Lifting it into a Vehicle as Part of a Group of four Soldiers



9 - Common & 19D Task 16 - Frequency of Loading TOW-2B Aero Missiles into a BFV Mounted TOW Weapon System



10 - Common & 19D Task 7 - Frequency of Pulling a Casualty from a Commander's Seat Through the Top Hatch with of a Wheeled Vehicle with Assistance from Another Soldier



2.2. The Extent to Which Each Common and 19D-specific Task Was Expected to be Performed

For each of the tasks represented by the JAQ, respondents were asked whether they were expected to complete the task if the situation arises. Table 5 below displays the responses to this question for each of the tasks included on the 19D JAQ.

Table 5. The extent to which each common and 19D-specific task was expected to be performed

| <u>Task¹</u> | <u>Yes, I am Expected to Perform This Task</u> | <u>No, I am Not Expected to Perform This Task</u> |
|--|---|--|
| 1) Lift and Drag a Casualty to Safe Location (n=610) | 99% | 1% |
| 1) Perform a dismounted foot march or tactical movement (n=613) | 98% | 2% |
| 2) Throw a Hand Grenade (n=609) | 96% | 4% |
| 3) With the assistance of another Soldier, pull a casualty from a commander's seat and through the top hatch of a wheeled vehicle (i.e., BFV or Stryker) (n=610) | 92% | 8% |
| 3) With a group of Soldiers, lift, carry and connect a vehicle tow bar for a Buffalo, BFV or Stryker from a towing vehicle to the disabled vehicle (n=610) | 92% | 8% |
| 4) Jack up a vehicle and remove lug nuts from a flat tire (n=612) | 90% | 10% |
| 4) Manually tighten the lug nuts on a tire with a lug or torque wrench (n=604) | 89% | 11% |
| 4) With the assistance of another Soldier, remove a spare tire from a HMMWV, roll into place, and lift onto the axle of the disabled vehicle (n=612) | 89% | 11% |
| 4) Load TOW-2B Aero Missiles into a BFV Mounted TOW Weapon System (n=544) | 88% | 12% |
| 4) Lift and carry sandbags to an emplacement location and build a fighting position (n=610) | 88% | 12% |
| 4) Use a shovel or entrenching tool to fill sand bags when preparing to build a fighting position (n=609) | 88% | 12% |
| 4) Climb over, through, or around barbed wire obstacles (n=607) | 86% | 14% |
| 4) Lift and carry ammunition cans from the supply point (e.g., ammunition center or truck) to the back of a BFV (n=609) | 86% | 14% |
| 5) With assistance from another Soldier, lift, carry, and install the barrel of a 25mm gun onto a BFV (n=610) | 85% | 15% |
| 5) As part of a group of four Soldiers, remove the flat tire from a HMMWV, then roll and lift it into the back of a vehicle (=607) | 85% | 15% |
| 5) While seated, remove and lift/lower the M242 Feeder Assembly from the 25mm gun on a BFV during maintenance and/or remedial action misfire procedures (n=600) | 81% | 19% |

¹ Tasks with the same ranking numbers (i.e., with the same numbers on the far left of the listed tasks) do not statistically differ from each other.

2.3. The Rated Importance of Each Common and 19D-specific Task

Tasks with the same ranking numbers (i.e., with the same number on the far left in the chart title) do not statistically differ from each other. So for example, Figure 2 shows all the tasks numbered “2” are rated at about the same level of importance.

Figure 2. The rated importance of each common and 19D-specific task

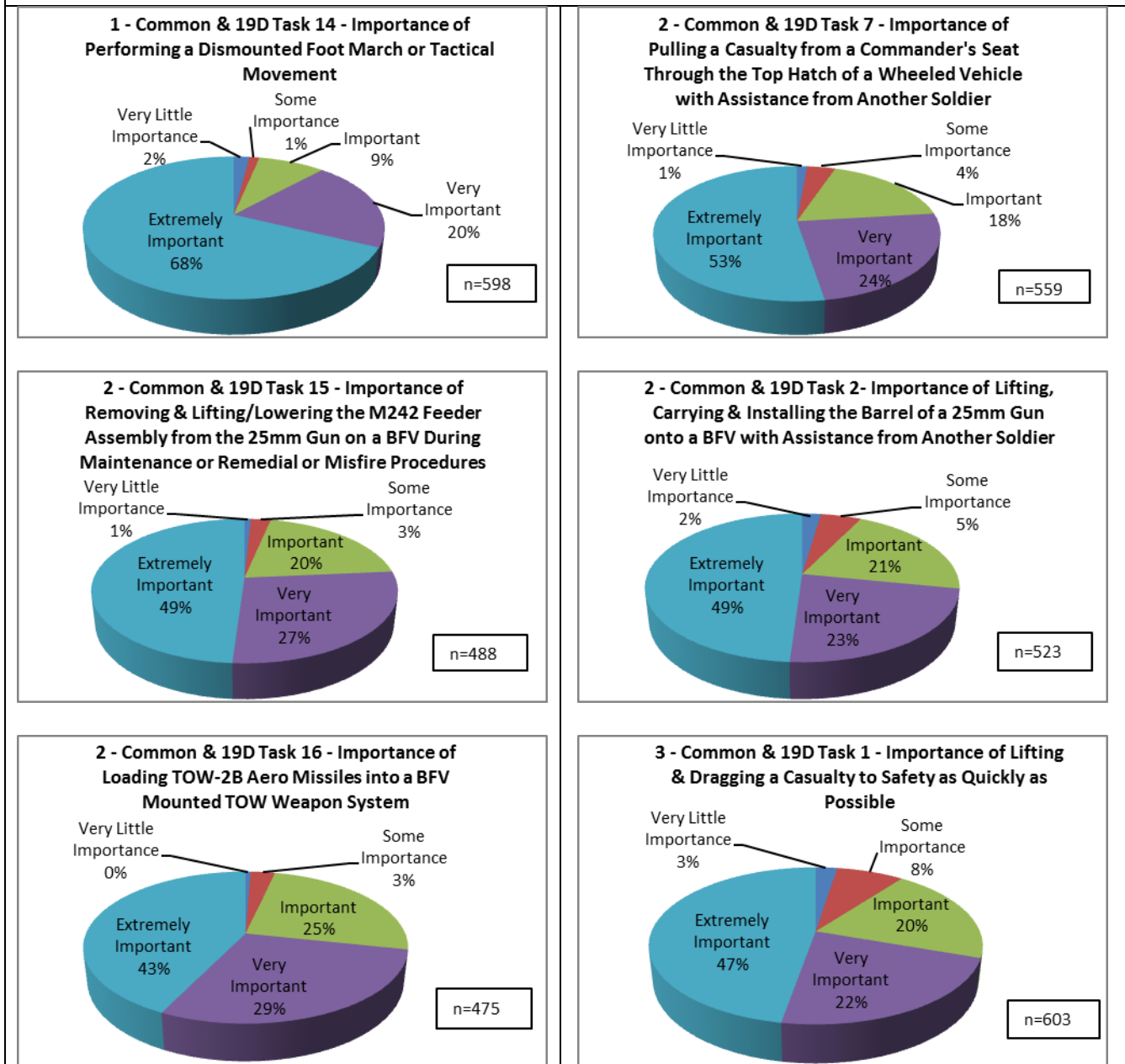


Figure 2. Continued

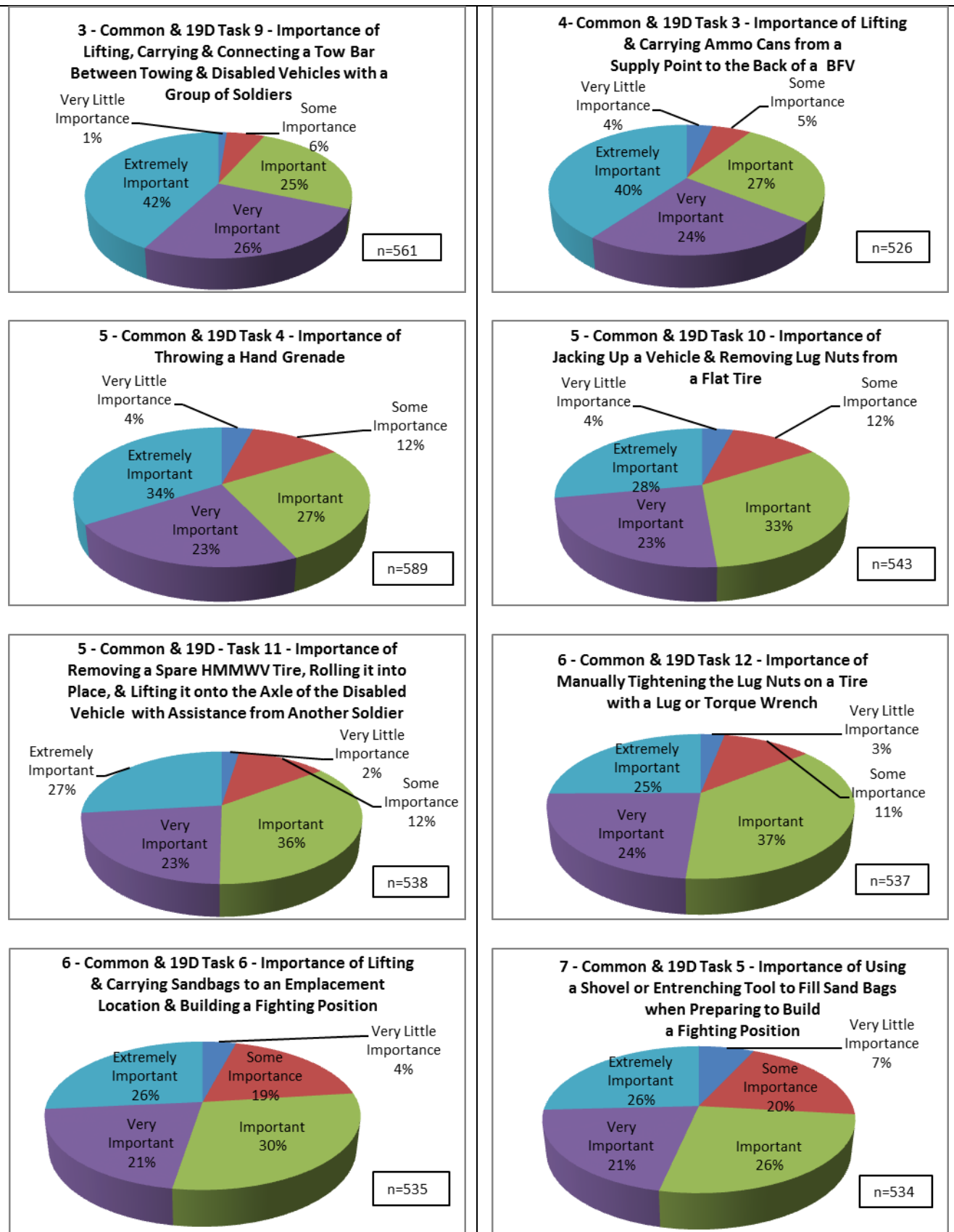
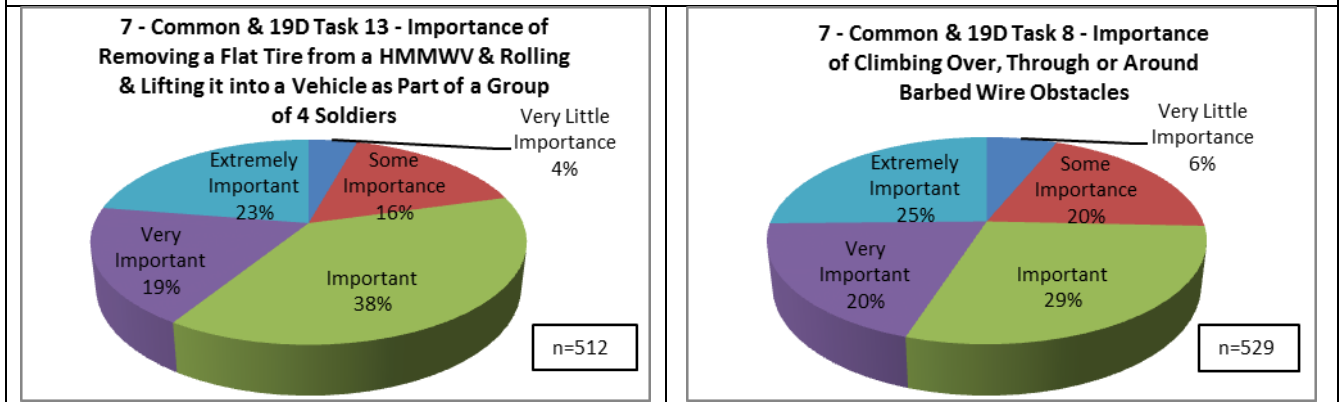


Figure 2. Continued



2.4. The Rated Time Each Common and 19D-specific Task Takes to Perform

Tasks with the same ranking numbers (i.e., with the same number on the far left in the chart title) do not statistically differ from each other. So for example, Figure 3 shows all the tasks numbered “6” are rated as taking about the same amount of time to complete.

Figure 3. The rated time each common and 19D-specific task takes to perform

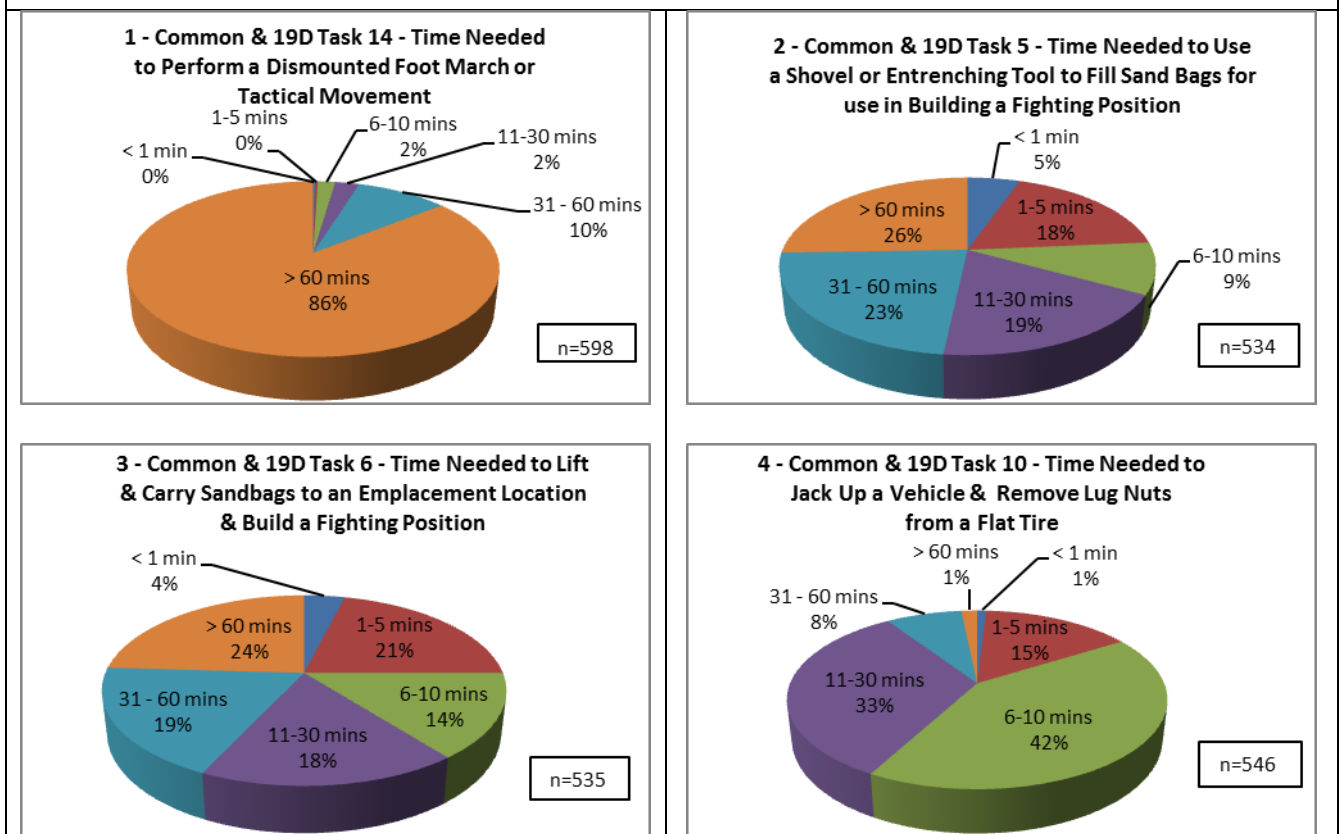


Figure 3. Continued

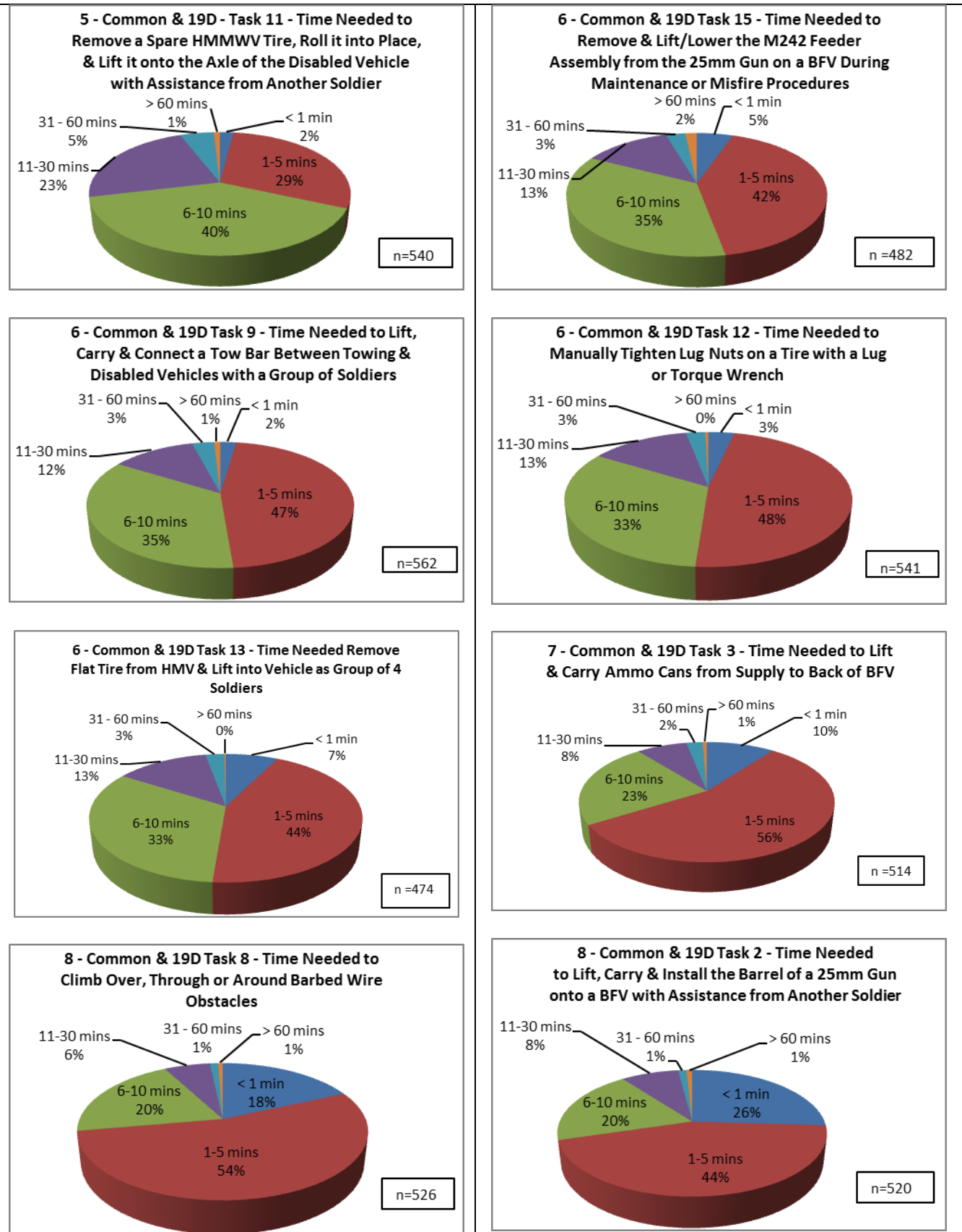
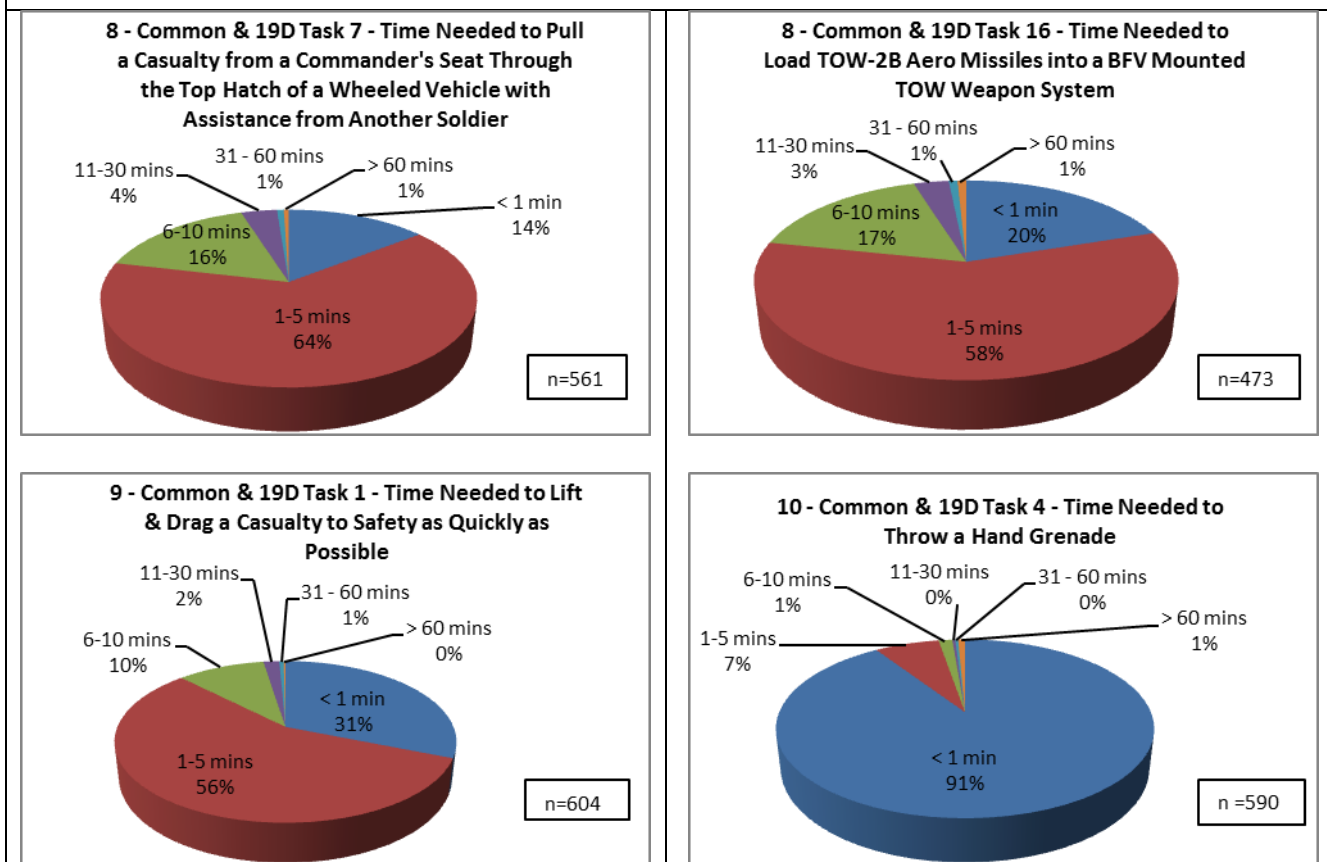


Figure 3. Continued



2.5. Uniforms Worn for Each Common and 19D-specific Task

Response options for these questions (Figure 4) were 1) Standard Uniform, 2) Standard Uniform with Vest, 3) Fighting Load Minus Weapon, 4) Fighting Load with Weapon, 5) Approach March Load, and 6) Emergency Approach March Load.

