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INDIVIDUAL LOAD CARRIAGE FRONT END ANALYSIS WARFIGHTER FEEDBACK

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14. ABSTRACT Natick Soldier Research, Development and Engineering Center (NSRDEC), now the Combat Capabilities Development Command (CCDC), in partnership with Product Manager – Soldier Clothing and Individual Equipment (PM-SCIE), collected Individual Load Carriage Front End Analysis data with 2,645 Soldiers at 11 locations. The objectives were to determine Soldier perspectives on current load carriage challenges, particularly of equipment carried by the individual Soldier; prioritize focus area for future research and equipment development; and provide recommendations for improvements when sufficient data allowed. All participants completed a load carriage survey that covered spending on equipment, compatibility, requests for improvement, weapons, body armor systems, rucksacks, load carriage vests, belts/sub-belts, hydration equipment and pouches. A subset of 218 Soldiers, identified as experts, provided additional feedback on attributes, importance prioritization and trade-offs between body armor and rucksacks. Focus groups were conducted with 242 Soldiers representative of the total population surveyed and captured qualitative data not covered on the surveys in the areas of prioritization of load carriage challenges, identification of needs for specialized load carriage equipment, access to and awareness of existing equipment and training on the features of adjustability of load carriage equipment. Findings revealed Soldiers are not fully aware of or experience challenges in obtaining new or even existing equipment. Participants reported inadequate training on load carriage equipment, particularly on adjustment features. Many reported sub-optimal fit of body armor from Central Issuing Facilities (CIFs), with improper sizing as challenge area. The most important attributes of body armor were mobility/ease of movement and weight of the body armor with hard plates, followed by durability and adjustability to fit body armor to individual torso size. For rucksacks, the most important attributes were compatibility with body armor and ability to distribute load between the shoulders and hips, followed by adjustability of shoulder straps, waist belt and frame fitting torso size and durability.						
15. SUBJECT TERMS FIT AGILITY INFANTRY FOCUS GROUPS IMPROVEMENTS DISMOUNTED SOLDIER VESTS PRESSURE BACKPACKS TEST METHODS LOAD CARRIAGE SHOULDERS(ANATOMY) TORSO MOBILITY RUCKSACKS COMPATIBILITY ARMY PERSONNEL TEST AND EVALUATION WEIGHT SURVEYS BODY ARMOR DEMOGRAPHICS RANGE OF MOTION FRONT END ANALYSIS DESIGN POUCHES COMPARISON PERFORMANCE(HUMAN) LOAD CARRYING EQUIPMENT MOTION COMFORT LOADS(FORCES) MOLLE(MODULAR LIGHTWEIGHT LOAD CARRYING EQUIPMENT)						
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EXECUTIVE SUMMARY

From January 2016 to September 2016, a total of 2,645 Soldiers from 11 locations participated in the Individual Load Carriage Front End Analysis data collection lead by the Natick Soldier Research Development and Engineering Center (NSRDEC) in partnership with Product Manager – Soldier Clothing and Individual Equipment (PM-SCIE). The goal of the Individual Load Carriage Front End Analysis was to collect data from Soldiers to characterize their perspectives on what load carriage challenges they currently face with a focus on equipment carried by the individual Soldier, to prioritize focus areas for future research and equipment development, and to provide recommendations for improvements whenever the data were sufficient to do so.

Data were collected using three techniques:

1. Load Carriage Survey – completed by 2,645 Soldiers covering the following:
 - Demographics
 - Individual Spending on Load Carriage Equipment
 - Equipment Compatibility
 - Equipment Improvement Requests
 - Weapons
 - Body Armor Systems
 - Rucksacks
 - Load Carriage Vests
 - Belts/Sub-belts
 - Hydration Equipment
 - Pouches
2. Expert Choice Survey – completed by 218 Soldiers selected from the 2,645 total population based on high levels of experience i.e. rank, years of service, deployment experience covering the following:
 - Attributes of body armor prioritized by importance using ranking and rating data
 - Attributes of rucksacks prioritized by importance using ranking and rating data
 - Trade-offs between attributes of body armor
 - Trade-offs between attributes of rucksacks
3. Focus Groups – completed by 242 Soldiers selected from the 2,645 total population based on representative samples of the total population during 23 1-hour focus groups each with 8–12 Soldiers. When available, focus groups were conducted with targeted demographics, e.g. all females, all medics, all infantry. Focus groups were designed to mine qualitative data both on anticipated challenge spaces and unanticipated challenge spaces that the surveys may not have captured including the following:
 - Prioritization of load carriage challenges
 - Identification of needs for specialized load carriage equipment
 - Access to and awareness of existing equipment
 - Training on features of adjustability of load carriage equipment

The tables below display ranks of Soldiers that participated in the three data collection techniques:

- 92.5% of ranks of the total population ranged from E-2 to E-6
- 83.9% of ranks of the focus group population ranged from E-3 to E-6
- 89.9% of ranks of the expert choice survey population ranged from E-4 to E-7

Table ES-1. Total Population Ranks

Total Population			92.5%
Rank	N	%	
E-1	75	2.8	
E-2	294	11.1	
E-3	562	21.2	
E-4	1096	41.4	
E-5	356	13.5	
E-6	139	5.3	
E-7	47	1.8	
E-8	9	0.3	
O-1	15	0.6	
O-2	39	1.5	
O-3	12	0.5	
WO-2	-	-	
Blank	1	0.0	