Figure 4. Uniforms worn for each common and 19D-specific task

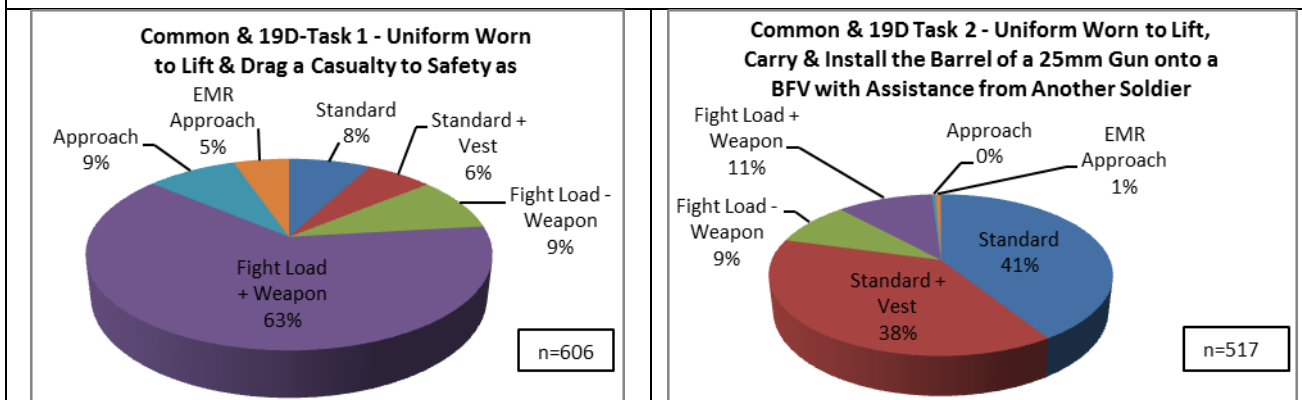


Figure 4. Continued

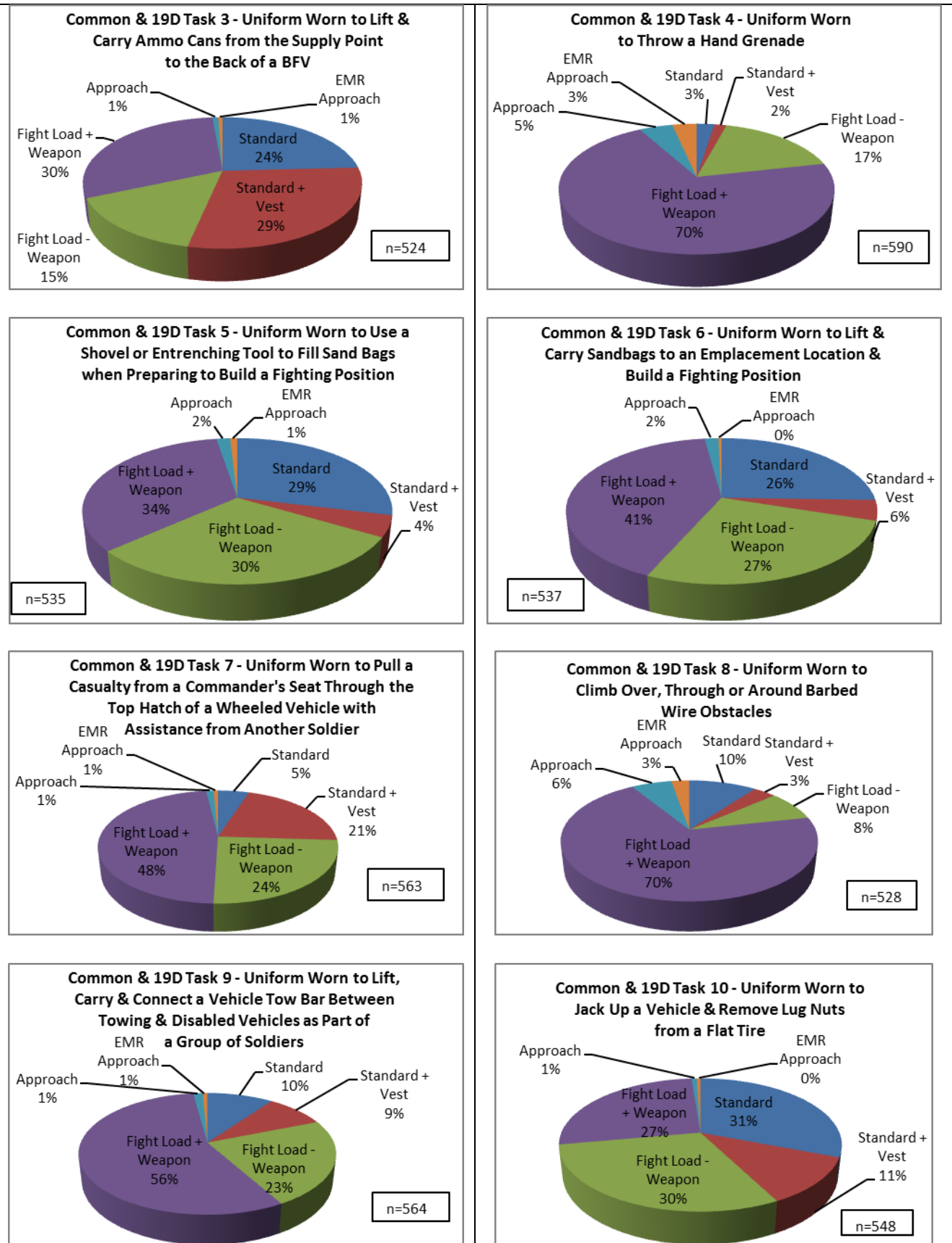
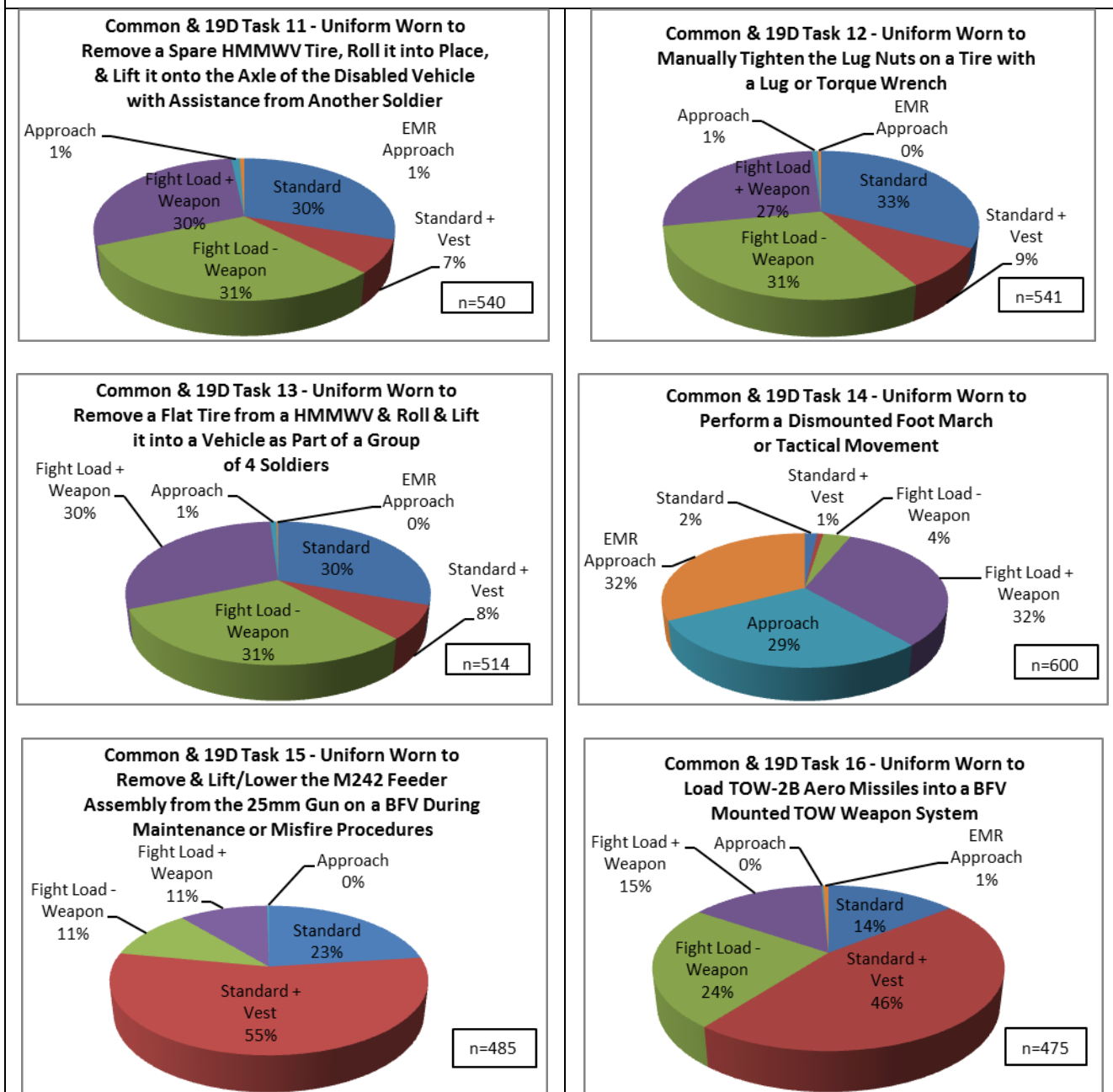


Figure 4. Continued



Section 3: Common and 19D-specific Task Supplemental Information

Following is information obtained by a second set of job-related questions on the 19D and 19K Common Task JAQs. These questions were asked to gain a more complete picture of some of the tasks addressed in the previous portions of the two questionnaires.

3.1. Time, Quantity and Distance Pertaining to Cavalry Scout Tasks

25mm Ammo Cans: Six questions were asked in this section. The first two questions using a fixed-response format asked: 1) When fully supplying a BFV, what is the total number of 25mm ammo cans you usually carry from a supply point to the vehicle? 2) How far (in yards) did you usually carry 25mm ammo cans from the supply point to the BFV? Figure 5 displays the responses to these two questions. An additional four questions were asked pertaining to the carrying of 25mm ammo cans using an open response format: 3) What is the smallest number of 25mm ammo cans you ever personally carried from a supply point to a BFV? 4) What is the largest number of 25mm ammo cans you ever personally carried from a supply point to a BFV? 5) What is the shortest distance (yards) you ever carried 25mm ammo cans from a supply point to a BFV? 6) What is the longest distance (yards) you ever carried 25mm ammo cans from a supply point to a BFV? Tables 6 and 7 below summarize the responses to these four questions.

Figure 5. Number of 25mm ammo cans carried and the distance traveled to BFV

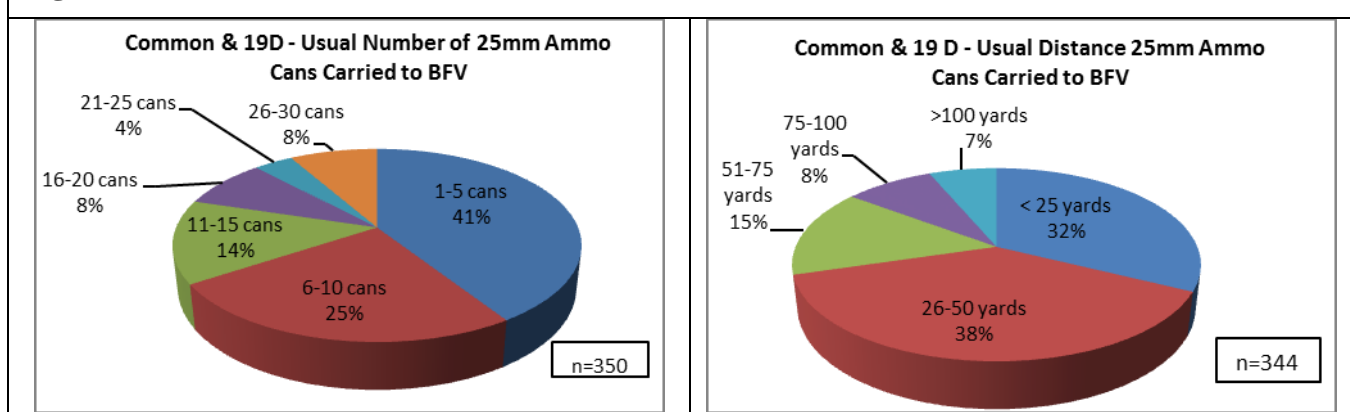
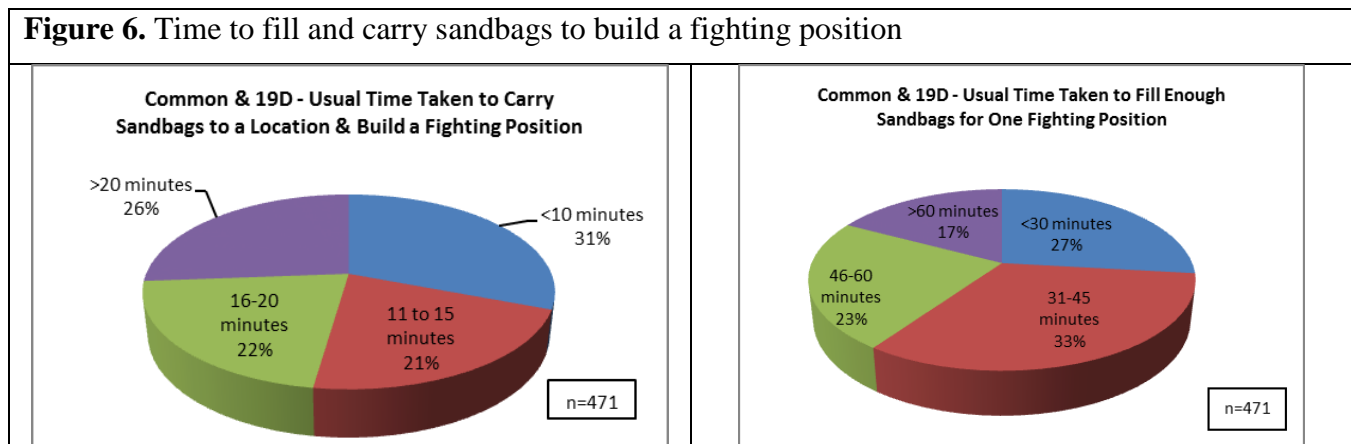


Table 6. Number of 25mm ammo cans subjects carried from a supply point to a BFV

| <u>Number</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|-------------------------|-------------|---------------|-------------|----------------|
| Smallest number (n=317) | 2.6 | 2.0 | 1 | 2.6 |
| Largest number (n=328) | 10.6 | 5.0 | 2 | 15.9 |

| Table 7. Distance (yards) subjects carried 25mm ammo cans from a supply point to a BFV | | | | |
|---|-------------|---------------|-------------|----------------|
| <u>Distance (Yards)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Shortest Distance (n=330) | 12.4 | 10.0 | 5 | 17.5 |
| Farthest Distance (n=337) | 83.4 | 50.0 | 50 | 77.2 |

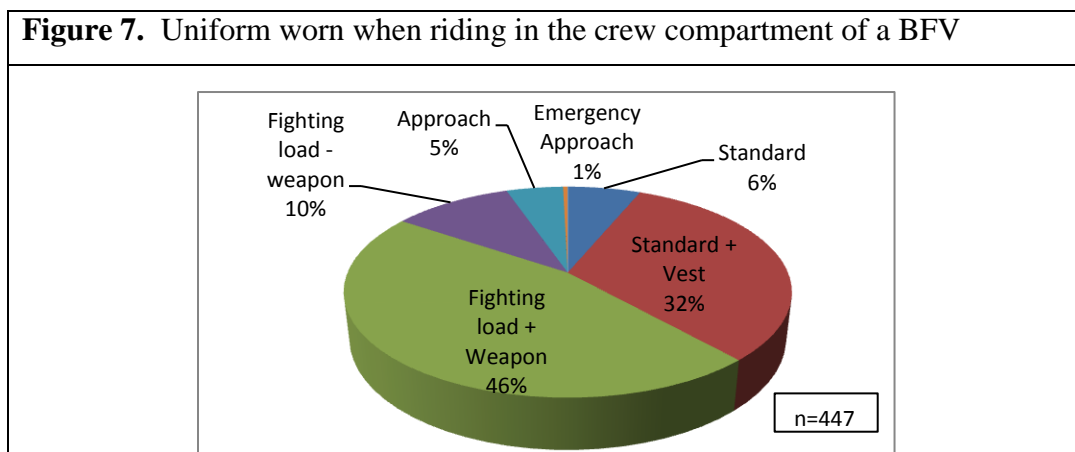
Filling Sandbags and Building a Fighting Position: Six questions were asked in this section. The first two questions using a fixed-response asked: 1) How long does it usually take you to fill enough sandbags to build one fighting position? 2) How long does it usually take you to carry sandbags to a designated location and build a fighting position? Figure 6 below displays the responses to these two questions. An additional four questions were asked pertaining to the carrying of 25mm ammo cans using an open response format: 3) When filling enough sandbags to build a single fighting position, what is the shortest amount of time (in minutes) it took you to fill enough sandbags? 4) What is the longest amount of time (in minutes) it took you to fill enough sandbags? 5) In the past, when you've carried sandbags and used them to build a fighting position, what is the shortest amount of time (in minutes) it has taken you to complete the task? 6) What is the longest amount of time (in minutes) it has taken you to complete the task? Tables 8 and 9 below displays data representing the answers to these four questions.



| Table 8. Time (minutes) spent by respondents to fill enough sandbags for a fighting position | | | | |
|---|--------------------|----------------------|--------------------|-----------------------|
| <u>Time (Minutes)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Shortest time (n=480) | 32.2 | 30.0 | 30 | 26.1 |
| Longest time (n=480) | 80.7 | 60.0 | 60 | 235.2 |

| Table 9. Time (minutes) spent by respondents to carry sandbags for and build a fighting position | | | | |
|---|--------------------|----------------------|--------------------|-----------------------|
| <u>Time (Minutes)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Shortest time (n=464) | 20.4 | 15.0 | 10 | 23.1 |
| Longest time (n=465) | 50.3 | 35.0 | 60 | 67.9 |

Uniform Worn When Riding in a BFV: One fixed-response question was asked in this section: Which response best describes the uniform you wear when riding in the crew compartment of a BFV or Stryker? The response options for this question were: 1) Standard Uniform, 2) Standard Uniform with Vest, 3) Fighting Load Minus Weapon, 4) Fighting Load with Weapon, 5) Approach March Load, and 6) Emergency Approach March Load. Figure 7 below displays the responses to this question.



Change Vehicle Track Section or Tire: Six questions were asked in this section of the JAQ. The first two questions using a fixed-response format asked: 1) When you changed a section of track on a vehicle (for example, BFV, M9 armored combat earth mover [ACE], Assault Breacher Vehicle), how many other Soldiers usually helped you perform the task? 2) When you changed a tire on a vehicle (for example, a Stryker or MRAP), how many other Soldiers usually helped you perform the task? Figure 8 displays the responses to these two questions. An additional four questions were asked in this section using an open response format: 3) When you changed a section of track on a vehicle, what is the smallest number of Soldiers who helped you perform the task? 4) What is the greatest number of Soldiers who helped you perform the task? 5) When you changed a tire on a vehicle like the Stryker or MRAP, what is the smallest number of Soldiers who helped you perform the task? 6) What is the greatest number of Soldiers who helped you perform the task? Tables 10 and 11 display data representing the answers to these four questions.

Figure 8. Number of Soldiers used to change sections of a track and a tire on a vehicle

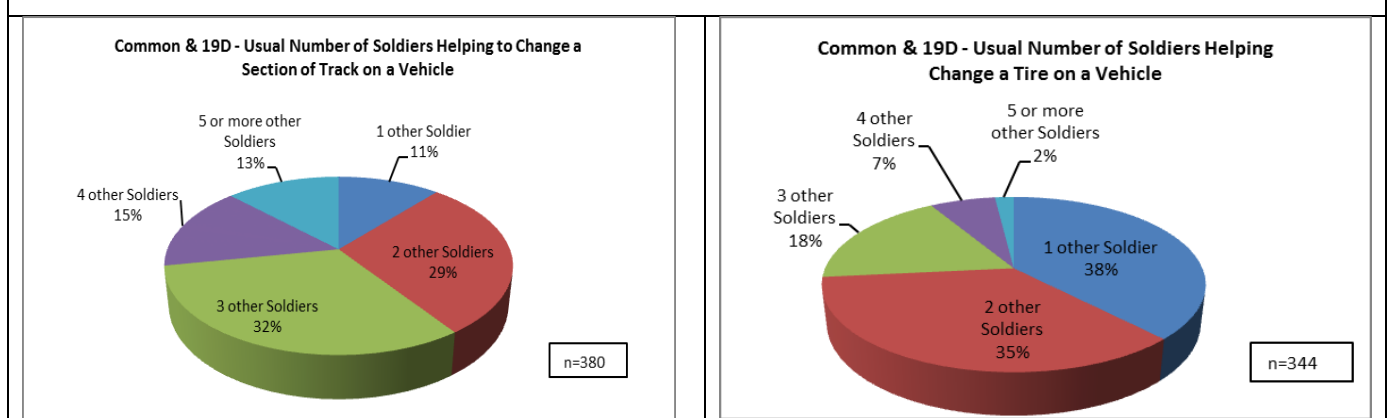


Table 10. Number of Soldiers helping the subject to change a vehicle track section

| <u>Number of Soldiers</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|---------------------------|-------------|---------------|-------------|----------------|
| Fewest soldiers (n=374) | 2.5 | 2.0 | 1 | 4.4 |
| Most soldiers (n=374) | 7.1 | 5.0 | 5 | 9.0 |

| Table 11. Number of Soldiers helping the subject to change a vehicle tire | | | | |
|--|--------------------|----------------------|--------------------|-----------------------|
| <u>Number of Soldiers</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Fewest soldiers (n=463) | 1.7 | 1.0 | 1 | 1.6 |
| Most soldiers (n=462) | 4.1 | 4.0 | 4 | 4.0 |

Lug Nuts: Two questions were asked in this section using an open response format: 1) When you changed a tire on a vehicle (for example, a Stryker or MRAP), what percentage of those times did you loosen and/or tighten the lug nuts manually with a wrench? 2) What percentage of those times did you use an air-operated impact wrench? Table 12 displays data representing the answers to these two questions.

| Table 12. Percentage of times the subject loosened lug nuts manually with a wrench or by using an air-operated impact wrench | | | | |
|---|--------------------|----------------------|--------------------|-----------------------|
| <u>Method to Loosen Lug Nuts</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Manually (n=494) | 59.3 | 70.0 | 100 | 36.2 |
| With Impact Wrench (n=494) | 32.2 | 25.0 | 0 | 32.9 |

Dismounted Tactical Movement: Six questions were asked in this section. The first two questions using a fixed-response format asked: 1) When performing a dismounted tactical movement, how far do you usually move? 2) When you performed a dismounted tactical movement, how heavy was the load you usually carried? (Weights represented in the response format for this question were: Ruck Sack – 40 pounds; Fighting Load – about 80 pounds; Approach March Load – fighting load with weapon plus 20-25 pound assault pack [total of perhaps 105-110 pounds]; Emergency Approach March Load – about 125 pounds or more.) Figure 9 displays the responses to these two questions. The other four questions in this section were asked using an open response format: 3) When you performed a dismounted tactical movement, what is the shortest distance you moved (in miles)? 4) What is the longest distance you moved (in miles)? 5) When you performed a dismounted tactical movement, what is the lightest load you carried

(in pounds)? 6) What is the heaviest load you carried (in pounds)? Tables 13 and 14 display data representing the answers to these four questions.

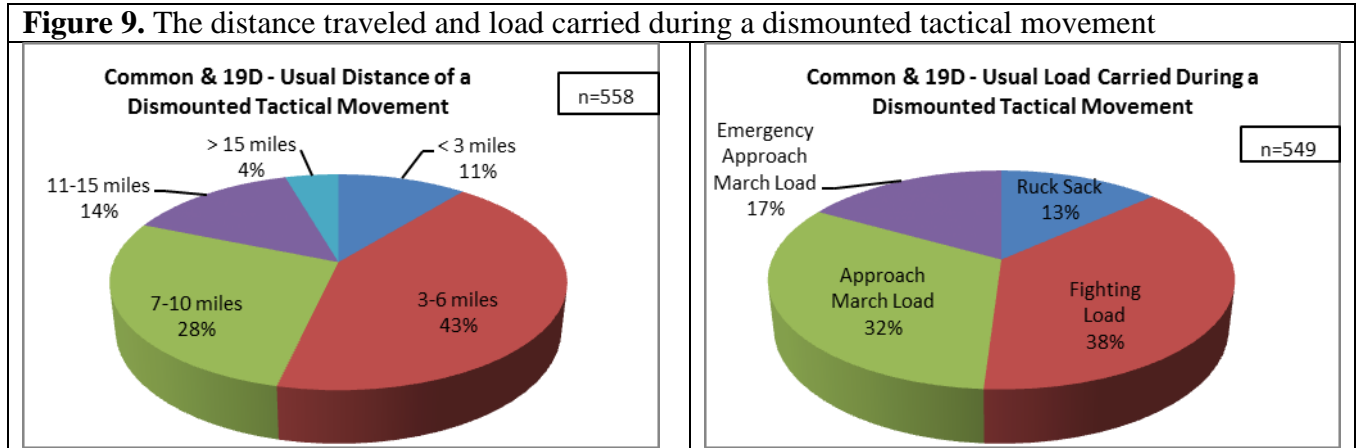


Table 13. Distances covered by subjects during a dismounted tactical movement

| <u>Distance (Miles)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|---------------------------|-------------|---------------|-------------|----------------|
| Shortest distance (n=537) | 2.2 | 2.0 | 1 | 1.9 |
| Longest distance (n=543) | 16.8 | 15.0 | 15 | 10.3 |

Table 14. Loads (pounds) carried by subjects during a dismounted tactical movement

| <u>Load (pounds)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|-----------------------|-------------|---------------|-------------|----------------|
| Lightest load (n=544) | 41.7 | 35.0 | 35 | 24.9 |
| Heaviest load (n=544) | 102.4 | 100.0 | 100 | 55.9 |

Dismounted Tactical Movements Over Six Miles: Six questions were asked in this section. The first two questions using a fixed-response asked: #1) How much weight do you usually carry when performing a dismounted tactical movement of 6 miles or more? (Response options to this question were: 1) Ruck Sack (40 lb), 2) Fighting Load (about 80 lb), 3) Approach March Load: Fighting load with weapon plus 20-25 lb assault pack, and 4) Emergency Approach March Load (about 125 lb or more): Fighting load with sustainment load weighing 40-50 lb), and question #2) How long does it usually take you to perform

a dismounted tactical movement of at least six miles while carrying a load of 100 lb or more? Figure 10 displays the responses to these two questions. An additional four questions were asked in this section using an open response format: 3) When you performed a dismounted tactical movement of six miles or more, what is the lightest load you carried (in pounds)? 4) What is the heaviest load you carried (in pounds)? 5) When you performed a dismounted tactical movement of 6 miles or more while carrying a load of 100 pounds or more, what is the shortest time it took you (in hours) to complete this task? 6) What is the longest time it took you (in hours) to complete this task? Data representing the answers to these questions are displayed in Tables 15 and 16.

Figure 10. Loads carried and time to complete dismounted tactical movements over six miles

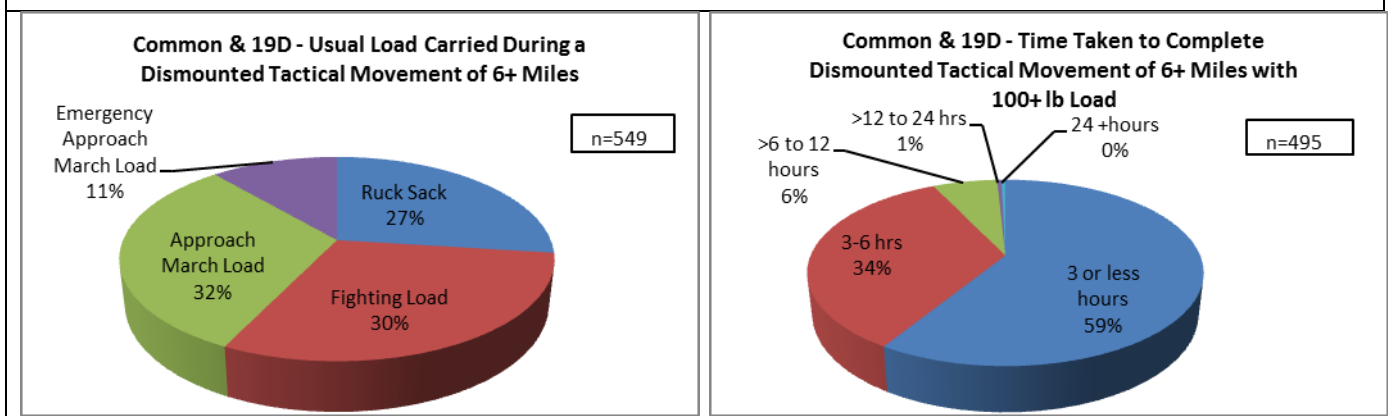


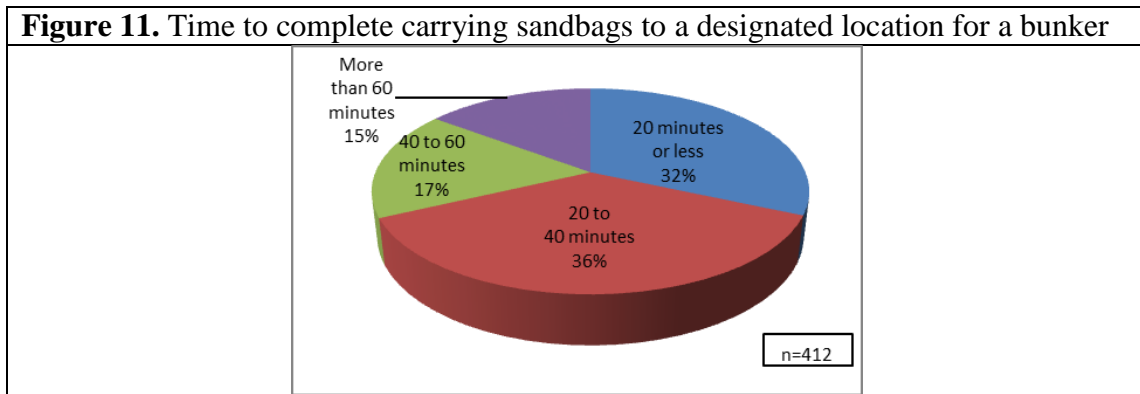
Table 15. Loads (pounds) carried by subjects during dismounted tactical movements of six miles or more

| <u>Load Carried (Pounds)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|------------------------------|-------------|---------------|-------------|----------------|
| Lightest Load (n=537) | 41.3 | 35.0 | 35 | 24.5 |
| Heaviest Load (n=537) | 92.3 | 90.0 | 80 | 35.0 |

Table 16. Time (hours) taken by subjects during dismounted tactical movements of six miles or more

| <u>Time Taken (Hours)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|---------------------------|-------------|---------------|-------------|----------------|
| Shortest Time (n=464) | 3.9 | 2.0 | 2 | 12.4 |
| Longest Time (n=465) | 7.1 | 4.0 | 3 | 19.9 |

Carrying Sandbags: Three questions were asked in this section. The first question, using a fixed-response format, asked: When you carried sandbags to build a protective bunker, how long did it usually take you to carry the required number of sandbags to the designated location for the bunker? Figure 11 displays the responses to this question. An additional two questions were asked in this section using an open response format: 2) When you carried sandbags to build a protective bunker, what is the shortest time (in minutes) it took to carry the sandbags and build the bunker? 3) What is the longest time (in minutes) it took to carry the sandbags and build the bunker? Table 17 displays data representing the answers to these two questions.



| Table 17. Time (minutes) taken by respondents to carry sandbags and build a bunker | | | | |
|---|--------------------|----------------------|--------------------|-----------------------|
| <u>Task Time (Minutes)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Shortest time (n=388) | 27.3 | 20.0 | 20 | 28.1 |
| Longest time (n=390) | 66.9 | 50.0 | 60 | 72.0 |

Dragging a Casualty Under Fire: Three questions were asked in this section. The first question, using a fixed-response format, asked: When you were dragging a casualty or saw someone else dragging a casualty under fire, what is the furthest distance they were ever dragged? Figure 12 displays the responses to this question. Two questions were asked in this section using an open response format: 2) When you were dragging a casualty or saw someone else dragging a casualty under fire, what percent of the time

was casualty being dragged by only one person? 3) What percent of the time was casualty being dragged by two people? Table 18 below displays data representing the answers to these two questions.

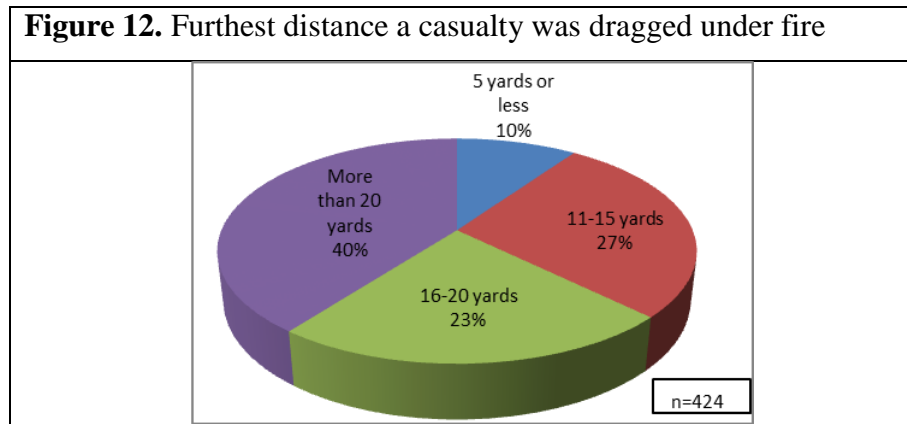


Table 18. Percentage of times a casualty was dragged under fire by one or by two people

| <u>Number of People Dragging a Casualty</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|--|--------------------|----------------------|--------------------|-----------------------|
| One Person (n=412) | 53.1 | 50.0 | 50 | 27.7 |
| Two People (n=411) | 46.6 | 50.0 | 50 | 27.6 |

Section 4: 19K-specific Task Ratings

In the following pages, the results are summarized in terms of

- how often each 19K-specific task was performed in the last two years,
- extent to which each 19K-specific task was expected to be performed,
- rated importance of each 19K-specific task,
- rated time each 19K-specific task takes to perform, and
- uniforms worn for each 19K-specific task.

2.1. How Often Each 19K-specific Task Was Performed in the Last Two Years

Tasks with the same ranking numbers (i.e., with the same number on the far left in the chart title) do not significantly differ from each other. So for example, in Figure 13 both the tasks numbered “1” are performed at about the same rate of frequency.

Figure 13. Frequencies of with which 19K-specific task performance in the last two years

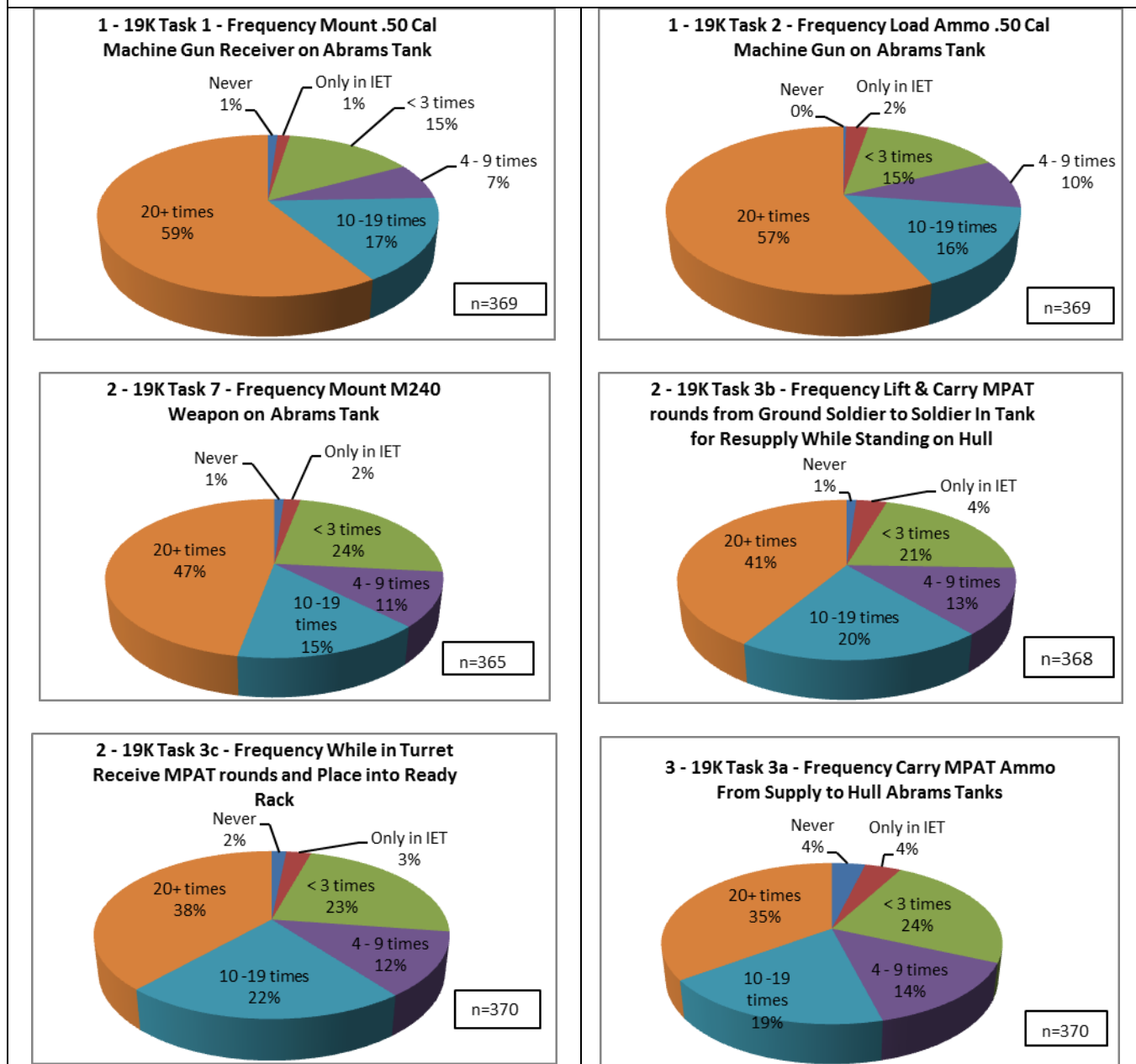
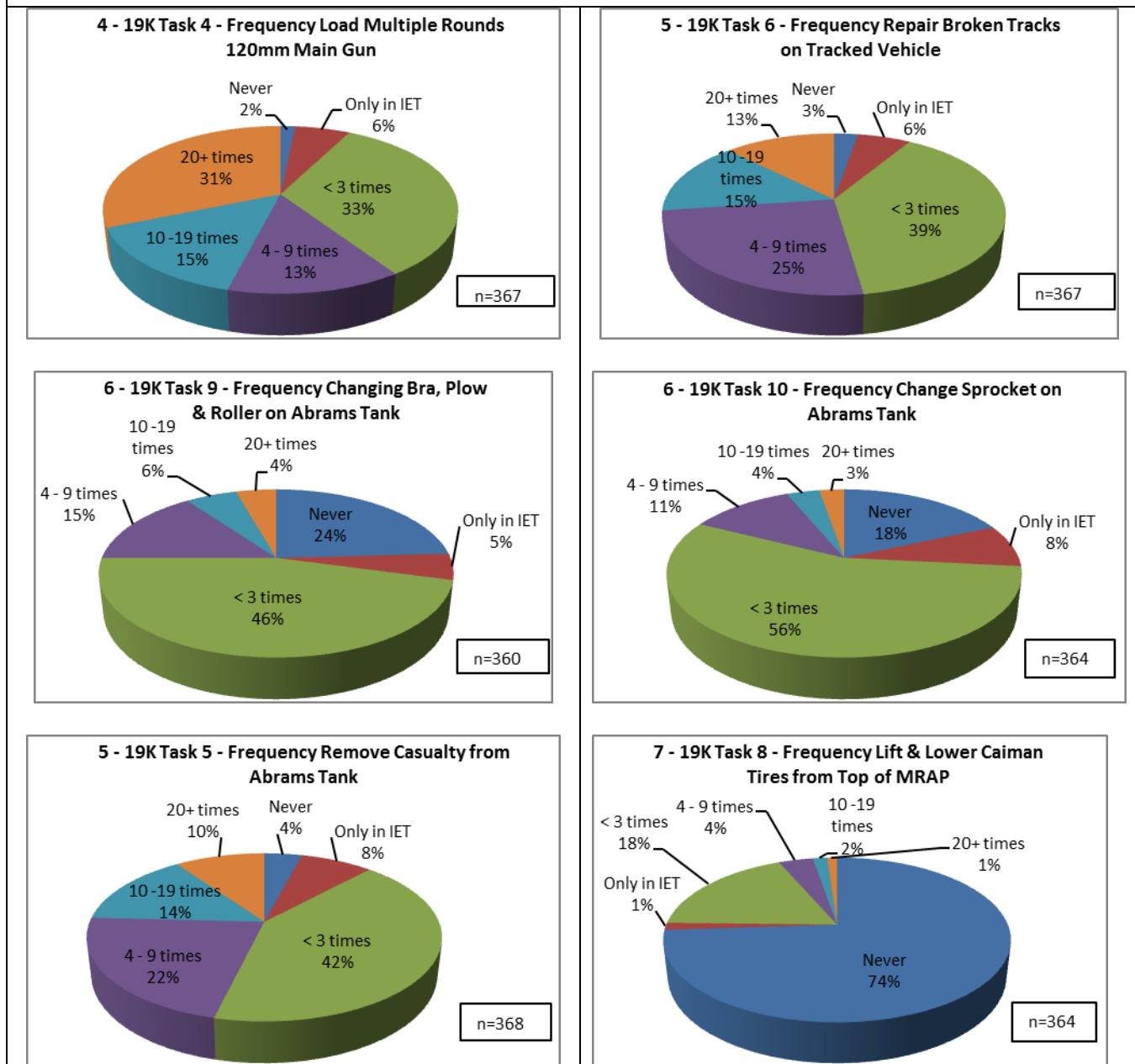


Figure 13. Continued



4.2. The Extent to Which Each 19K-specific Task Was Expected to be Performed

For each of the tasks represented by the 19K-specific JAQ, respondents were asked whether they were expected to complete the task if the situation arises. Table 19 below displays the responses to this question for each of the included tasks.

Table 19. The extent to which each 19K-specific task was expected to be performed

| <u>Task</u>¹ | <u>Yes, I am expected to perform this task</u> | <u>No, I am not expected to perform this task</u> |
|---|---|--|
| 1) Repair broken tracks on a tracked vehicle (n=368) | 100% | 0% |
| 1) While standing on the hull of an Abrams Tank, lift and carry rounds such as MPAT rounds from a Soldier on the ground or HEMTT, and hand it to a Soldier inside the tank for resupply (n=368) | 99% | < 1% |
| 1) While standing in the turret of an Abrams Tank, receive rounds (such as MPAT rounds) from a Soldier on the hull and place into the ready rack (n=369) | 99% | 1% |
| 1) Remove a casualty from an Abrams Tank (n=368) | 99% | 1% |
| 1) Mount M2 .50 Cal Machine Gun Receiver on an Abrams Tank (n=366) | 99% | 1% |
| 1) Load ammunition for the M2 .50 Cal Machine Gun on an Abrams Tank (n=364) | 99% | 1% |
| 1) Mount the M240 weapon on an Abrams tank (n=365) | 99% | 1% |
| 1) Carry ammunition such as MPAT rounds from a supply point to the hull of an Abrams Tank (n=366) | 98% | 2% |
| 1) Load multiple rounds in the 120mm Main Gun (n=365) | 96% | 4% |
| 2) Changing the sprocket on an Abrams Tank (n=361) | 93% | 7% |
| 2) Changing bra, plow and roller on an Abrams Tank (n=363) | 91% | 9% |
| 3) Lifting and lowering Caiman Tires from the top of an MRAP (n=358) | 38% | 62% |

¹ Tasks with the same ranking numbers (i.e., with the same numbers on the far left of the listed tasks) do not statistically differ from each other.

4.3. The Rated Importance of Each 19K-specific Task

In Figure 14, the tasks with the same ranking numbers (i.e., with the same number on the far left in the chart title) do not significantly differ from each other.

Figure 14. The rated importance of each 19K-specific task

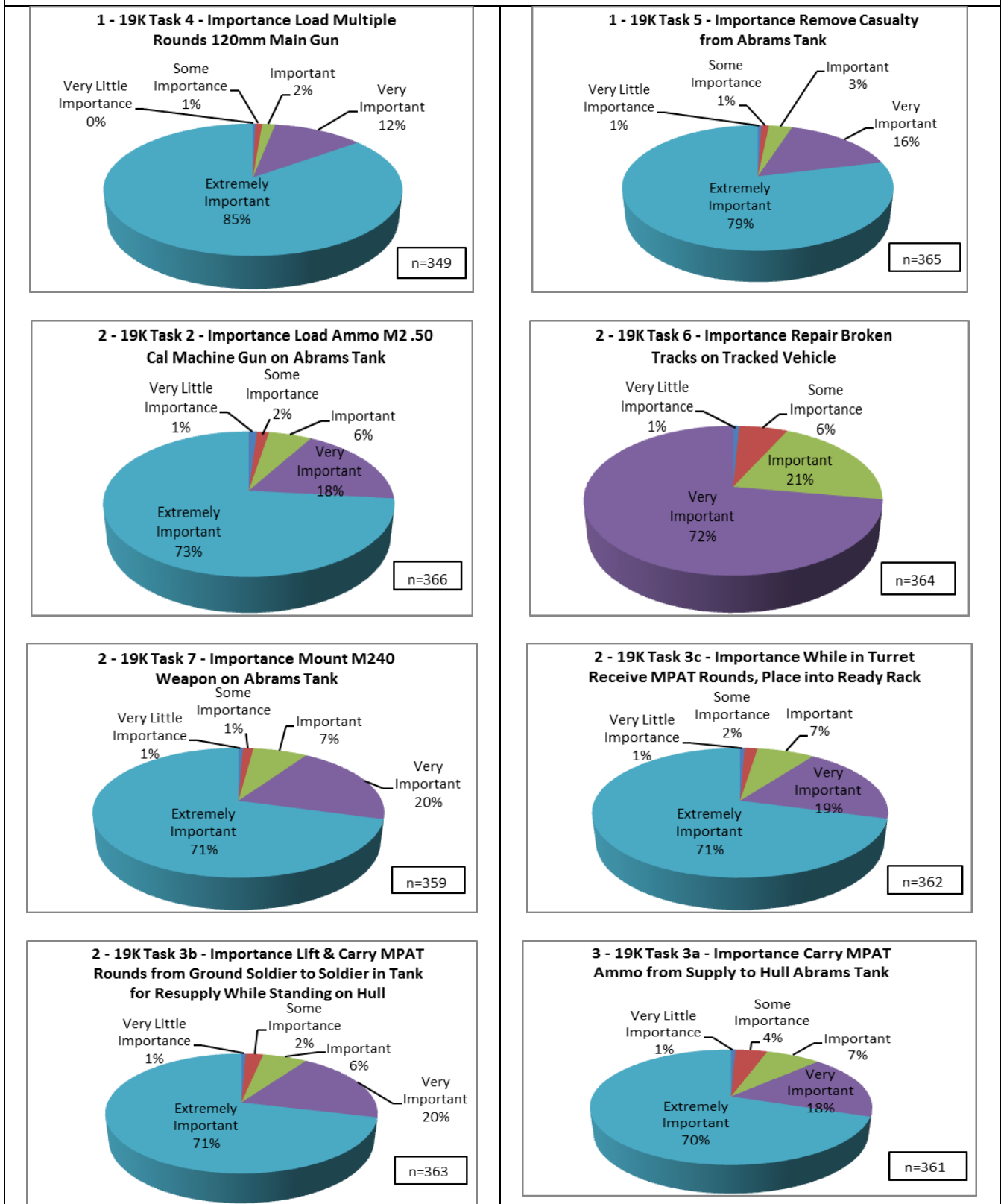
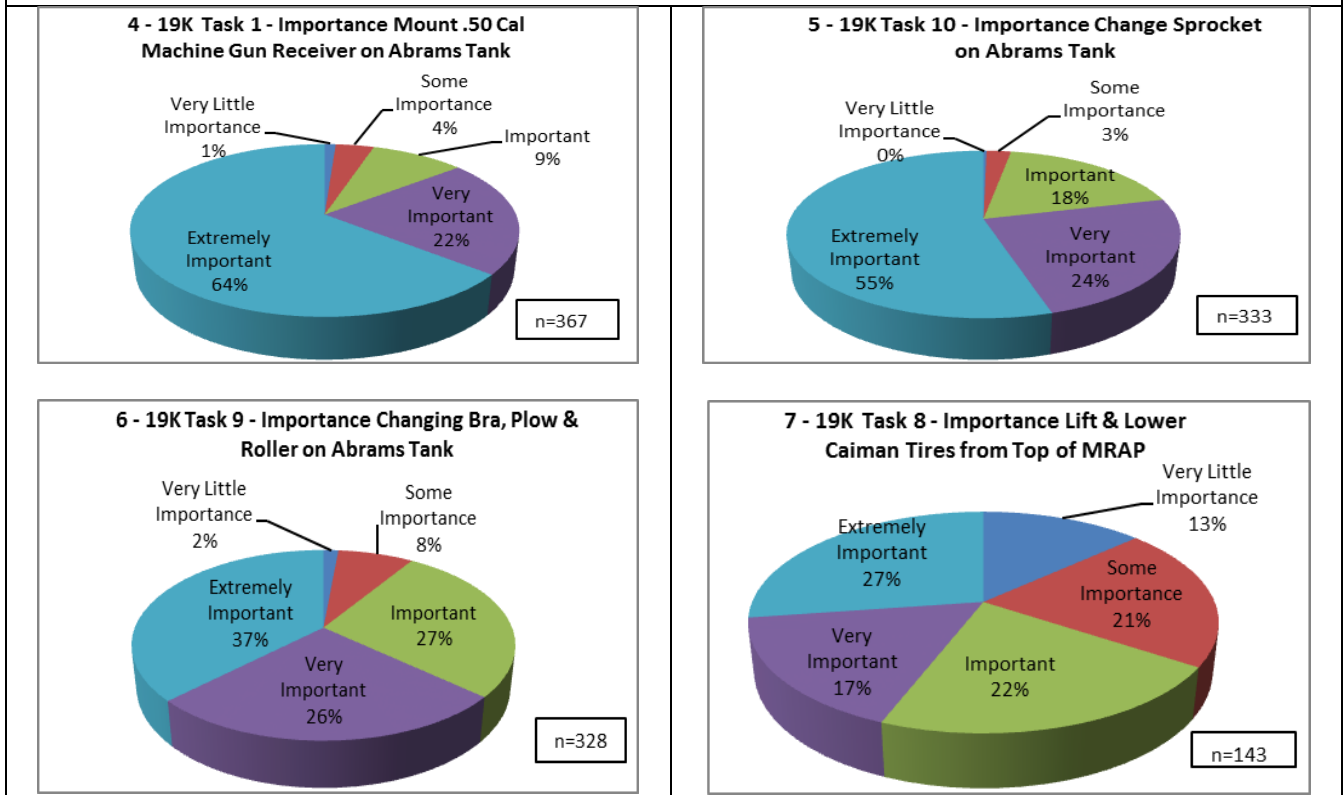


Figure 14. Continued



4.4. The Rated Time Each 19K-specific Task Takes to Perform

In Figure 15, tasks with the same ranking numbers (i.e., with the same number on the far left in the chart title) do not significantly differ from each other.

Figure 15. The rated time each 19K-specific task takes to perform

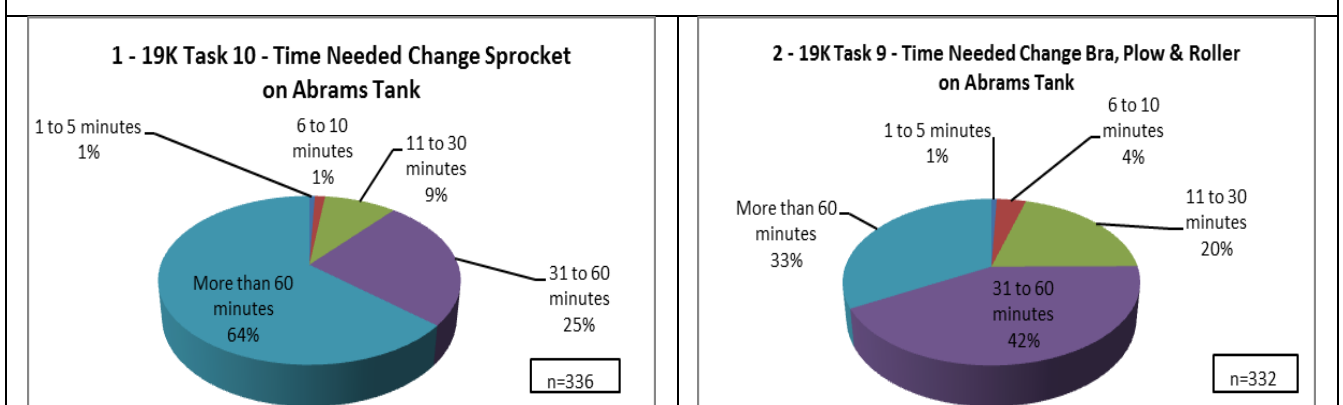


Figure 15. The rated time each 19K-specific task takes to perform

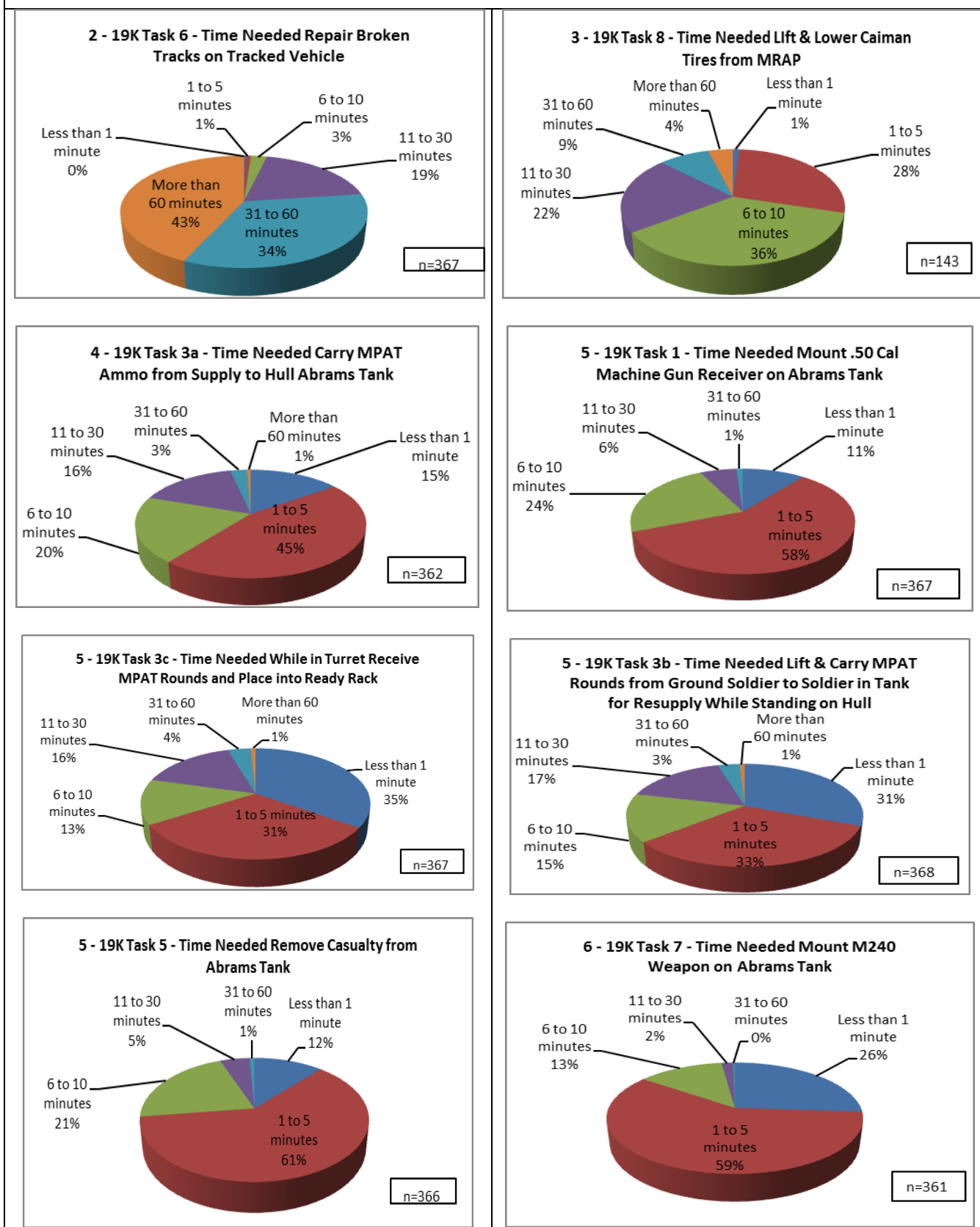
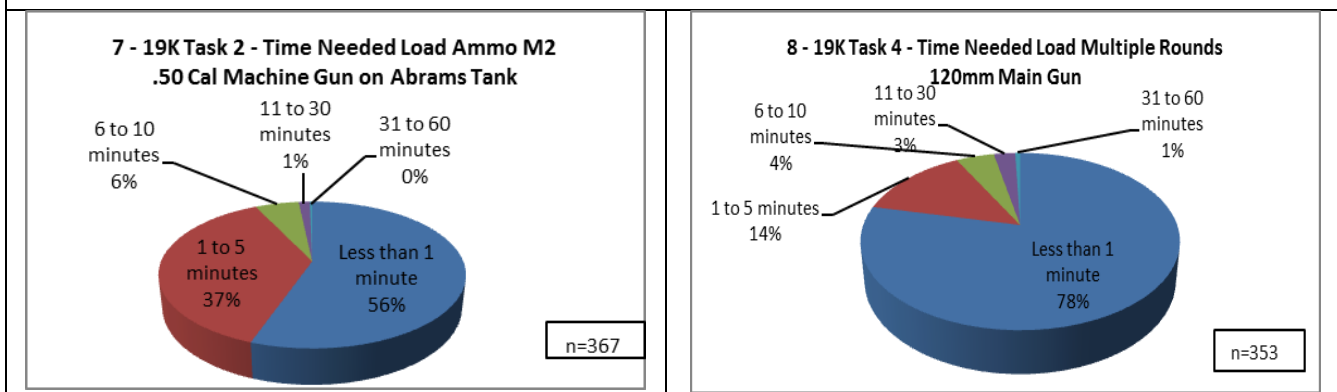


Figure 15. Continued



4.5. Uniforms Worn for Each 19K-specific Task

The responses options for these questions in Figure 16 were: 1) Standard Uniform, 2) Standard Uniform with Vest, 3) Fighting Load Minus Weapon, 4) Fighting Load with Weapon, 5) Approach March Load, and 6) Emergency Approach March Load.

Figure 16. Uniforms worn for each 19K-specific task

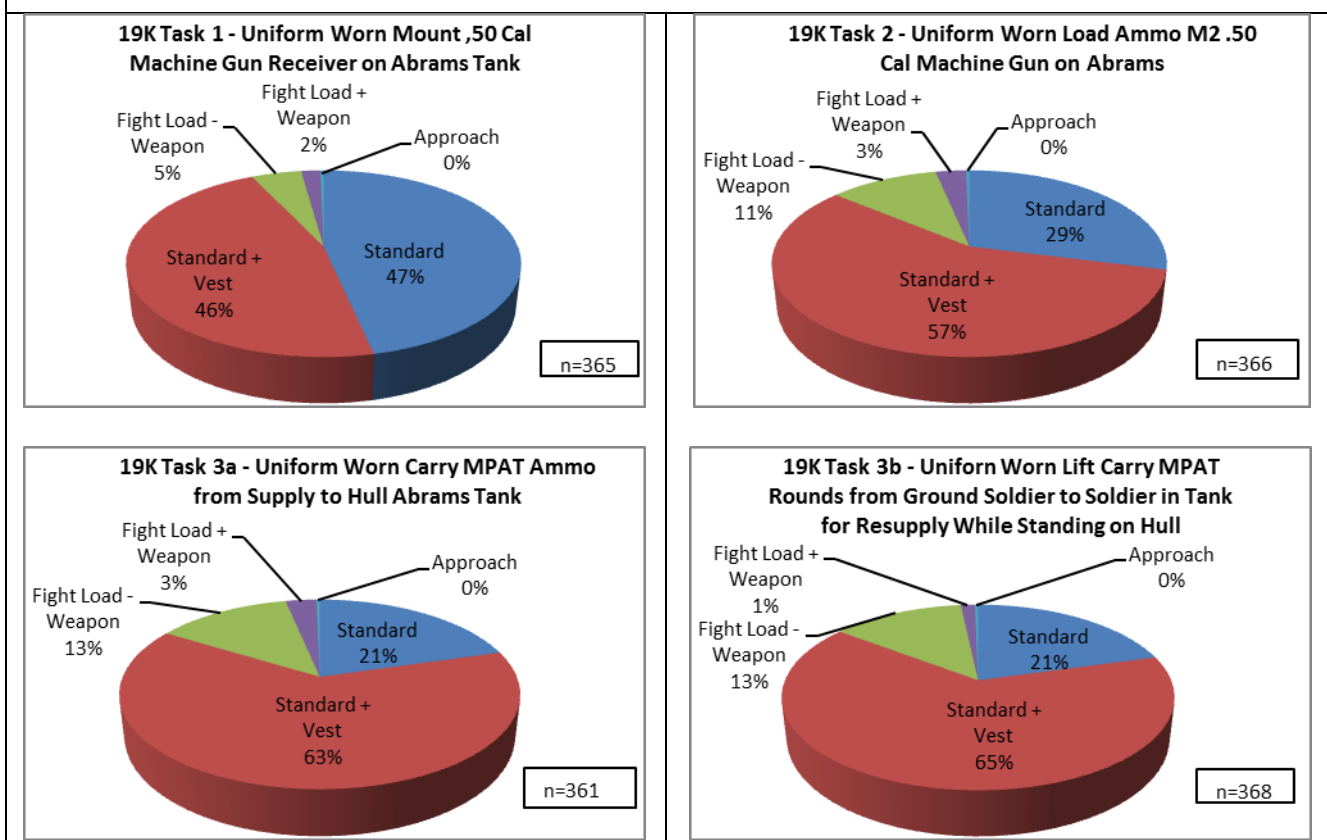
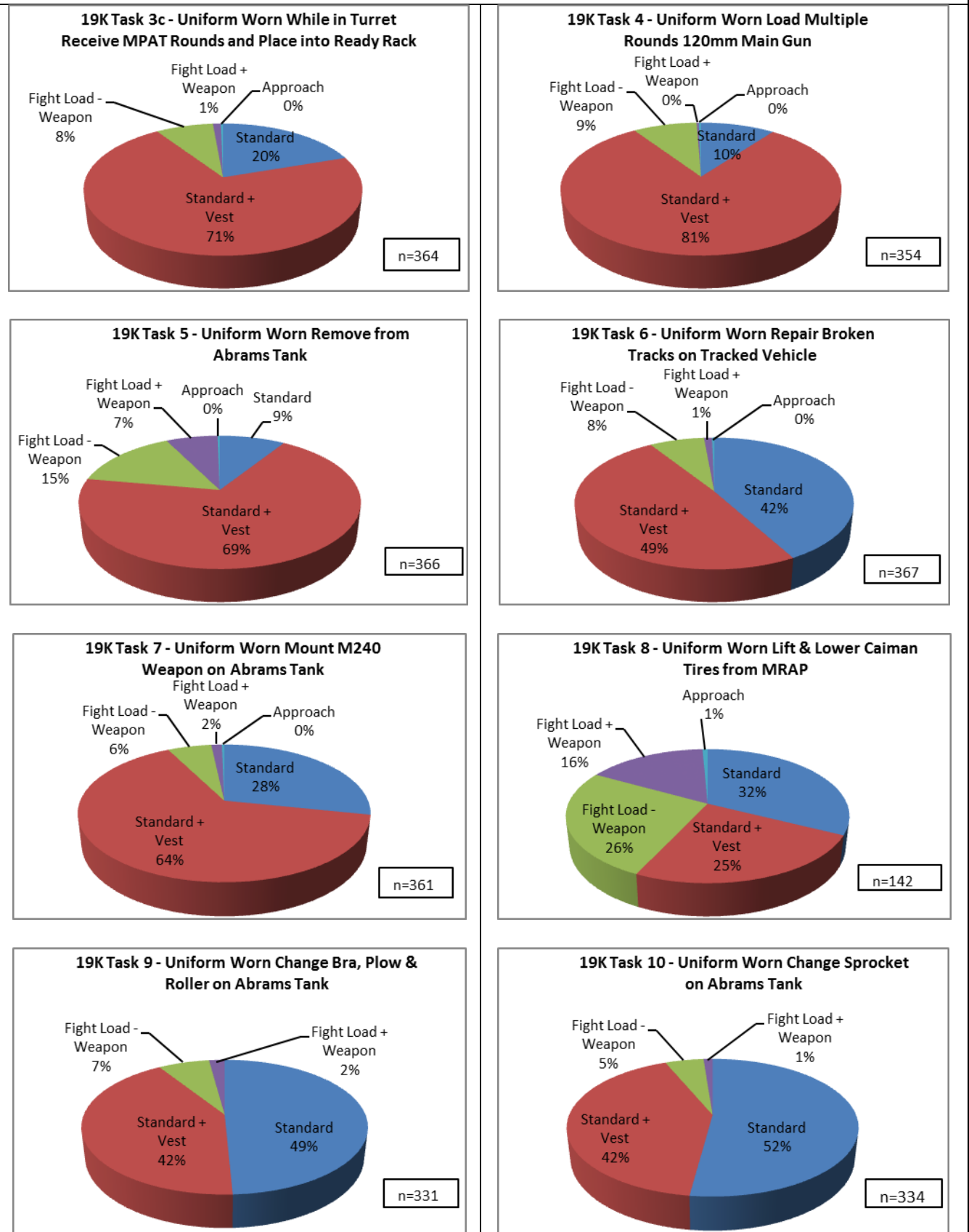


Figure 16. Continued



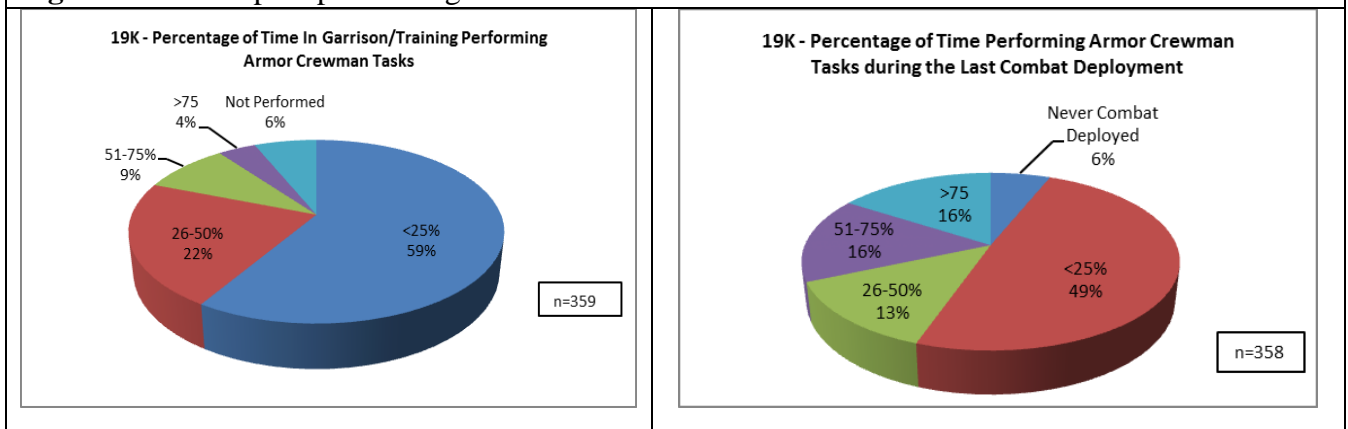
Section 5: 19K-specific Task Supplemental Information

Following is information obtained by a second set of job-related questions on the 19K-specific Task JAQ. These questions were asked to gain a more complete picture of some of the tasks addressed in the previous portions of the questionnaire.

5.1. Time, Quantity and Distance Pertaining to Armor Crewman Tasks

Armor Crewman Tasks. Two questions were asked in this subsection: 1) During a typical week in garrison (or training weekend for AR/NG), what percentage of your time do you spend performing armor crewman tasks (i.e., mounting the M2 .50 cal machine gun, stowing ammunition on an Abrams Tank, loading the 120mm main gun, etc.)? 2) During your last combat deployment, what percentage of your time do you spend performing armor crewman tasks (listed as immediately above)? Figure 17 below displays the responses to these two questions.

Figure 17. Time spent performing armor crewman tasks



Lifting and Carrying Rounds to Load an Abrams Tank. Six questions were asked in this subsection.

Two of these questions, using a fixed-response format, asked the following: 1) “How many rounds do you typically carry from a stockpile location and lift up to a Soldier on the hull of an Abrams tank?” 2) “When you carried rounds (such as MPATs) from a stockpile location, how far did you typically carry them?”

Figure 18 displays the responses to these two questions.

Four additional questions were asked concerning lifting and carrying rounds to load an Abrams Tank using an open response format. These questions were: 3) When you carried rounds (such as MPATs) from a stockpile location and lifted them up to a Soldier on the hull of an Abrams tank to reload the tank one time, what is the smallest number of rounds you lifted and carried? 4) What is the greatest number of rounds you lifted and carried? 5) When you carried rounds (such as MPATs) from a stockpile location and loaded them on an Abrams Tank, what was the shortest distance you carried them? 6) What was the longest distance you carried them? Tables 20 and 21 summarize the responses to these two questions.

Figure 18. Typical number of rounds carried from stockpile and lifted up to Abrams tank hull

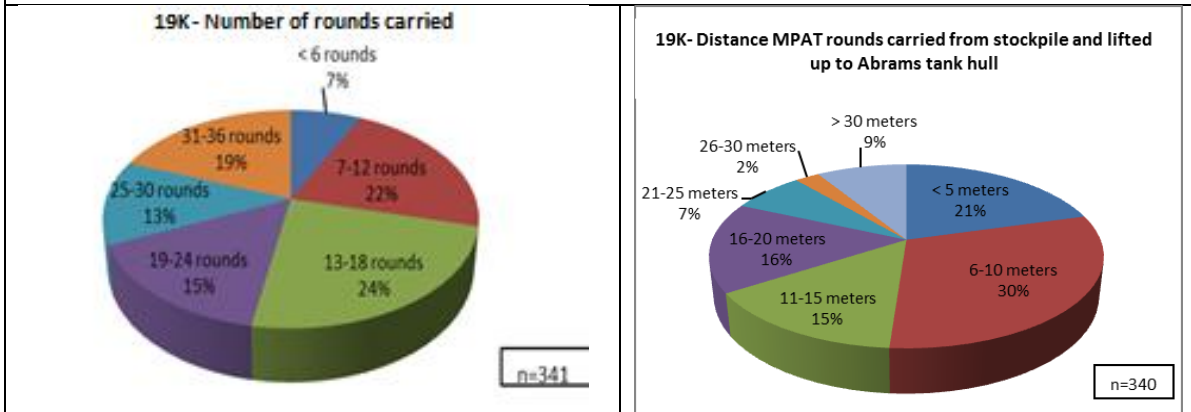


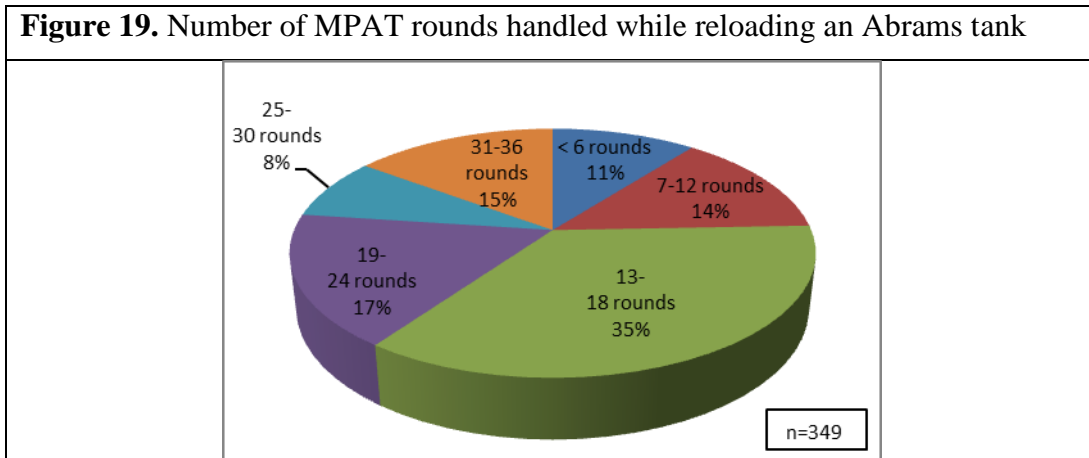
Table 20. Number of rounds lifted and carried to load an Abrams Tank

| <u>Number of Rounds</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|--|-------------|---------------|-------------|----------------|
| Smallest number of rounds lifted and carried (n=328) | 11.4 | 5.0 | 1 | 57.6 |
| Greatest number of rounds lifted and carried (n=335) | 40.1 | 24.0 | 30 | 89.7 |

Table 21. Distance rounds were carried to load an Abrams Tank

| <u>Task Distance (in Yards)</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
|-----------------------------------|-------------|---------------|-------------|----------------|
| Shortest distance carried (n=315) | 5.3 | 5.0 | 5 | 8.8 |
| Longest distance carried (n=332) | 35.1 | 20.0 | 10 | 47.6 |

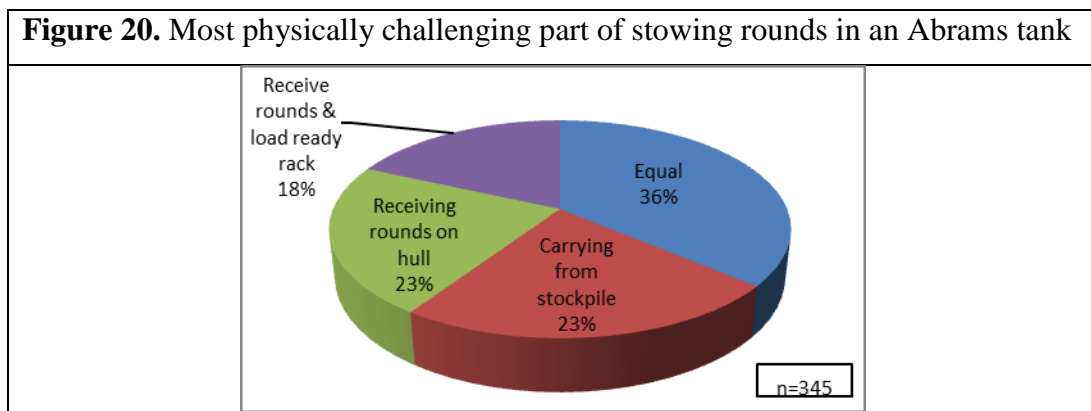
Reloading in the Turret of an Abrams Tank. Three questions were asked in this section. The first question, using a fixed-response format, asked: When reloading in the turret of an Abrams Tank, receiving rounds (such as MPAT rounds) from a Soldier on the hull and placing them into the ready rack, how many rounds do you typically handle to reload the tank one time? Figure 19 displays the responses to this question. An additional two questions were asked in this section using an open response format: 2) When reloading in the turret of an Abrams Tank, receiving rounds (such as MPAT rounds) from a Soldier on the hull and placing them into the ready rack, what is the smallest number of rounds you loaded? 3) what is the greatest number of rounds you loaded? Table 22 displays data representing the answers to these two questions.



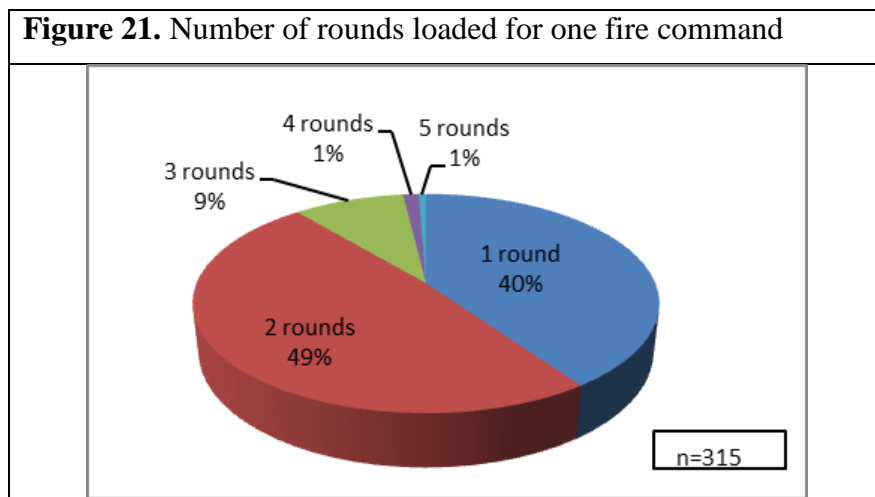
| Table 22. Number of MPAT rounds reloaded in the turret of an Abrams Tank | | | | |
|---|-------------|---------------|-------------|----------------|
| <u>Number of Rounds</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Smallest number of rounds loaded (n=334) | 6.2 | 4.0 | 1 | 8.5 |
| Greatest number of rounds loaded (n=340) | 28.3 | 24.0 | 18 | 38.7 |

Stowing Rounds on an Abrams Tank. One fixed-response question asked, When stowing rounds on an Abrams Tank, what part of the task do you feel is the most physically challenging? The response options for this question were: 1) No one part is more difficult than the others, 2) Carrying rounds from the stockpile and handing them to the Soldier on the hull, 3) While standing on the hull, receiving rounds

from the Soldier on the ground and handing them to the Soldier in the turret, and 4) While standing in the turret, receiving rounds from the Soldier on the hull and loading them on the ready rack. Figure 20 displays the responses to this question.

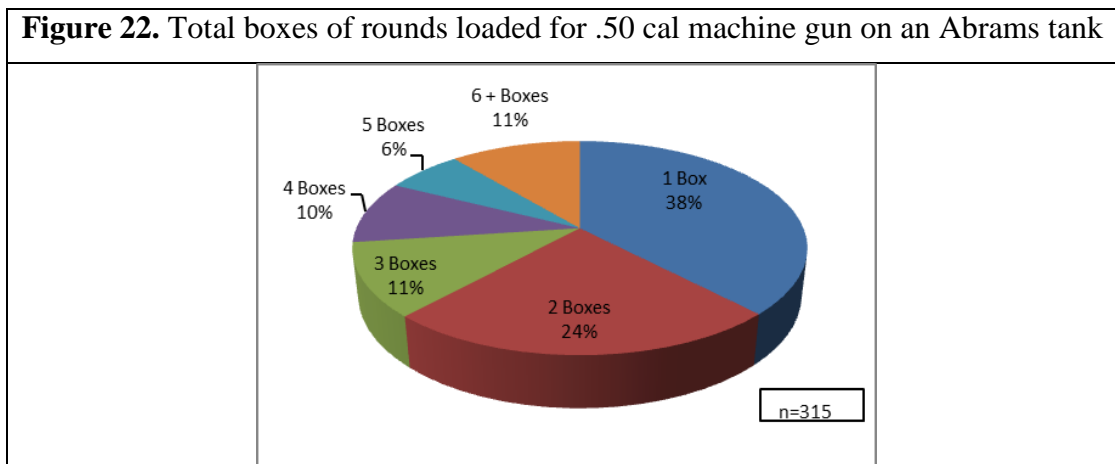


Loading the 120mm Main Gun. Three questions were asked in this section. The first question, using a fixed-response format, asked: When loading the 120mm Main Gun, how many rounds do you typically load for one fire command? Figure 21 displays the responses to this question. An additional two questions were asked in this section using an open response format: 2) When loading the 120mm Main Gun for one fire command, what is the smallest number of rounds you loaded? 3) What is the greatest number of rounds you loaded? Table 23 displays data representing the answers to these two questions.



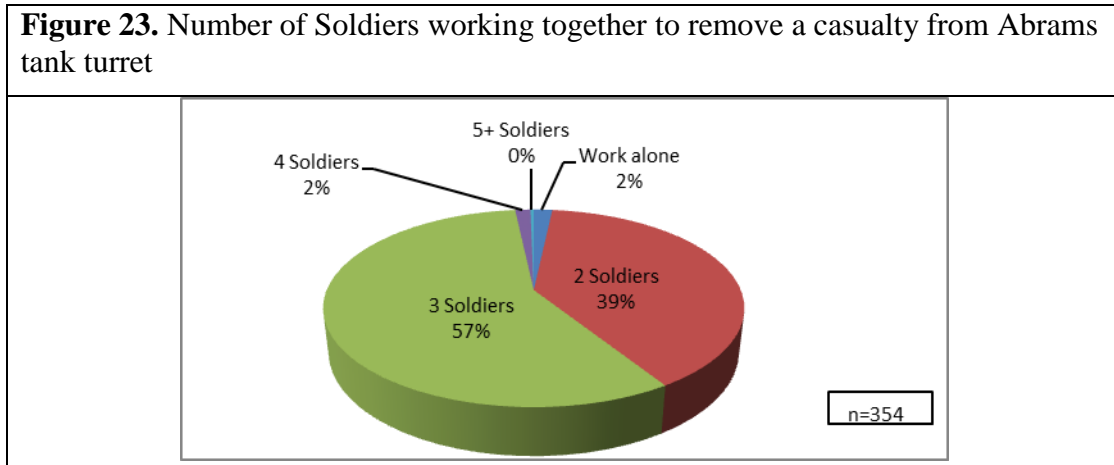
| Table 23. Number of rounds loaded into the 120mm main gun for one fire command | | | | |
|---|-------------|---------------|-------------|----------------|
| <u>Number of Rounds</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Smallest number of rounds loaded (n=302) | 1.2 | 1.0 | 1 | 1.8 |
| Greatest number of rounds loaded (n=311) | 3.8 | 3.0 | 3 | 6.0 |

Loading the .50 Cal Machine Gun. Three questions were asked in this section. The first question, using a fixed-response format, asked: When loading rounds for the .50 Cal Machine Gun on an Abrams Tank, how many boxes of rounds do you typically load? Figure 22 displays the responses to this question. An additional two questions were asked in this section using an open response format: 2) When loading rounds for the .50 Cal Machine Gun on an Abrams Tank, what is the smallest number of boxes you loaded? 3) What is the greatest number of boxes you loaded? Table 24 displays data representing the answers to these two questions.



| Table 24. Boxes of rounds loaded for the .50 Cal Machine Gun on an Abrams Tank | | | | |
|---|-------------|---------------|-------------|----------------|
| <u>Number of Boxes</u> | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Smallest number of boxes of rounds loaded (n=319) | 4.2 | 1.0 | 1 | 21.2 |
| Greatest number of boxes of rounds loaded (n=322) | 15.0 | 4.0 | 2 | 64.0 |

Removing a Casualty Through the Turret of an Abrams Tank. Finally, one fixed-response question asked, “When removing a casualty through the turret of an Abrams Tank, how many Soldiers typically work together to remove the casualty? Figure 23 displays the responses to this question.



Section 6: Contrasting Time Spent Performing Tasks in Garrison and in Deployment Settings

6.1. 19D JAQ

The 19D JAQ had only two items that provided a means to compare time spent conducting job-related tasks in garrison settings to time spent conducting similar tasks during combat deployments. However, these two items each contained seven sub-items addressing specific types of tasks (i.e., seated tasks, less active tasks, loading and unloading supplies and equipment, tactical marches/patrolling, MOS-specific tasks, physically demanding combat arms tasks, and physical training). Soldiers were asked to provide estimates of the percentages of time they spent performing each of these types of tasks in both garrison/training and combat settings. Results addressing tasks performed in garrison or training settings were compared to those pertaining to tasks conducted during combat deployments.

Table 25 displays the results of the comparative analysis. Consistent with expectations, Soldiers in the 19D MOS reported spending a somewhat greater percentage of their time performing MOS-specific tasks during combat deployments (19% more), as compared to garrison and training settings. They also said they spent well over twice as much time (125% more) performing tactical foot marches and walking

patrols during combat deployments. This sample reported spending more time performing seated and less active tasks in garrison and training settings than during deployment but also reported performing more physical readiness training (72% more) in these types of settings.

Table 25. Mean estimates of time spent by 19Ds performing different types of tasks in both garrison or training settings and combat deployments (n=560)

| <u>Type of Task</u> | <u>In Garrison or Training</u> | <u>During Combat Deployment</u> | <u>Percentage Trend from Person to Person</u> |
|---|---------------------------------------|--|--|
| Seated tasks (clerical duties, classroom- or computer-based training) | 21.0% | 7.6% | 177% more time in garrison/training settings |
| Physical Training | 17.2% | 10.0% | 72% more time in garrison/training settings |
| Less Active Tasks (vehicle maintenance, driving, cleaning, charge of quarters or guard) | 14.3% | 10.6% | 35% more time in garrison/training settings |
| Loading/Unloading Supplies and Equipment | 7.6% | 8.8% | 17% more time during combat deployments |
| MOS-specific Tasks (i.e., tasks that only Soldiers in your MOS perform) | 14.7% | 17.5% | 19% more time during combat deployments |
| Physically Demanding Combat Arms Tasks (i.e., tasks common to many combat arms MOSs) | 13.7% | 19.5% | 42% more time during combat deployments |
| Tactical marches/patrolling | 11.6% | 26.0% | 125% more time during combat deployments |

6.2. 19K Common Task JAQ.

The 19K Common Task JAQ had the same two items and 14 sub-items (7 sub-items for each of the two items) to compare the settings in which tasks were performed (i.e., garrison/training and deployment settings) as did the 19D JAQ. For both garrison/training and deployment settings, Soldiers were asked to provide estimates of the percentages of time they spent conducting each of the following types of tasks: Seated tasks, less active tasks, loading & unloading supplies and equipment, tactical marches/patrolling, MOS-specific tasks, physically demanding combat arms tasks, and physical training. Results addressing tasks performed in garrison or training settings were compared to those pertaining to tasks conducted during combat deployments.

Table 26 displays the results of this comparative analysis. Consistent with the 19D JAQ data, Soldiers in the 19K MOS said they spent far more time (245% more) performing tactical foot marches and walking patrols during combat deployments than they did in garrison and training settings. It appears that this large a difference in foot marches and walking patrols from one type of setting to the other may well be increasing the risk that several of these Soldiers will experience some type of musculoskeletal injury. This sample reported spending far more time performing seated and less active tasks in garrison and training locations than during deployment but they also said they spent more time in these venues performing physical readiness training. Notably, inconsistent with expectations and the results noted from the 19D JAQ data, these Soldiers reported spending a slightly greater percentage of their time performing MOS-specific tasks in garrison or training settings (6% more). However, this result deviates only slightly from the results noted in the 19D data (19% more time spent on MOS-specific tasks during combat deployments) and is based on a much smaller sample (n = 54 respondents in the 19K MOS as contrasted with 560 19D respondents).

6.3. 19K-specific JAQ.

Only two items on the 19K-specific JAQ provide a means to compare time spent conducting job-related tasks in garrison settings to time spent conducting similar tasks during combat deployments. These two items were as follows: Item 74: “During a typical week in garrison (or training weekend for AR/NG), what percentage of your time do you spend performing Armor Crewman tasks (i.e., mounting the M2 .50 cal machine gun, stowing ammunition on an Abrams Tank, loading the 120mm main gun, etc.)?” Item 75: “During your last combat deployment, what percentage of your time did you spend performing Armor Crewman tasks (i.e., mounting the M2 .50 cal machine gun, stowing ammunition on an Abrams Tank, loading the 120mm main gun, etc.)?” Item responses ranged from less than 25% of the time to over 75% of the time.

Responses to these two items indicated that armor crewman tasks were generally performed somewhat more often during combat deployments than in garrison settings. Thirty-eight percent of the

sample indicated that they spent more of their time performing armor crewman tasks during combat deployments than they did in garrison, whereas only 19% responded they spent more time performing armor crewman tasks while in garrison than during their last combat deployment.

Table 26. Mean estimates of time spent by 19Ks performing different types of tasks in both garrison or training settings and combat deployments (n=54)

| <u>Type of Task</u> | <u>In Garrison or Training</u> | <u>During Combat Deployment</u> | <u>Percentage Trend from Person to Person</u> |
|---|---|--|--|
| Seated tasks (clerical duties, classroom- or computer-based training) | 23.5% | 7.7% | 206% more time in garrison/training settings |
| Physical Training | 16.8% | 9.2% | 84% more time in garrison/training settings |
| Less Active Tasks (vehicle maintenance, driving, cleaning, charge of quarters or guard) | 16.2% | 13.9% | 17% more time in garrison/training settings |
| MOS-specific Tasks (i.e., tasks that only Soldiers in your MOS perform) | 16.3% | 15.4% | 6% more time in garrison/training settings |
| Loading/Unloading Supplies and Equipment | 6.7% | 9.9% | 48% more time during combat deployments |
| Physically Demanding Combat Arms Tasks (i.e., tasks common to many combat arms MOSs) | 13.9% | 21.2% | 53% more time during combat deployments |
| Tactical marches/patrolling | 6.6% | 22.9% | 245% more time during combat deployments |

Section 7: Comparing Subjects Who Had Been Deployed to Those Who Had Not Deployed

Another set of analyses that can be used to obtain understanding concerning differences in performance from one work setting to another is to compare the work performance of Soldiers who had been deployed to those who had not been deployed. Much more information from the three JAQs can be included using this strategy, but this set of analyses is also limited in that nearly all the Soldiers in the three survey samples had been deployed. The results from these analyses are provided, however, because they may be useful to decision and policy makers.

7.1. Common and 19D-specific Task JAQs.

The comparisons of participants who had deployed at least once to those who had not on aspects of the common and 19D-specific tasks (e.g., the likelihood of being expected to perform the tasks if the situation arose, the numbers of times the tasks were performed, their importance to job success, the time needed to perform them one time, and other supplemental information concerning the tasks) are reported in Tables 27, 28 and 29. Only the statistically significant comparisons are reported in these three tables.

- Completion of four of the 16 tasks was more likely to be expected of subjects who had deployed one or more times if the situation arose.
- Completion of none of the 16 tasks was more likely to be expected of subjects who had not deployed.
- Seven of the 16 tasks were reported to have been performed more frequently by respondents who had deployed at least once.
- None of the common or 19D-specific tasks had been performed more frequently by non-deployed subjects.
- No significant differences between the two groups were found on the task importance ratings or the reports of time needed to complete the tasks.

Table 27. Others' expectations of subject task completion: Statistically significant chi-squared tests with deployed and non-deployed respondents who completed the common or 19D-specific task JAQ

| <u>Task</u> | <u>Deployed</u> | | <u>Non-Deployed</u> | | | | |
|---|-----------------|----------|---------------------|----------|--------------------|----------|---|
| | <u>Yes (%)</u> | <u>n</u> | <u>Yes (%)</u> | <u>n</u> | <u>Chi-Squared</u> | <u>p</u> | <u>Summary</u> |
| Throw a hand grenade | 96.9 | 573 | 88.2 | 34 | 6.8 | .009 | Respondents who deployed were more likely to be expected to perform this task as part of their MOS. |
| With a group of Soldiers, lift, carry and connect a vehicle tow bar for a Buffalo, BFV or Stryker from a towing vehicle to the disabled vehicle | 93.2 | 574 | 73.5 | 34 | 17.1 | <.001 | Respondents who deployed were more likely to be expected to perform this task. |
| With the assistance of another Soldier, remove a spare tire from a HMMWV, roll into place, and lift onto the axle of the disabled vehicle | 89.4 | 576 | 76.5 | 34 | 5.4 | .021 | Respondents who deployed were more likely to be expected to perform this task. |
| Manually tighten the lug nuts on a tire with a lug or torque wrench | 89.5 | 569 | 75.8 | 33 | 5.8 | .016 | Respondents who deployed were more likely to be expected to perform this task. |

Table 28. Deployed vs. non-deployed respondents who completed the common or 19D-specific task JAQ: Task frequencies, task importance, time taken for the task, and supplementary task information

| | | <u>Deployed</u> | | | <u>Non-Deployed</u> | | | | |
|------------------|--|-----------------|------------------|----------|---------------------|------------------|----------|-------------------|---|
| <u>Item Type</u> | <u>Task</u> | <u>Mean</u> | <u>Mean Rank</u> | <u>n</u> | <u>Mean</u> | <u>Mean Rank</u> | <u>n</u> | <u>2-tailed p</u> | <u>Summary</u> |
| Frequency | With the assistance of another Soldier, pull a casualty from a commander's seat and through the top hatch of a wheeled vehicle (i.e., BFV or Stryker | 2.1 | 276.1 | 515 | 1.6 | 184.4 | 27 | .002 | More frequently done among respondents who had deployed |
| | Climb over, through, or around barbed wire obstacles | 2.5 | 246.7 | 461 | 2.0 | 172.5 | 24 | .007 | More frequently done among respondents who had deployed |
| | With a group of Soldiers, lift, carry and connect a vehicle tow bar for a Buffalo, BFV or Stryker from a towing vehicle to the disabled vehicle | 2.9 | 296.6 | 555 | 2.5 | 227.2 | 30 | .024 | More frequently done among respondents who had deployed |
| | Jack up a vehicle and remove lug nuts from a flat tire | 2.5 | 301.8 | 559 | 1.9 | 207.2 | 33 | .001 | More frequently done among respondents who had deployed |
| | With the assistance of another Soldier, remove a spare tire from a HMMWV, roll into place, and lift onto the axle of the disabled vehicle | 2.3 | 294.6 | 548 | 1.8 | 208.0 | 31 | .002 | More frequently done among respondents who had deployed |
| | Manually tighten the lug nuts on a tire with a lug or torque wrench | 2.5 | 301.6 | 559 | 1.8 | 184.8 | 31 | <.001 | More frequently done among respondents who had deployed |
| | As part of a group of 4 Soldiers, remove the flat tire from a HMMWV, then roll and lift it into the back of a vehicle | 2.2 | 297.9 | 555 | 1.6 | 188.5 | 29 | <.001 | More frequently done among respondents who had deployed |

¹ The following item types were found to have no significant differences: Task importance, time to complete

^a Means were not computed for this item because of the response format.

Table 28. Continued

| <u>Item Type</u> | <u>Task</u> | <u>Deployed</u> | | | <u>Non-Deployed</u> | | | <u>2-tailed p</u> | <u>Summary</u> |
|------------------|--|-----------------|------------------|----------|---------------------|------------------|----------|-----------------------|--|
| | | <u>Mean</u> | <u>Mean Rank</u> | <u>n</u> | <u>Mean</u> | <u>Mean Rank</u> | <u>n</u> | | |
| Supplementary | When you performed a dismounted tactical movement, how heavy was the load you usually carried? ^a | | 278.5 | 522 | | 180.4 | 25 | .001 | More weight was usually carried during dismounted tactical movements by respondents who had deployed. |
| | How much weight do you usually carry when performing a dismounted tactical movement of 6 miles or more? ^a | | 279.1 | 522 | | 168.5 | 25 | <.001 | More weight was usually carried during dismounted tactical movements of six miles or more by respondents who had deployed. |

¹ The following item types were found to have no significant differences: Task importance, time to complete

^a Means were not computed for this item because of the response format.

Table 29. Deployed vs. non-deployed respondents who completed the common or 19D-specific task
JAQ: Supplementary information items with open response formats - Statistically significant t-tests

| <u>Item</u> | <u>Deployed</u> | | | <u>Non-Deployed</u> | | | | | |
|--|-----------------|-----------|----------|---------------------|-----------|----------|----------|-------------------|--|
| | <u>Mean</u> | <u>SD</u> | <u>n</u> | <u>Mean</u> | <u>SD</u> | <u>n</u> | <u>t</u> | <u>2-tailed p</u> | <u>Summary</u> |
| When you performed a dismounted tactical movement, what is the longest distance you moved? | 16.3 | 7.6 | 510 | 12.6 | 6.5 | 24 | 2.3 | .021 | Respondents who deployed had greater maximum distances moved during dismounted tactical movements than respondents who did not |
| When you performed a dismounted tactical movement, what is the lightest load you carried? | 42.1 | 25.0 | 516 | 29.2 | 13.8 | 25 | 2.6 | .011 | Respondents who deployed had heavier minimum loads carried during dismounted tactical movements than others |
| When you performed a dismounted tactical movement, what is the heaviest load you carried? | 101.4 | 33.9 | 515 | 77.3 | 22.5 | 25 | 3.5 | < .001 | Respondents who deployed had heavier maximum loads carried during dismounted tactical movements than others |
| When you performed a dismounted tactical movement of six miles or more, what is the lightest load you carried? | 41.4 | 24.3 | 509 | 29.5 | 13.7 | 24 | 2.4 | .017 | Respondents who deployed had heavier minimum loads carried during dismounted tactical movements of six miles or more than others |
| When you performed a dismounted tactical movement of six miles or more, what is the heaviest load you carried? | 92.8 | 33.8 | 509 | 68.8 | 20.2 | 24 | 3.4 | .001 | Respondents who deployed had heavier maximum loads carried during dismounted tactical movements of six miles or more than others |

7.2. 19K-specific JAQ.

The comparisons of subjects who had deployed at least once to those who had not, on aspects of the 19K-specific tasks, are reported in Tables 30, 31 and 32. Only the statistically significant comparisons are reported in these three tables.

- Completion of three of the 12 19K-specific tasks (i.e., loading ammunition for the M2 .50 Cal Machine Gun on an Abrams Tank, changing the bra, plow and roller on an Abrams Tank, and lifting and lowering Caiman Tires from the top of an MRAP) if the situation arose were more likely to be expected of subjects who had deployed one or more times.
- Completion of none of the 19K-specific tasks was more likely to be expected of subjects who had not deployed.
- Three of the 12 19K-specific tasks (i.e., mounting the M2 .50 Cal Machine Gun on an Abrams Tank, changing the sprocket on an Abrams Tank, and lifting and lowering Caiman Tires from the top of an MRAP) were reported to have been performed more frequently by respondents who had deployed at least once.
- Only one of the 19K-specific tasks (i.e., loading multiple rounds in the 120mm Main Gun) was reported to have been performed more frequently by non-deployed subjects.
- Only two of the 19K-specific tasks (i.e., mounting and loading ammunition for the M2 .50 Cal Machine Gun on an Abrams Tank) were rated as more important to job success by those who had deployed, and none were rated as more important by non-deployed participants.
- Respondents who had not deployed rated two 19K-specific tasks as taking more time to perform than did respondents who deployed. These tasks were: 1) lifting and lowering Caiman Tires from the top of an MRAP, and 2) while standing on the hull of an Abrams Tank, lifting and carrying rounds such as MPAT rounds from a Soldier on the ground or HEMTT, and handing them to a Soldier inside the tank for resupply. This may be related to the need to perform these tasks more quickly in combat deployment settings, as well as the benefits of repeated practice.

Table 30. Others' expectations of subject task completion: statistically significant chi-squared tests with deployed and non-deployed respondents who completed the 19K-specific JAQ

| <u>Task</u> | <u>Deployed</u> | | <u>Non-Deployed</u> | | | | |
|--|-----------------------|----------|-----------------------|----------|--------------------|----------|--|
| | <u>Percentage Yes</u> | <u>n</u> | <u>Percentage Yes</u> | <u>n</u> | <u>Chi-Squared</u> | <u>p</u> | <u>Summary</u> |
| Load ammunition for the M2 .50 Cal Machine Gun on an Abrams Tank | 99.7% | 342 | 90.9% | 22 | 19.6 | <.001 | Respondents who deployed were more likely to be expected to load ammunition for the M2 .50 Cal Machine Gun |
| Lift and lower Caiman Tires from the top of an MRAP | 39.8% | 337 | 14.3% | 21 | 5.4 | .020 | Respondents who deployed were more likely to be expected to perform this task |
| Changing the bra, plow and roller on an Abrams Tank | 92.4% | 342 | 71.4% | 21 | 10.8 | .001 | Respondents who deployed were more likely to be expected to perform this task |

Table 31. Deployed vs. non-deployed respondents who completed the 19K-specific JAQ: Task frequencies, task importance, time taken for the task, and supplementary task information

| <u>Item Type</u> | <u>Task</u> | <u>Deployed</u> | | | <u>Non-Deployed</u> | | | <u>2-tailed p</u> | <u>Summary</u> |
|------------------|--|-----------------|------------------|----------|---------------------|------------------|----------|-------------------|---|
| | | <u>Mean</u> | <u>Mean Rank</u> | <u>n</u> | <u>Mean</u> | <u>Mean Rank</u> | <u>n</u> | | |
| Frequency | Mount M2 .50 Cal Machine Gun on an Abrams Tank | 4.2 | 185.0 | 344 | 3.6 | 139.5 | 20 | .033 | More frequently done among respondents who had deployed |
| | Load multiple rounds in the 120mm Main Gun | 3.4 | 170.0 | 326 | 4.1 | 224.5 | 19 | .015 | More frequently done among respondents who had <u>not</u> deployed |
| | Lift and lower Caiman Tires from the top of an MRAP | 1.3 | 182.8 | 338 | 1.0 | 135.0 | 21 | .007 | More frequently done among respondents who had deployed |
| | Changing the sprocket on an Abrams Tank | 2.2 | 171.3 | 317 | 1.5 | 96.8 | 17 | <.001 | More frequently done among respondents who had deployed |
| Importance | Mount M2 .50 Cal Machine Gun on an Abrams Tank | 4.5 | 187.6 | 345 | 3.9 | 128.0 | 22 | .003 | Respondents who had deployed ranked this task as more important than respondents who had not |
| | Load ammunition for the M2 .50 Cal Machine Gun on an Abrams Tank | 4.6 | 185.7 | 346 | 4.2 | 145.2 | 20 | .032 | Respondents who had deployed ranked this task as more important than respondents who had not |
| Time | While standing on the hull of an Abrams Tank, lift and carry rounds such as MPAT rounds from a Soldier on the ground or HEMTT, and hand it to a Soldier inside the tank for resupply | 2.3 | 181.8 | 346 | 2.9 | 227.5 | 22 | .042 | Respondents who had <u>not</u> deployed ranked this task as taking more time to perform than respondents who had |
| | Lift and lower Caiman Tires from the top of an MRAP | 4.5 | 71.0 | 140 | 7.0 | 118.0 | 3 | .044 | Respondents who had <u>not</u> deployed ranked this task as taking more time to perform than did respondents who had |

Table 31. Continued

| <u>Item Type</u> | <u>Task</u> | <u>Deployed</u> | | | <u>Non-Deployed</u> | | | <u>2-tailed p</u> | <u>Summary</u> |
|------------------|--|-----------------|------------------|----------|---------------------|------------------|----------|-------------------|---|
| | | <u>Mean</u> | <u>Mean Rank</u> | <u>n</u> | <u>Mean</u> | <u>Mean Rank</u> | <u>n</u> | | |
| Supplementary | When loading rounds for the .50 Cal Machine Gun on an Abrams Tank, how many boxes of rounds do you typically load? | 3.6 | 165.3 | 308 | 2.7 | 120.5 | 17 | .047 | Respondents who had deployed loaded more boxes of rounds for the .50 Cal Machine Gun than those who had not |

Table 32. Deployed vs. non-deployed respondents who completed the 19K-specific JAQ: Supplementary information items with open response formats - Statistically significant t-tests

| <u>Item</u> | <u>Deployed</u> | | | <u>Non-Deployed</u> | | | | | |
|---|-----------------|-----------|----------|---------------------|-----------|----------|----------|---|---|
| | <u>Mean</u> | <u>SD</u> | <u>n</u> | <u>Mean</u> | <u>SD</u> | <u>n</u> | <u>t</u> | <u>2-tailed p</u> | <u>Summary</u> |
| When loading rounds for the .50 Cal Machine Gun on an Abrams Tank, how many boxes of rounds do you typically load? | 3.6; 165.3 | | 308 | 2.7; 120.5 | | 17 | .04 7 | Respondents who had deployed loaded more boxes of rounds for the .50 Cal Machine Gun than those who had not | When loading rounds for the .50 Cal Machine Gun on an Abrams Tank, how many boxes of rounds do you typically load? |
| When loading the 120mm Main Gun for one fire command, what is the smallest number of rounds you loaded? | 1.1 | 0.3 | 280 | 1.2 | 0.7 | 19 | -2.1 | .037 | Respondents who had <u>not</u> deployed loaded a greater minimum number of rounds for one fire command than those who had |
| When loading rounds for the .50 Cal Machine Gun on an Abrams Tank, what is the smallest number of boxes you loaded? | 1.4 | 1.1 | 295 | 1.0 | 0.0 | 16 | 5.5 | <.001 | Respondents who had deployed loaded a greater minimum number of ammo boxes for the .50 Cal Machine Gun than those who had not |

Section 8: The Effect of Task Completion Expectations on Task Performance Frequency

Task expectations were strongly related to the frequency with which the tasks in this study was performed. Task performance expectations were associated with more frequent performance for 21 of the 28 tasks represented in the three JAQs administered in this study, and for all 16 of the tasks represented in the common and 19D-specific JAQs. These analyses are summarized in Table 33.

Table 33. The effects of task completion expectations on task performance frequency: all three JAQs (i.e., the common, 19D-specific and 19K-specific JAQs)

| | <u>Task</u> | <u>Cramer's V^{a,b}</u> | <u>Range of Cramer's V</u> | <u>Summary</u> |
|---|--|---------------------------------|----------------------------|--|
| Common and 19D-specific (3 highest Cramer's V's) | While seated, remove and lift/lower the M242 Feeder assembly from the 25mm gun on a BFV during maintenance and/or remedial action misfire procedures (n = 477) | .64 | | |
| | Lift and carry ammunition cans from the supply point (e.g. ammunition center or truck) to the back of a BFV (n = 511) | .58 | | |
| | With assistance from another Soldier, lift, carry, and install the barrel of a 25mm gun onto a BFV (n = 484) | .58 | | |
| | ^a All <i>p</i> 's for the task analyses represented in the top half of this table (i.e., for all 16 common and 19D-specific tasks) are significant at the .001 level. | | .27 - .64 | Each of the common and 19D-specific tasks was likely to be performed more frequently by a Soldier when the Soldier said he was expected to perform that task when the situation arose. This relationship was strongest in the three common tasks listed above. |
| 19K-specific (3 highest Cramer's V's) | Lift and lower Caiman tires from the top of an MRAP (n = 353) | .42 | | |
| | Change the sprocket on an Abrams Tank (n = 331) | .36 | | |
| | Carry ammunition such as MPAT rounds from a supply point to the hull of an Abrams Tank (n = 351) | .35 | | |

Table 33. Continued

| | <u>Task</u> | <u>Cramer's V^{a,b}</u> | <u>Range of Cramer's V</u> | <u>Summary</u> |
|-------------------------------------|--|-------------------------------------|--------------------------------|---|
| 19K-specific (continued) | ^b The <i>p</i> 's for 5 of the 12 task analyses represented in the bottom half of this table (i.e., for 5 of the 12 19K-specific tasks) are significant at the .001 level. The <i>p</i> 's for the remaining 7 task analyses represented in this portion of the table are non-significant at the .05 level. | | .04 - .42 | Five of the 12 19K-specific tasks were likely to be performed more frequently by a Soldier when the Soldier said he was expected to perform that task when the situation arose. This relationship was strongest in the three 19K-specific tasks listed above. |

Section 9: The Number of Tasks Performed in the Last Two Years

Based on these survey results, a significant percentage of both cavalry scouts and armor crewmen had not once in the last two years performed some of the tasks addressed -- not even in their initial entry training. For example, 55% of the cavalry scouts said they had not in the last two years loaded TOW-2B aero missiles into a BFV-mounted TOW weapon system -- the only 19D-specific task represented in the questionnaire. Twenty-one percent of these cavalry scouts reported not using a shovel or entrenching tool to fill sandbags for a fighting position in the last two years, and 10% said they had not quickly lifted and dragged a casualty to safety during the same time period. Ten percent of the armor crewmen said they had not, in the last two years, removed a casualty from an Abrams Tank. Thirty-one percent of the crewmen said they had not, in the last two years, changed the bra, plow and roller on an Abrams Tank, and 27% reported not changing the sprocket on an Abrams over the same time period. Finally, considering both cavalry scouts and armor crewmen, 12 of these Soldiers (i.e., 2.0% of the 614 participants who responded to this question) said they had not performed a dismounted foot march or tactical movement even once in the last two years. The graphs of task performance frequencies in Results Sections 2 and 4 display the data indicating how often each common and job-specific task was done (and not done) in the two years prior to the surveys. However, a notable statistic that these graphs don't show is the total number of these tasks that were performed (and not performed) by respondents in the two prior years.

For each of the three JAQs administered in this study, we conducted an analysis of the number of tasks represented by the survey that each of the respondents performed. Tables 34 through 36 display the numbers of both common and MOS-specific tasks reported to be performed by cannon crewmembers and fire support specialists in the last two years.

| Table 34. The number of common and 19D-specific tasks performed by cavalry scouts in the last two years | | | |
|--|------------------------------|-------------------|------------------------------|
| <u>Number of Tasks</u> | <u>Number of Respondents</u> | <u>Percentage</u> | <u>Cumulative Percentage</u> |
| 0 | 5 | 0.9 | 0.9 |
| 1 | 8 | 1.4 | 2.3 |
| 2 | 5 | 0.9 | 3.2 |
| 3 | 6 | 1.1 | 4.3 |
| 4 | 6 | 1.1 | 5.4 |
| 5 | 10 | 1.8 | 7.1 |
| 6 | 9 | 1.6 | 8.8 |
| 7 | 15 | 2.7 | 11.4 |
| 8 | 18 | 3.2 | 14.6 |
| 9 | 42 | 7.5 | 22.1 |
| 10 | 41 | 7.3 | 29.5 |
| 11 | 55 | 9.8 | 39.3 |
| 12 | 70 | 12.5 | 51.8 |
| 13 | 47 | 8.4 | 60.2 |
| 14 | 47 | 8.4 | 68.6 |
| 15 | 56 | 10.0 | 78.6 |
| 16 | 120 | 21.4 | 100 |
| Total | 560 | 100 | |

Table 35. The number of 19K-specific tasks performed by armor crewmen in the last two years

| <u>Number of Tasks</u> | <u>Number of Respondents</u> | <u>Percentage</u> | <u>Cumulative Percentage</u> |
|-------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| 0 | 2 | 0.5 | 0.5 |
| 1 | 1 | 0.3 | 0.8 |
| 2 | 1 | 0.3 | 1.1 |
| 3 | 2 | 0.5 | 1.6 |
| 4 | 1 | 0.3 | 1.9 |
| 5 | 4 | 1.1 | 3.0 |
| 6 | 6 | 1.6 | 4.6 |
| 7 | 8 | 2.2 | 6.8 |
| 8 | 15 | 4.1 | 10.8 |
| 9 | 38 | 10.3 | 21.1 |
| 10 | 80 | 21.6 | 42.7 |
| 11 | 152 | 41.1 | 83.8 |
| 12 | 60 | 16.2 | 100 |
| Total | 370 | 100 | |

Table 36. The number of common tasks performed by armor crewmen in the last two years

| <u>Number of Tasks</u> | <u>Number of Respondents</u> | <u>Percentage</u> | <u>Cumulative Percentage</u> |
|------------------------|------------------------------|-------------------|------------------------------|
| 5 | 2 | 3.7 | 3.7 |
| 6 | 4 | 7.4 | 11.1 |
| 7 | 4 | 7.4 | 18.5 |
| 8 | 3 | 5.6 | 24.1 |
| 9 | 10 | 18.5 | 42.6 |
| 10 | 7 | 13.0 | 55.6 |
| 11 | 13 | 24.1 | 79.6 |
| 12 | 10 | 18.5 | 98.1 |
| 13 | 1 | 1.9 | 100 |
| 14 | 0 | 0 | 100 |
| 15 | 0 | 0 | 100 |
| Total | 54 | 100 | |

Table 34 indicates that over 20% of the cavalry scouts completing the 19D-specific JAQ (i.e., 22.1%) performed only nine or fewer of the 16 common and MOS-specific tasks represented by the questionnaire. Further, referring to Tables 35 and 36, over 10% of the armor crewmen completing the 19K-specific JAQ (i.e., 10.8%) performed only eight or fewer of the 12 job-specific tasks represented by that survey, and well over half the armor crewmen completing the Common Task JAQ (i.e., 55.6%) performed only 10 or fewer of the 15 common tasks represented by that questionnaire. Thus it appears that among both cavalry scouts and armor crewmen, a large percentage of the respondents have not even once in the last two years performed many of the tasks represented in the JAQs administered in this study.

Section 10: Deployed Soldiers Who Performed MOS-specific Tasks in the Field but Not in Garrison

A number of cavalry scouts and armor crewmen who had deployed at least once said that they had performed MOS-specific tasks in the field *but not in garrison*. Among the 526 cavalry scouts who said they had deployed, 23 of them (4.4% of these deployed respondents) reported spending time performing

MOS-specific tasks during combat deployments but not in a garrison setting. Four of these 23 respondents said they had performed MOS-specific tasks 30% of the time during their last deployment. Table 37 displays a summary of the amounts of time spent by these respondents performing MOS-specific tasks during combat deployments.

| Table 37. Percentage of time spent performing MOS-specific tasks during combat deployments by cavalry scouts who had not performed these tasks in garrison | | | | |
|---|-------------|---------------|-------------|----------------|
| | <u>Mean</u> | <u>Median</u> | <u>Mode</u> | <u>Std Dev</u> |
| Percentage of time spent (n=23) | 13.6 | 10 | 5 | 9.7 |

Among the 335 armor crewmen who said they had deployed in two questions on the 19K-specific JAQ, 6 of them (1.8% of these deployed respondents) reported spending time performing MOS-specific tasks during their last combat deployment but not in a garrison setting. Four of these six respondents said they had performed MOS-specific tasks *over 75% of the time* during their last deployment. Another 12 reported spending less than 25% of their time performing MOS-specific tasks during their last combat deployment, but no time performing these tasks in garrison. A response of less than 25% for this question could equate to zero and thus, it is uncertain how much time these respondents actually spent performing MOS-specific tasks during their last combat deployment. Table 38 displays the amounts of time these respondents said they spent performing MOS-specific tasks during their last combat deployment.

| Table 38. Percentage of time spent performing MOS-specific tasks during their last combat deployment by armor crewmen who had not performed these tasks in garrison | | |
|--|------------------------------|-------------------|
| <u>Percentage of Time Spent¹</u> | <u>Number of Respondents</u> | <u>Percentage</u> |
| Less than 25% | 12 | 66.7 |
| 26 – 50% | 2 | 11.1 |
| Over 75% | 4 | 22.2 |
| Total | 18 | 100 |

¹ 15.4% percent of 335 deployed armor crewmen are represented in this table

Section 11: Comparisons of JAQ Ratings to Judgments of Subject Matter Experts

As part of the larger study conducted with TRADOC to develop physical performance standards for the Army's most physically demanding jobs, researchers from USARIEM obtained information on the critical tasks performed by cavalry scouts and armor crewmen from 20 subject matter experts (SMEs). These SMEs had served in several capacities in relation to the MOSs being addressed (e.g., officers, warrant officers or non-commissioned officers in the MOS for at least 12 of the past 24 months and deployed within the past 24 to 36 months; some also serving as battalion- and/or company-level leaders).

11.1. Comparing the Ratings of SMEs and Cavalry Scouts.

When asked to identify the critical physically-demanding tasks of the cavalry scout MOS, the 20 SMEs selected the following tasks:

- Performing a dismounted tactical movement
- Dragging a casualty to a safe location
- Evacuating a casualty from the top of a vehicle
- Using a hand grenade
- Filling and carrying sandbags to prepare a fighting position
- Removing a feeder assembly from a BFV
- Loading ammunition cans onto a BFV
- Loading a TOW missile launcher onto a BFV

Similarities and differences (i.e., mixed results) were noted between the tasks selected as critical by the SMEs and those rated as highly important by the cavalry scouts completing the JAQ. Response options for the importance scale items on each of the JAQs administered in this study (for both cavalry scouts and armor crewmen) ranged from 1 ("of little importance") to 5 ("extremely important"). A rating of "4" was labeled on the JAQ as "very important;" and thus a mean of at least "4" was used as the

criterion indicating an agreement between the job incumbents and SMEs that a job task was “critical,” or highly important. Of the tasks selected by the SMEs, those also rated highly in importance on the 19D JAQ were performing a dismounted tactical movement (mean = 4.59), evacuating a casualty from the top of a vehicle (mean = 4.23), removing a feeder assembly from a BFV (mean = 4.21), loading a TOW missile launcher onto a BFV (mean = 4.10), and dragging a casualty to a safe location (mean of 4.01).

Four tasks selected as critical by the SMEs were not rated as highly in importance by the JAQ respondents. These were filling and carrying sandbags to prepare a fighting position (means = 3.43 for filling and 3.50 for carrying), using a hand grenade (mean = 3.77), and loading ammunition cans onto a BFV (mean = 3.92). Carrying and connecting a vehicle tow bar for a Buffalo, BFV or Stryker from a towing vehicle to a disabled vehicle was rated highly in importance on the JAQ (mean = 4.02) but not selected as critical by the SMEs.

11.2. Comparing the Ratings of SMEs and Armor Crewmen.

The 20 SMEs selected the following common and MOS-specific tasks when asked to identify the critical physically-demanding tasks performed by armor crewmen:

- Performing a dismounted tactical movement
- Dragging a casualty to a safe location
- Evacuating a casualty from the top of a vehicle
- Using a hand grenade
- Filling and carrying sandbags to prepare a fighting position
- Removing a feeder assembly from a BFV
- Loading ammunition cans onto a BFV
- Mounting the M2 .50 Cal Machine Gun on an Abrams Tank
- Loading the 120mm Main Gun
- Removing a casualty from an Abrams Tank

- Stowing ammunition on an Abrams Tank

Concerning stowing ammunition on an Abrams Tank, the JAQ included four component subtasks of this duty – all of which were considered rated “critical” by the SMEs based on their ratings of the ammunition stowing task. These four subtasks were:

- Loading ammunition for the M2 .50 Cal Machine Gun on an Abrams Tank
- Carrying ammunition such as MPAT rounds from a supply point to the hull of an Abrams Tank
- Carrying rounds such as MPAT rounds from a Soldier on the ground or HEMTT and handing them to a Soldier inside the tank for resupply (while standing on the hull)
- Receiving rounds such as MPAT rounds from a Soldier on the hull of an Abrams Tank and placing them into the ready rack (while standing in the turret)

Similarities and differences were noted between the tasks selected as critical by the SMEs and those rated as highly important by the armor crewmen completing either or both the Common Task or 19K-specific JAQ. Of the tasks rated as critical by the SMEs, those also rated highly in importance on the JAQ were the following (in descending order of rated importance): Loading the 120mm main gun (mean = 4.81), removing a casualty from an Abrams Tank (mean = 4.72), loading ammo for the M2 .50 Cal Machine Gun on an Abrams (mean = 4.61), receiving rounds from a Soldier on the hull of an Abrams and placing them in the ready rack (mean = 4.58), carrying rounds from a Soldier on the ground or HEMTT and handing them to a Soldier inside the tank (mean = 4.58), carrying ammo from a supply point to the hull of an Abrams (mean = 4.52), mounting an M2 .50 Cal Machine Gun Receiver on an Abrams (mean = 4.44), dragging a casualty to a safe location (mean = 4.32), and evacuating a casualty from the top of a vehicle (mean = 4.21).

Four tasks selected as critical by the SMEs were not rated as highly in importance by the JAQ respondents. These tasks were filling and carrying sandbags to prepare a fighting position (means = 2.95 for filling and 3.11 for carrying), using a hand grenade (mean = 3.12), and performing a dismounted

tactical movement (mean = 3.53). Carrying and connecting a vehicle tow bar for a Buffalo, BFV or Stryker from a towing vehicle to a disabled vehicle was rated highly in importance on the JAQ (mean = 4.09) but not selected as critical by the SME's. And finally, two other tasks selected as critical by the SME's were not rated by enough crewmen to draw a conclusion about how armor crewmen in the Army evaluate the importance of these tasks to job success. These tasks were removing a feeder assembly from a BFV and loading ammunition cans onto a BFV (n's of 2 and 9 respectively).

11.3. Summary Comments Concerning the Rating Comparisons.

When comparing task importance ratings of the JAQ respondents to those tasks rated as critical by subject matter experts (i.e., those developing doctrine and training programs for the cavalry scout and armor crewman MOSs), it is important to note that respondents to the questionnaire were specifically instructed that not all tasks can be extremely important. Nonetheless, there appears to be at least a fair amount of disagreement between 19 Series Soldiers (i.e., cavalry scouts and armor crewmen) and subject matter experts concerning what tasks are highly important to success in their MOSs. Several tasks identified as critical by the SMEs (e.g., filling and carrying sandbags, throwing hand grenades, and even performing a dismounted tactical movement) were not rated as highly in importance by cavalry scouts and/or armor crewmen on the JAQ. In addition, one of the common tasks rated as highly important by both cavalry scouts and armor crewmen was not selected as a critical task by the SMEs. These findings may be an indicator that one or both of these jobs (i.e., the cavalry scout and/or armor crewman job) may have changed to some extent, and this may have implications for the preparation, training and equipping of Soldiers. Further, there may be job tasks or aspects of the ways these jobs are currently performed that were not considered by the SMEs.

Section 12: Comments Provided on the JAQ

Part of the purpose of this research investigation was to ascertain if there are any physically demanding jobs performed by cavalry scouts or armor crewmen that we failed to identify. Thus, study

participants were asked to respond to the following item at the end of the JAQ: “If this survey has omitted physically demanding tasks that you believe all combat arms Soldiers should be capable of performing, please identify and explain these tasks in the space provided below. Please list any tasks you think are physically hard to perform and important.” For a response to be considered as valid, it must have mentioned a specific task or tasks that was not or were not mentioned on the JAQ. Otherwise it was considered as irrelevant. Valid responses were collected from 154 cavalry scouts and 183 armor crewmen. The following would be considered as examples of irrelevant responses: “None,” “N/A,” “Can’t think of anything,” comments addressing non-task related issues, and comments providing personal opinions of the questionnaire as a whole.

12..1 Comments Provided by Cavalry Scouts (19Ds).

The following two broad task areas were frequently mentioned by cavalry scouts: 1) Mounting/dismounting, loading/unloading, and transporting equipment and ammunition that were not mentioned (e.g., LRAS3, various crew-served weapons, missile launchers, IED detection and disable equipment, and grenade launchers), sometimes to observational point positions, and 2) navigating and sprinting through obstacles (e.g., climbing over walls, navigating or sprinting across rugged terrain, and climbing up ropes and ladders) in full fighting load, while carrying equipment such as crew-served weapons. Further, many respondents in the 19D MOS believed that one of the tasks statements mentioned in the survey did not provide a good representation of what actually occurs. Specifically, one task statement in the JAQ reads, “Lift and drag a casualty to a safe location as quickly as possible.” Many cavalry scouts specified that in addition to or instead of dragging casualties, they frequently have to carry them on litters. Finally, the JAQ referred to the M242 Bushmaster and cavalry scouts mentioned other tasks they perform that are associated with the M242 (e.g., removing, installing, and loading the M242, removing the receiver). Table 39 displays more information concerning the JAQ comments associated with the 19D MOS.

12.2. Comments Provided by Armor Crewmen (19Ks).

Three broad task areas were frequently mentioned by armor crewmen. These were: 1) Performing manual track maintenance on tracked vehicles (e.g., replacing sections and entire sides of the track, replacing track pads, and replacing a track support chain) and transporting the materials necessary to perform these tasks, 2) installing, removing and transporting tracked vehicle road wheels, and 3) tracked vehicle engine service and maintenance tasks (e.g., checking oil levels, servicing the breech, and servicing v-packs). Additionally, the JAQ contained a task statement which read, “Repair broken tracks on a tracked vehicle (i.e., an Abrams Tank).” Several armor crewmen elaborated on this, reporting that this process of repair is made more physically demanding by the requirement of manually transporting the necessary materials. Table 40 displays more information concerning the JAQ comments associated with the 19K MOS.

| Table 39. Summary of comments provided on the JAQ completed by cavalry scouts | |
|--|---|
| Topic Addressed | Number of Comments (Not all represented) |
| Mounting/Dismounting, loading/unloading, and transporting equipment and ammunition not mentioned (e.g., M2 .50 cal, MK19, MK48, THORs) | 41 |
| Navigating and sprinting in full fighting gear while carrying equipment | 30 |
| Long-Range Advanced Scout Surveillance System (LRAS3) | 22 |
| Lifting a casualty on a litter | 20 |
| Dismounted tactical movements while carrying equipment (Addressed in the JAQ) | 10 |
| M242 Bushmaster (Addressed in the JAQ) | 10 |
| Shooting accurately under stressful scenarios | 9 |
| Maintenance and loading tactical fighting vehicles | 9 |
| Casualty evacuation from tactical fighting vehicles in full fighting gear (Addressed in the JAQ) | 7 |
| Performing combatives against enemies | 4 |
| Airborne-related operations | 4 |
| Combat patrolling | 4 |
| Manually traversing the turret | 2 |
| All Valid Comments | 172 |
| 34 “irrelevant” responses | |

| Table 40. Summary of comments provided on the JAQ completed by armor crewmen | |
|--|---|
| Topic Addressed | Number of Comments (Not all represented) |
| Installing, removing and transporting road wheels | 74 |
| Manual tank track maintenance, and transporting materials (Addressed in JAQ) | 70 |
| Engine service and maintenance tasks | 31 |
| Installing and removing suspension parts (i.e., torsion bars, idler arms, tension arms) | 17 |
| Preparing the tank for recovery/tow operations and properly using the tow bar | 15 |
| Servicing the breech block | 14 |
| Cleaning the main gun (“punching the gun tube”) | 14 |
| Installing, removing and transporting batteries from battery box | 11 |
| Properly using a sledgehammer and tanker bar to reinstall end connectors on tracked vehicles | 10 |
| Loading the bustle rack with equipment and personal items | 10 |
| Mounting and dismounting from the tank in full fighting load | 6 |
| Installing and removing seats inside the tank (driver, gunner, loader) | 4 |
| Washing and cleaning the tank | 2 |
| Manually traversing the turret | 2 |
| All Valid Comments | 280 |
| 23 “irrelevant” responses | |

Discussion

The purpose of this survey project was to gather various types of job-related information pertaining to the Army cavalry scout and armor crewman positions (MOSs 19D and 19K) from job incumbents. This information will be used to develop physical performance standards for these positions, with a view toward identifying and implementing two sets of proxy assessment tools (one for each MOS) that are effective in predicting performance on a subset of the tasks performed by cavalry scouts and armor crewmen.

Most Frequently Performed and Most Important Tasks

The tasks reported by these JAQ respondents as the most frequently performed, and those that were rated as most important, are specified in this report. The most frequently performed tasks were conducting dismounted foot marches and tactical movements, lifting and dragging casualties to safe locations as quickly as possible, loading M2 .50 Cal Machine Gun ammunition on an Abrams Tank, and mounting the M240 weapon on the Abrams. Tasks rated as more important to success in the cavalry scout and armor crewman positions were conducting dismounted foot marches and tactical movements, loading M2 .50 Cal Machine Gun ammo on the Abrams, mounting the M240 on the Abrams, and repairing broken tracks on a tracked vehicle.

The tasks rated as most important to job success are to a large extent those reported as the most frequently performed. However, for both the cavalry scout and armor crewman positions, certain tasks were indicated by the data as being more important but less frequently done. For cavalry scouts, these tasks were: 1) with the assistance of another Soldier, pulling a casualty from a commander's seat and through the top hatch of a wheeled vehicle (i.e., BFV or Stryker), and 2) loading TOW-2B Aero Missiles into a BFV Mounted TOW Weapon System. For armor crewmen, these tasks were: 1) loading multiple rounds in the 120mm Main Gun, and 2) removing a casualty from an Abrams Tank (Mounted). The data also highlighted one task for each of the two MOSs that respondents reported were less important but

more frequently done. For cavalry scouts, this task was using a shovel or entrenching tool to fill sand bags when preparing a fighting position. For armor crewmen, this task was mounting the M2 .50 Cal Machine Gun Receiver on an Abrams Tank.

Comparing Task Performance in Garrison and Combat Settings

It appears there are several important tasks inherent to the cavalry scout and armor crewman MOSs that are, as a whole, performed more often during combat deployments than in garrison or training settings. For example, cavalry scouts reported that while they spent over 25% of their time conducting tactical marches and patrols during combat deployments, they spent less than half that time conducting foot marches and patrols in garrison and training settings. This result was even more pronounced among armor crewmen: 19Ks reported spending less than 30% of the time conducting tactical marches and patrols in garrison and training settings than they did during combat deployments. Further, cavalry scouts reported performing MOS-specific tasks nearly 20% more often during combat deployments. Thirty-eight percent of the armor crewmen reported spending more time performing MOS-specific tasks during combat deployments, whereas only 19% reported spending more time performing these types of tasks in garrison or training settings. These findings are underscored by comparing the task performance of respondents who had deployed to that of respondents who had not. Those who had deployed reported more often pulling casualties from commander's seats through the tops of vehicles (rated as one of the most important common tasks), loading multiple rounds into the 120mm Main Gun (rated as one of the most important 19K-specific tasks), and mounting an M2 .50 Cal Machine Gun on an Abrams Tank. They also indicated carrying more weight during dismounted tactical movements – an average of nearly 25% more weight than their counterparts who had not deployed. It is possible there are specific training strategies that account for most or all of these differences in task emphasis across settings (e.g., the findings pertaining to dismounted tactical movements and patrols across settings may reflect a desire on the part of trainers not to overly strain or injure troops by high amounts of exceedingly-demanding physical work in settings other than combat). However, these differences highlight a potential need to

review training programs focused on preparing Soldiers in cavalry scout and armor crewman positions for performance in combat theaters.

Performance Expectations and Task Performance

Expectations of task completion were found to be strongly associated with how often Soldiers performed the tasks represented in this study. Most of the tasks on the three JAQs, including all of the common tasks, were performed more often by Soldiers when they knew they were expected to perform the task when the situation arises.

Results indicated that for each task, there was a small to significant percentage of Soldiers who did not believe they were expected to perform the task when needed. Perhaps for some of these Soldiers, there are good reasons to believe that one or more of the tasks represented by the survey(s) they completed for this study are not part of their jobs. However, the belief these Soldiers have that they are not expected to complete certain specific tasks when the situation arises may well reflect on the training they receive.

The Number of Tasks Performed

Based on these survey results, a significant percentage of both cavalry scouts and armor crewmen had not once in the last two years performed some of the tasks addressed -- not even in their initial entry training. For example, 55% of the 19Ds said they had not in the last two years loaded TOW-2B Aero Missiles into a BFV Mounted TOW Weapon System, and 38% said they had not ever with assistance pulled a casualty from a commander's seat and through the top hatch of a wheeled vehicle during the same time period (despite the fact that this latter task was rated one of the most important tasks to job success). Thirty-nine percent said they had not with assistance installed the barrel of a 25mm gun onto a BFV within the two-year timeframe. Of the 19Ks, 10% said they had not removed a casualty from an Abrams Tank in the last two years, and 7% said they had not repaired broken tracks on a tracked vehicle over the same time period. Further, considering both cavalry scouts and armor crewmen, 12 of these Soldiers (i.e., 2.0% of the 614 participants who responded to this question) said they had not performed a

dismounted foot march or tactical movement even once in the last two years. Perhaps these latter respondents were on medical restrictions [i.e., “profiles”] when their units conducted movements of this type – it seems highly unlikely that their units would not have conducted a dismounted foot march or tactical movement even once over an entire two-year period. The results being described here may be partially or fully explained by the fact that a substantial majority of these subjects (i.e., over 92%) had obtained the rank of E5 or higher, and thus may have delegated many of these tasks. These results may also be largely explained if the base or bases these Soldiers were assigned to in the last two years did not have some or all of the equipment in question located there. Nonetheless -- overall, 30% of the 19D sample indicated that they had performed only 10 or fewer of the 16 tasks addressed in the common and 19D-specific JAQs in the last two years, and 11% of the 19K sample said they had done only eight or fewer of the 12 tasks addressed by the 19K-specific JAQ over the same two-year period.

Tasks Performed in Combat Settings but Not in Garrison

A number of cavalry scouts and armor crewmen who had been deployed said that they had performed MOS-specific tasks in the field *but not in garrison*. Thus, it appears that these Soldiers completed at least some MOS-specific tasks during deployments but were not being trained in garrison to perform these tasks. This may be cause for concern. Of those completing the 19D JAQ who said they had deployed at least once in the past two years, 23 respondents – nearly 5% of this sample - indicated that they had spent from 1% to 30% of their time (an average of nearly 14%) performing MOS-specific tasks in combat settings but no time at all performing these tasks in a garrison or training environment. Of those completing the 19K-specific JAQ who reported deploying on a combat assignment but not performing MOS-specific tasks in garrison or training, six participants said they had performed MOS-specific tasks at least 25% of the time they had been deployed, with four of these saying they performed these types of tasks over 75% of the time in combat settings. Another 12 indicated that they completed MOS-specific tasks less than 25% of the time they were deployed. Thus, they also may have occasionally completed MOS-specific tasks during their deployment that they were not trained in garrison to perform.

Comparing Task Importance Ratings of Soldiers to Those of SMEs

A comparison of the task importance ratings of the JAQ respondents with the judgments of 20 SMEs revealed a good deal of similarity between the two sets of evaluations but also some notable differences. The job incumbents and SMEs agreed on the high importance of some of the tasks (e.g., dragging a casualty to safety, evacuating a casualty from the top of a vehicle), and came fairly close to agreement on others (e.g., loading ammunition cans onto a BFV, performing a dismounted tactical movement). However, the SMEs saw several tasks as critical that the scouts and crewman rated as far less important (e.g., using hand grenades, filling and carrying sandbags). Also notably, one particular task (i.e., carrying and connecting a vehicle tow bar for a Buffalo, BFV or Stryker from a towing vehicle to a disabled vehicle) was rated as highly important by both cavalry scouts and armor crewmen but not selected as critical by the SMEs.

What are some implications of these comparisons? First, it appears that some tasks that were once important to the job of a cavalry scout or armor crewman (e.g., using grenades, filling and carrying sandbags, and in the case of the armor crewmen, performing dismounted tactical movements) may still be thought of as critical to job success by SMEs but not by job incumbents. Thus, differences of perspective concerning the relative importance of tasks performed by 19Ds and 19Ks may lead to differences in the manner that experts think these jobs should be performed and the way they are actually prepared for and performed by incumbents. For example, perhaps various types of tools or equipment (e.g., the Long-Range Advanced Scout Surveillance System (LRAS3) or the M242 Bushmaster, both mentioned by Soldiers in their comments) would be set aside and other equipment used. This may happen because some of this equipment may not be used in current combat scenarios, because Soldiers do not believe it's the best equipment available for the task, or because they are unaware that such equipment exists. Some of these possibilities may reflect a lack of knowledge and experience on the part of incumbent Soldiers that SMEs often possess, and these possibilities can be addressed in training settings and scenarios. As another example, it would be entirely possible to select a set of physically demanding tasks that are approved by

experts for assessing Soldiers for the 19D or 19K positions that would not be widely or consistently used by job incumbents or others for screening purposes.

Tasks Not Addressed by JAQs but Mentioned by Soldiers

Part of the purpose of this research investigation was to ascertain whether there were any physically demanding tasks performed by cavalry scouts or armor crewmen that those conducting this research failed to identify. A number of such tasks were often mentioned. Among the sample of cavalry scouts, frequently mentioned tasks not addressed by the JAQ included 1) mounting/dismounting, loading/unloading, and transporting equipment and ammunition that were not mentioned in the survey (e.g., the LRAS3, various crew-served weapons, missile launchers, IED detection and disable equipment, and grenade launchers), sometimes to observational point positions, and 2) navigating and sprinting through obstacles (e.g., climbing over walls, navigating or sprinting across rugged terrain, and climbing up ropes and ladders) in full fighting load, while carrying equipment such as crew-served weapons. Among the armor crewmen, several frequently mentioned tasks not represented by the survey were 1) performing manual track maintenance on tracked vehicles (e.g., replacing sections and entire sides of the track, replacing track pads, and replacing a track support chain) and transporting the materials necessary to perform these tasks, 2) installing, removing and transporting tracked vehicle road wheels, and 3) tracked vehicle engine service and maintenance tasks (e.g., checking oil levels, servicing the breech, and servicing v-packs). Tables 39 and 40 above reference several other tasks mentioned by the scouts and crewmen that were not addressed by the JAQ.

Questionnaires and surveys are by their very nature slow and time-consuming methods of information collection. The entire process of survey research design, survey preparation, distribution, completion, data analysis, report preparation, and distribution of findings may span months or even years. Job analysis using such methods can obtain accurate and helpful information, but the time involved in the survey process allows the jobs being analyzed to change to a possibly considerable extent. It is quite possible that the 19 Series MOSs being addressed in this report may have changed to some degree during

the survey process, and may now contain a number of aspects not originally identified in this study. These aspects may need to be considered and addressed during the process of developing proxy measures for selection, as well as during the process of upgrading the appropriate training programs.

Strengths and Limitations of this Research

The three survey studies discussed in this report were designed with the following strengths.

- 1) The surveys used in this research were designed using best practices for survey development, including the writing and scaling of items based on the combined experience of 20 SMEs and observations of job performance conducted by several research scientists. Many item response sets were quantified as appropriate, and supplemental items were used to gather qualitative information concerning many of the tasks.
- 2) The entire population of Army cavalry scouts and armor crewmen (a total of 17,950 Soldiers) was provided the opportunity to respond to the surveys, rather than only a sample of these Soldiers.
- 3) Survey content was distributed over three surveys, to increase the number of fully completed surveys and the focused attention of Soldiers while completing them.
- 4) Surveys were administered by computer to maximize sample size, ease of use, and ease of data compilation and transfer.

This research is also limited in the following ways:

- 1) The response rates in this research were low (i.e., 9.3%, 7.0%, and 1.8% respectively for the 19D-specific, 19K-specific, and Common Task JAQs). Thus, there may be a moderate to high likelihood that some results do not well represent the cavalry scout and armor crewman populations as a whole. Further, due to the study survey procedures, those conducting this research had no way to compare respondents to non-respondents.
- 2) Despite the customization of many items to the cavalry scout and armor crewman MOSs, a large percentage of the JAQ items were of necessity written generically to ensure comparability of

responses from Soldiers in many Army MOSs. This may have affected the quality of some item responses.

- 3) This survey was web-administered, and thus participants had limited opportunity to seek feedback about question intent. This may have affected the appropriateness of some item responses. For example, participants may have overlooked the units of distance being asked and thus responded in feet or yards when the unit being requested was miles. Task importance ratings were made on the following unanchored scale: “Very little importance” to the performance of my MOS, “Some importance,” “Important,” “Very important,” and “Extremely important.” Thus, these response options may represent different meanings or levels of importance to different subjects.

Recommendations

The question can now fairly be asked based on these highlighted results: Is the Army adequately preparing cavalry scouts and armor crewmen for their jobs? If not, then 19 Series training programs may need to be comprehensively assessed and to some extent modified. Results indicated that cavalry scouts spent nearly 82% of their deployment time performing physically demanding work (i.e., physical training, tactical movements & patrols, loading and unloading supplies and equipment, physically demanding tasks common to many combat arms jobs, and MOS-specific tasks such as loading missiles into weapon systems) as opposed to less than 65% of their time performing such work during garrison or training. The corresponding figures among armor crewmen are over 78% of deployment time and about 60% of their time in garrison and training settings, respectively. Perhaps more importantly, among cavalry scouts about 125% more time was reported to have been spent conducting tactical movements, foot marches and patrols during combat deployments than in garrison or training settings (i.e., about 26% and slightly under 12% respectively). Armor crewmen said they spent about 245% more time conducting foot movements and patrols during combat deployments than in garrison or training settings (i.e., nearly 23% and slightly under 7% respectively). It is understandable that dismounted tactical movements would be conducted less in garrison and training settings than during combat deployments, given the demands of the task and high

risk of injury. However, these reported differences are substantial and probably larger than ideal. Overall, it appears that the training engaged in by cavalry scouts and armor crewmen may not be optimally preparing them for the physical demands of combat deployments. It also appears that expectations of performance are not being passed on to each and every Soldier.

A maxim and doctrinal summary statement often put forward in Army training settings is that the Army should “train as it fights.” The results of these three questionnaires completed by a total of well over 900 Soldiers in the cavalry scout and armor crewman MOSs (the total number depending on the number of armor crewmen who completed both the common and 19K-specific surveys) indicate that perhaps cavalry scouts and armor crewmen do not train as they fight. It would certainly seem that they should perform in garrison or training settings the tasks that they will encounter during a combat deployment. It also certainly seems that they should have at least some experience in all or nearly all of the tasks they are expected to perform in combat scenarios, particularly those that are the most important to success in their jobs. Following are three major/general recommendations suggested from this data:

- 1) Regular standardized assessments of cavalry scout and armor crewman training programs could be conducted to determine what common and 19 Series-specific tasks and capabilities will be emphasized or downplayed to reflect actual performance in combat settings. As force size changes and enemies are encountered in different theaters of operation, changes in training programs are also needed and thus the degree to which these tasks are emphasized in training programs may also need to change. Further, new tasks and demands are occasionally encountered and may need to be incorporated into training doctrine and scenarios. Information pertaining to task participation could be gathered from recently deployed Soldiers, and lessons learned could be used to identify the physically demanding tasks that are more important and frequently performed.
- 2) More time may need to be spent performing certain tasks in garrison settings. For example, based on this survey data, tactical marches and patrols are being performed by 19 Series Soldiers more than twice as often in theater than they are in garrison and training settings (well over three times

as often in the case of 19Ks). Further, a large percentage of the respondents said that they had never pulled a casualty from a commander's seat through the top hatch of a wheeled vehicle, despite the fact that this was rated one of the most important tasks to job success. On a more general level, most of the respondents said that in the last two years they had not performed one or more of the tasks represented in this study.

- 3) A dedicated follow-up effort is recommended to ascertain that Soldiers are trained on each of the tasks represented in this study, perhaps along with others that were mentioned by Soldiers in their comments. Considering each of the tasks evaluated by SMEs as critical to job success, the percentages of JAQ respondents who reported that they had not performed the task ranged from 2% (not loading ammunition for the M2 .50 Cal Machine Gun onto an Abrams tank; not performing a dismounted tactical movement) to 27% (not evacuating a casualty from the top of a vehicle).

APPENDIX A

Common Task Ratings of the Individual 19D and 19K Samples

| Ratings of Frequencies with Which 19 Series Common Tasks are Performed (Percentages) | | | | | | | |
|--|-------------|-------|-------------|-----------|-----------|-------------|-----------|
| Task | MOS | Never | Only In IET | < 3 Times | 4-9 Times | 10-19 Times | 20+ Times |
| 1. Lift & Drag Casualty to Safe Position as Quickly as Possible | 19D (n=560) | 4.6 | 5 | 34.8 | 21.6 | 18.6 | 15.4 |
| | 19K (n=54) | 0 | 1.9 | 48.1 | 25.9 | 18.5 | 5.6 |
| 2. With Assistance Lift, Carry & Install Barrel of 25mm gun on BFV | 19D (n=558) | 17.9 | 22.4 | 24.9 | 7.7 | 6.5 | 20.6 |
| | 19K (n=54) | 96.3 | 1.9 | 1.9 | 0 | 0 | 0 |
| 3. Lift & Carry Ammo Cans from Supply Point to BFV | 19D (n=559) | 13.4 | 17.7 | 25 | 13.1 | 8.6 | 22.2 |
| | 19K (n=54) | 85.2 | 1.9 | 3.7 | 3.7 | 1.9 | 3.7 |
| 4. Throw a Hand Grenade | 19D (n=559) | 4.1 | 22.4 | 42.6 | 18.6 | 5 | 7.3 |
| | 19K (n=54) | 1.9 | 27.8 | 50 | 11.1 | 7.4 | 1.9 |
| 5. Use Shovel to Fill Sand Bags for Building Fighting Position | 19D (n=557) | 9.3 | 12.9 | 37 | 17.4 | 8.6 | 14.7 |
| | 19K (n=54) | 9.3 | 16.7 | 50 | 14.8 | 5.6 | 3.7 |
| 6. Lift & Carry Sandbags & Build Fighting Position | 19D (n=559) | 9.7 | 11.5 | 39.7 | 18.1 | 8.1 | 12.9 |
| | 19K (n=53) | 9.4 | 15.1 | 52.8 | 15.1 | 1.9 | 5.7 |
| 7. With Assistance Pull Casualty Through Top Hatch of Vehicle | 19D (n=560) | 26.8 | 12 | 37 | 15.4 | 4.5 | 4.5 |
| | 19K (n=53) | 34 | 3.8 | 34 | 26.4 | 1.9 | 0 |
| 8. Climb Over, Through, or Around Barbed Wire Obstacles | 19D (n=558) | 10.6 | 20.2 | 38.6 | 16.5 | 7.3 | 6.8 |
| | 19K (n=53) | 17 | 24.5 | 45.3 | 7.5 | 1.9 | 3.8 |
| 9. With Group, Lift, Carry & Connect Vehicle Tow Bar to Disabled Vehicle | 19D (n=559) | 9 | 4.3 | 29.2 | 28.1 | 14.7 | 14.7 |
| | 19K (n=54) | 24.1 | 1.9 | 35.2 | 22.2 | 13 | 3.7 |
| 10. Jack Up Vehicle & Remove Lug Nuts from Flat Tire | 19D (n=560) | 13.4 | 3.4 | 48.4 | 19.1 | 7.1 | 8.6 |
| | 19K (n=54) | 14.8 | 1.9 | 68.5 | 13 | 1.9 | 0 |

Ratings of Frequencies with Which 19 Series Common Tasks are Performed (Percentages)
(Continued)

| Task | MOS | Never | Only In IET | < 3 Times | 4-9 Times | 10-19 Times | 20+ Times |
|--|----------------|--------------|------------------------|-------------------------|----------------------|------------------------|----------------------|
| 11. With Assistance, Remove HMMWV Spare Tire, Roll, & Lift onto Axle of Disabled Vehicle | 19D (n=560) | 17.5 | 5.4 | 47 | 18.8 | 5.4 | 5.9 |
| | 19K (n=54) | 24.1 | 3.7 | 64.8 | 5.6 | 1.9 | 0 |
| 12. Manually Tighten Lug Nuts on Tire with Lug or Torque Wrench | 19D (n=560) | 13.6 | 3.4 | 48.8 | 18.5 | 6.8 | 8.8 |
| | 19K (n=54) | 14.8 | 0 | 68.5 | 7.4 | 5.6 | 3.7 |
| 13. As Part of Group of 4, Remove HMMWV Flat Tire & Lift into Back of Vehicle | 19D (n=560) | 22 | 4.3 | 47.7 | 16.1 | 5 | 4.8 |
| | 19K (n=53) | 22.6 | 1.9 | 66 | 5.7 | 3.8 | 0 |
| 14. Perform Dismounted Foot March or Tactical Movement | 19D (n=560) | 2 | 1.3 | 7 | 9.5 | 14.8 | 65.5 |
| | 19K (n=54) | 1.9 | 3.7 | 27.8 | 13 | 16.7 | 37 |
| 15. While Seated, Remove & Lift/Lower M242 Feeder Assembly on BFV 25mm Gun | 19D (n=559) | 22 | 22.4 | 22 | 8.6 | 8 | 16.9 |
| | 19K (n=54) | 96.3 | 1.9 | 1.9 | 0 | 0 | 0 |

| Others' Expectations Concerning Performance of 19 Series Common Tasks (Percentages) | | | |
|--|----------------|-----------|------------|
| Task | MOS | No | Yes |
| 1. Lift & Drag Casualty to Safe Position as Quickly as Possible | 19D (n=557) | 1.3 | 98.7 |
| | 19K (n=53) | 1.9 | 98.1 |
| 2. With Assistance Lift, Carry & Install Barrel of 25mm gun on BFV | 19D (n=556) | 7.2 | 92.8 |
| | 19K (n=54) | 94.4 | 5.6 |
| 3. Lift & Carry Ammo Cans from Supply Point to BFV | 19D (n=555) | 7.2 | 92.8 |
| | 19K (n=54) | 83.3 | 16.7 |
| 4. Throw a Hand Grenade | 19D (n=555) | 3.6 | 96.4 |
| | 19K (n=54) | 5.6 | 94.4 |
| 5. Use Shovel to Fill Sand Bags for Building Fighting Position | 19D (n=555) | 11.9 | 88.1 |
| | 19K (n=54) | 18.5 | 81.5 |
| 6. Lift & Carry Sandbags & Build Fighting Position | 19D (n=557) | 10.6 | 89.4 |
| | 19K (n=53) | 30.2 | 69.8 |
| 7. With Assistance Pull Casualty Through Top Hatch of Vehicle | 19D (n=557) | 6.3 | 93.7 |
| | 19K (n=53) | 20.8 | 79.2 |
| 8. Climb Over, Through, or Around Barbed Wire Obstacles | 19D (n=554) | 11.6 | 88.4 |
| | 19K (n=53) | 34 | 66 |
| 9. With Group, Lift, Carry & Connect Vehicle Tow Bar to Disabled Vehicle | 19D (n=557) | 7.2 | 92.8 |
| | 19K (n=53) | 17 | 83 |
| 10. Jack Up Vehicle & Remove Lug Nuts from Flat Tire | 19D (n=558) | 9.1 | 90.9 |
| | 19K (n=54) | 24.1 | 75.9 |
| 11. With Assistance, Remove HMMWV Spare Tire, Roll, & Lift onto Axle of Disabled Vehicle | 19D (n=558) | 10.8 | 89.2 |
| | 19K (n=54) | 18.5 | 81.5 |
| 12. Manually Tighten Lug Nuts on Tire with Lug or Torque Wrench | 19D (n=550) | 10.5 | 89.5 |
| | 19K (n=54) | 20.4 | 79.6 |

Others' Expectations Concerning Performance of 19 Series Common Tasks (Percentages)
(Continued)

| Task | MOS | No | Yes |
|---|----------------|-----------|------------|
| 13. As Part of Group of 4, Remove HMMWV Flat Tire & Lift into Back of Vehicle | 19D (n=553) | 14.3 | 85.7 |
| | 19K (n=53) | 25.9 | 74.1 |
| 14. Perform Dismounted Foot March or Tactical Movement | 19D (n=559) | 1.1 | 98.9 |
| | 19K (n=54) | 9.3 | 90.7 |
| 15. While Seated, Remove & Lift/Lower M242 Feeder Assembly on BFV 25mm Gun | 19D (n=547) | 11 | 89 |
| | 19K (n=54) | 98.1 | 1.9 |

| Importance Ratings of 19 Series Common Tasks (Percentages) | | | | | | |
|--|----------------|--------------------|-------------|------------------|-------------|------------------|
| Task | MOS | Very Little | Some | Important | Very | Extremely |
| 1. Lift & Drag Casualty to Safe Position as Quickly as Possible | 19D (n=550) | 2.7 | 8.4 | 20.5 | 21.5 | 46.9 |
| | 19K (n=53) | 0 | 1.9 | 15.1 | 32.1 | 50.9 |
| 2. With Assistance Lift, Carry & Install Barrel of 25mm gun on BFV | 19D (n=520) | 2.3 | 5 | 21 | 22.9 | 48.8 |
| | 19K (n=3) | 0 | 0 | 0 | 33.3 | 66.7 |
| 3. Lift & Carry Ammo Cans from Supply Point to BFV | 19D (n=517) | 3.3 | 5.6 | 26.7 | 24.8 | 39.7 |
| | 19K (n=9) | 22.2 | 0 | 22 | 0 | 56 |
| 4. Throw a Hand Grenade | 19D (n=538) | 3.5 | 11.3 | 25.7 | 24 | 35.5 |
| | 19K (n=51) | 9.8 | 19.6 | 39.2 | 11.8 | 19.6 |
| 5. Use Shovel to Fill Sand Bags for Building Fighting Position | 19D (n=491) | 6.3 | 19.6 | 26.5 | 20.6 | 27.1 |
| | 19K (n=43) | 14 | 23.3 | 27.9 | 23.3 | 11.6 |
| 6. Lift & Carry Sandbags & Build Fighting Position | 19D (n=498) | 3.8 | 18.3 | 29.7 | 20.9 | 27.3 |
| | 19K (n=37) | 8.1 | 27 | 27 | 21.6 | 16.2 |
| 7. With Assistance Pull Casualty Through Top Hatch of Vehicle | 19D (n=517) | 1.4 | 4.1 | 17.4 | 24.6 | 52.6 |
| | 19K (n=42) | 2.4 | 0 | 23.8 | 21.4 | 52.4 |
| 8. Climb Over, Through, or Around Barbed Wire Obstacles | 19D (n=493) | 5.7 | 18.3 | 30 | 19.9 | 26.2 |
| | 19K (n=36) | 13.9 | 36.1 | 19.4 | 16.7 | 13.9 |
| 9. With Group, Lift, Carry & Connect Vehicle Tow Bar to Disabled Vehicle | 19D (n=516) | 1.2 | 5.8 | 24.8 | 26 | 42.2 |
| | 19K (n=45) | 2.2 | 2.2 | 22.2 | 31.1 | 42.2 |
| 10. Jack Up Vehicle & Remove Lug Nuts from Flat Tire | 19D (n=502) | 3.6 | 11.2 | 33.1 | 22.9 | 29.3 |
| | 19K (n=41) | 9.8 | 19.5 | 29.3 | 29.3 | 12.2 |
| 11. With Assistance, Remove HMMWV Spare Tire, Roll, & Lift onto Axle of Disabled Vehicle | 19D (n=494) | 2.6 | 11.3 | 34.6 | 23.7 | 27.7 |
| | 19K (n=44) | 0 | 22.7 | 45.5 | 15.9 | 15.9 |

| Importance Ratings of 19 Series Common Tasks (Percentages) (Continued) | | | | | | |
|---|----------------|--------------------|-------------|------------------|-------------|------------------|
| Task | MOS | Very Little | Some | Important | Very | Extremely |
| 12. Manually Tighten Lug Nuts on Tire with Lug or Torque Wrench | 19D (n=494) | 3 | 10.1 | 37.2 | 23.7 | 25.9 |
| | 19K (n=43) | 2.3 | 23.3 | 34.9 | 23.3 | 16.3 |
| 13. As Part of Group of 4, Remove HMMWV Flat Tire & Lift into Back of Vehicle | 19D (n=473) | 4.2 | 15 | 38.5 | 18.6 | 23.7 |
| | 19K (n=39) | 5.1 | 33.3 | 35.9 | 17.9 | 7.7 |
| 14. Perform Dismounted Foot March or Tactical Movement | 19D (n=549) | 1.3 | 0.4 | 7.3 | 20 | 71 |
| | 19K (n=49) | 10.2 | 12.2 | 22.4 | 24.5 | 30.6 |
| 15. While Seated, Remove & Lift/Lower M242 Feeder Assembly on BFV 25mm Gun | 19D (n=486) | 0.8 | 2.5 | 20.4 | 27.4 | 49 |
| | 19K (n=2) | 0 | 0 | 0 | 50 | 50 |

| Ratings of Time Requirements (in Minutes) for 19 Series Common Tasks (Percentages) | | | | | | | |
|---|----------------|-----------------------|---------------------|----------------------|-----------------------|-----------------------|------------------------|
| Task | MOS | <1 Mins | 1-5 Mins | 6-10 Mins | 11-30 Mins | 31-60 Mins | >60 Mins |
| 1. Lift & Drag Casualty to Safe Position as Quickly as Possible | 19D (n=551) | 32.3 | 55.4 | 9.8 | 1.8 | 0.5 | 0.2 |
| | 19K (n=53) | 18.9 | 67.9 | 11.3 | 1.9 | 0 | 0 |
| 2. With Assistance Lift, Carry & Install Barrel of 25mm gun on BFV | 19D (n=517) | 25.9 | 44.7 | 19.1 | 8.3 | 1.2 | 0.8 |
| | 19K (n=3) | 33.3 | 0 | 66.7 | 0 | 0 | 0 |
| 3. Lift & Carry Ammo Cans from Supply Point to BFV | 19D (n=514) | 10.3 | 55.8 | 23.2 | 7.6 | 2.5 | 0.6 |
| | 19K (n=9) | 11.1 | 0 | 33.3 | 44.4 | 0 | 11.1 |
| 4. Throw a Hand Grenade | 19D (n=559) | 4.1 | 22.4 | 42.6 | 18.6 | 5 | 7.3 |
| | 19K (n=51) | 96.1 | 2 | 0 | 0 | 0 | 2 |
| 5. Use Shovel to Fill Sand Bags for Building Fighting Position | 19D (n=491) | 5.9 | 17.7 | 9.4 | 18.7 | 22.4 | 25.9 |
| | 19K (n=43) | 0 | 23.3 | 9.3 | 18.6 | 27.9 | 20.9 |
| 6. Lift & Carry Sandbags & Build Fighting Position | 19D (n=498) | 4 | 21.1 | 14.5 | 17.9 | 19.1 | 23.5 |
| | 19K (n=37) | 2.7 | 21.6 | 13.5 | 13.5 | 16.2 | 32.4 |
| 7. With Assistance Pull Casualty Through Top Hatch of Vehicle | 19D (n=519) | 14.3 | 64.2 | 16.2 | 4 | 0.8 | 0.6 |
| | 19K (n=42) | 16.7 | 64.3 | 19 | 0 | 0 | 0 |
| 8. Climb Over, Through, or Around Barbed Wire Obstacles | 19D (n=491) | 18.7 | 53.4 | 19.8 | 6.3 | 1.2 | 0.6 |
| | 19K (n=35) | 11.4 | 62.9 | 22.9 | 2.9 | 0 | 0 |
| 9. With Group, Lift, Carry & Connect Vehicle Tow Bar to Disabled Vehicle | 19D (n=518) | 2.5 | 46.5 | 35.3 | 11.4 | 3.3 | 1 |
| | 19K (n=44) | 0 | 45.5 | 31.8 | 20.5 | 2.3 | 0 |
| 10. Jack Up Vehicle & Remove Lug Nuts from Flat Tire | 19D (n=491) | 18.7 | 53.4 | 19.8 | 6.3 | 1.2 | 0.6 |
| | 19K (n=41) | 2.4 | 7.3 | 43.9 | 39 | 7.3 | 0 |
| 11. With Assistance, Remove HMMWV Spare Tire, Roll, & Lift onto Axle of Disabled Vehicle | 19D (n=496) | 2.2 | 30.2 | 39.9 | 21.8 | 5 | 0.8 |
| | 19K (n=44) | 0 | 22.7 | 36.4 | 34.1 | 4.5 | 2.3 |

| Ratings of Time Requirements (in Minutes) for 19 Series Common Tasks (Percentages) (Continued) | | | | | | | |
|---|----------------|-----------------------|---------------------|----------------------|-----------------------|-----------------------|------------------------|
| Task | MOS | <1 Mins | 1-5 Mins | 6-10 Mins | 11-30 Mins | 31-60 Mins | >60 Mins |
| 12. Manually Tighten Lug Nuts on Tire with Lug or Torque Wrench | 19D (n=498) | 3.6 | 48 | 32.3 | 13.1 | 2.6 | 0.4 |
| | 19K (n=43) | 2.3 | 44.2 | 34.9 | 16.3 | 2.3 | 0 |
| 13. As Part of Group of 4, Remove HMMWV Flat Tire & Lift into Back of Vehicle | 19D (n=474) | 7.4 | 43.9 | 32.7 | 13.1 | 2.7 | 0.2 |
| | 19K (n=40) | 7.5 | 47.5 | 25 | 17.5 | 0 | 2.5 |
| 14. Perform Dismounted Foot March or Tactical Movement | 19D (n=549) | 0.2 | 0.4 | 2 | 4.2 | 13.7 | 84.6 |
| | 19K (n=49) | 0 | 2 | 4.1 | 6.1 | 10.2 | 77.6 |
| 15. While Seated, Remove & Lift/Lower M242 Feeder Assembly on BFV 25mm Gun | 19D (n=480) | 5.4 | 41.9 | 35.2 | 12.9 | 2.9 | 1.7 |
| | 19K (n=2) | 0 | 0 | 2 | 0 | 0 | 0 |

| Uniform Worn While Performing 19 Series Common Tasks (Percentages) | | | | | | | |
|--|-------------|----------|-----------------|--------------------|---------------------|----------|--------------|
| Task | MOS | Standard | Standard + Vest | Fight Load -Weapon | Fight Load + Weapon | Approach | EMR Approach |
| 1. Lift & Drag Casualty to Safe Position as Quickly as Possible | 19D (n=553) | 8 | 4.9 | 8.7 | 63.7 | 9.2 | 5.6 |
| | 19K (n=53) | 5.7 | 20.8 | 13.2 | 56.6 | 1.9 | 1.9 |
| 2. With Assistance Lift, Carry & Install Barrel of 25mm gun on BFV | 19D (n=514) | 40.7 | 38.5 | 8.9 | 10.9 | 0.4 | 0.6 |
| | 19K (n=3) | 3 | 0 | 0 | 0 | 0 | 0 |
| 3. Lift & Carry Ammo Cans from Supply Point to BFV | 19D (n=515) | 23.7 | 29.3 | 15.3 | 30.3 | 0.8 | 0.6 |
| | 19K (n=9) | 55.6 | 22.2 | 22.2 | 0 | 0 | 0 |
| 4. Throw a Hand Grenade | 19D (n=539) | 2.2 | 0.9 | 17.8 | 70.3 | 5.2 | 3.5 |
| | 19K (n=51) | 5.9 | 9.8 | 11.8 | 70.6 | 0 | 2 |
| 5. Use Shovel to Fill Sand Bags for Building Fighting Position | 19D (n=492) | 29.1 | 4.3 | 30.1 | 33.9 | 1.6 | 1 |
| | 19K (n=43) | 25.6 | 9.3 | 27.9 | 34.9 | 2.3 | 0 |
| 6. Lift & Carry Sandbags & Build Fighting Position | 19D (n=500) | 26 | 3.8 | 26.4 | 41.8 | 1.6 | 0.4 |
| | 19K (n=37) | 18.9 | 13.5 | 29.7 | 35.1 | 2.7 | 0 |
| 7. With Assistance Pull Casualty Through Top Hatch of Vehicle | 19D (n=522) | 5 | 19.7 | 24.3 | 48.9 | 1.3 | 0.8 |
| | 19K (n=41) | 4.9 | 36.6 | 26.8 | 31.7 | 0 | 0 |
| 8. Climb Over, Through, or Around Barbed Wire Obstacles | 19D (n=493) | 10.3 | 2.8 | 7.7 | 70.2 | 6.3 | 2.6 |
| | 19K (n=35) | 8.6 | 11.4 | 11.4 | 62.9 | 2.9 | 2.9 |
| 9. With Group, Lift, Carry & Connect Vehicle Tow Bar to Disabled Vehicle | 19D (n=519) | 10.2 | 8.1 | 22.2 | 57.2 | 1.5 | 0.8 |
| | 19K (n=45) | 6.7 | 20 | 31.1 | 42.2 | 0 | 0 |
| 10. Jack Up Vehicle & Remove Lug Nuts from Flat Tire | 19D (n=507) | 29.8 | 11 | 30.4 | 27.4 | 0.8 | 0.6 |
| | 19K (n=41) | 43.9 | 17.1 | 22 | 17.1 | 0 | 0 |

Uniform Worn While Performing 19 Series Common Tasks (Percentages) (Continued)

| Task | MOS | Standard | Standard + Vest | Fight Load - Weapon | Fight Load + Weapon | Approach | EMR Approach |
|---|----------------|-----------------|----------------------------|------------------------------------|------------------------------------|-----------------|-------------------------|
| 11. With Assistance, Remove HMMWV Spare Tire, Roll, & Lift onto Axle of Disabled Vehicle | 19D (n=496) | 29 | 7.5 | 30.8 | 30.8 | 1.2 | 0.6 |
| | 19K (n=44) | 43.2 | 6.8 | 31.8 | 18.2 | 0 | 0 |
| 12. Manually Tighten Lug Nuts on Tire with Lug or Torque Wrench | 19D (n=498) | 31.3 | 8.4 | 31.1 | 27.9 | 0.8 | 0.4 |
| | 19K (n=43) | 48.8 | 11.6 | 23.3 | 16.3 | 0 | 0 |
| 13. As Part of Group of 4, Remove HMMWV Flat Tire & Lift into Back of Vehicle | 19D (n=475) | 29.7 | 7.8 | 30.7 | 30.7 | 0.8 | 0.2 |
| | 19K (n=39) | 41 | 5.1 | 28.2 | 25.6 | 0 | 0 |
| 14. Perform Dismounted Foot March or Tactical Movement | 19D (n=551) | 1.6 | 0.9 | 2.9 | 32.5 | 29 | 33 |
| | 19K (n=49) | 0 | 2 | 12.2 | 32.7 | 24.5 | 28.6 |
| 15. While Seated, Remove & Lift/Lower M242 Feeder Assembly on BFV 25mm Gun | 19D (n=483) | 23 | 55.1 | 11 | 10.8 | 0.2 | 0 |
| | 19K (n=2) | 50 | 0 | 50 | 0 | 0 | 0 |