Table ES-2. Focus Group Population Ranks

Focus Group Population			83.9%
Rank	n	%	
E-1	1	0.4	
E-2	2	0.8	
E-3	28	11.6	
E-4	92	38.0	
E-5	54	22.3	
E-6	29	12.0	
E-7	5	2.1	
E-8	1	0.4	
O-1	1	0.4	
O-2	7	2.9	
O-3	7	2.9	
WO-2	2	0.8	
Blank	13	5.4	

Table ES-3. Expert Choice Survey Population Ranks

Expert Choice Survey			89.9%
Rank	n	%	
E-1	-	-	
E-2	4	1.8	
E-3	-	-	
E-4	21	9.6	
E-5	116	53.3	
E-6	45	20.6	
E-7	14	6.4	
E-8	1	0.5	
O-1	4	1.8	
O-2	11	5.0	
O-3	-	-	
WO-2	1	0.5	
Blank	1	0.5	

The table below summarizes all units that participated in the Individual Load Carriage Front End Analysis:

Table ES-4. Participating Army Units

Major Army Installation	Participating Army Units	Total Survey Respondents		Expert Choice Survey Respondents	Focus Groups Conducted (8-12 TPs per group)
		N	%	n	n
Ft. Bliss, TX	1st ABCT 1st AD 1-36 IN 4-17 IN 1st Sustainment Brigade (formerly 15 th) 4 th FMSU 4 th BSB	301	11.4	66	3
Ft. Drum, NY	1st BCT, 10th MTN DIV 2-22 IN 3-6 FA 10 BSB 3d BCT 10th Mountain 1-32 (3d BCT)	284	10.7	-	3
JBER, AK	4th BCT, 25th ID 1-40 CAV 1-501 PIR 2-377 PFAR 6 BEB 725 BSB 545 MP Co 673 Dental (DENTAC)	281	10.6	20	3
Fort Hood, TX	Unit data not available	264	10.0	-	3
Ft. Carson, CO	1st SBCT, 4th ID 1-38 IN 1-4 BSB 2-23 IN 4-4 ARB	264	10.0	73	-
Ft. Riley, KS	1st ABCT, 1st ID 2-34 AR 1-16 IN 1-5 FA 3-66 AR 1 ENG BN 101 BSB	246	9.3	11	1
Fort Stewart, GA	Unit data not available	232	8.8	-	3
JBLM, WA	62 MED BDE 47 th CSH 218 MDVSS 520 th AMSC 98 th CSC 102 FST 153 rd BSD 211 CTC 250 FST 54 MP CO 593 ESC 63 ORD 42nd MP BDE 13 th CSSB 508 MP BN 504 MP CO 170 MP CO 51 MP CO 571 MP CO 13th CSSB 542 SMC 513 TRANS CO 523 CTC	231	8.7	48	1
Schofield Barracks, HI	2d IBCT, 25ID 65 th BEB 1-14 IN 3d IBCT, 25 ID 2-27 th IN 2-35 IN 3-4 CAV	196	7.4	-	3
Fort Bragg, NC	Unit data not available	181	6.8	-	3
JRTC, LA	1st BN (ABN) 509th IN 3rd BCT 10th MTN DIV	165	6.3	-	-
Total	-	2645	100	218	23

RESULTS SUMMARY

FOCUS GROUP RESULTS SUMMARY

Prevalent themes included the following:

- Soldiers are either unaware of new/existing equipment or are aware of it and have difficulty getting access existing equipment. The problem highlighted here is that even if optimal equipment is developed, Soldiers that are not aware or do not have access to new equipment receive none of the benefits. Further investigation is required by stakeholders to determine the best path forward to increase awareness and access of new equipment/capabilities to end users.
- Inadequate training on how to use load carriage equipment, particularly adjustment features. Soldiers concurred that standardized training videos provided by the Army would be well received. Suggestions included the following: include link to the video on the equipment tag/fabric, 3–5 min video provided by a lead engineer as well as a fellow Soldier with a focus on adjustability features and performance features with an emphasis on positive impact of ‘best fit’
- Sub-optimal fit of body armor from Central Issuing Facilities (CIFs). The problem highlighted here is that if a Soldier is issued the wrong size equipment, their performance will suffer significantly. There is little recourse available to Soldiers to be reassigned properly sized equipment. Further investigation is required by stakeholders to determine the best path forward to address how CIFs issue equipment to Soldiers.
- Body armor shoulder straps and rucksack shoulder straps are incompatible. Typically, rucksack shoulder straps drift out and off of the shoulders when on top of body armor shoulder straps, reducing range of motion of the arms and causing numbness down the arms and into the hands. Recommend the development of rucksack shoulder straps and body armor shoulder straps simultaneously with a focus on compatibility.
- Medics, Assistant Gunners and Indirect Fire Infantrymen have unique load carriage requirements. The limitation of this data collection can only identify that there is a unique load carriage requirement for these user groups, and that further investigation with these user groups is warranted.

EXPERT CHOICE SURVEY RESULTS SUMMARY

- *Mobility/Ease of movement* and *Weight of body armor with hard plates* are the two most important attributes of body armor
- *Durability* and *Adjustability to fit body armor to individual torso size* are in the second most important category for attributes of body armor
- The majority of Soldiers (69%) indicated they would rather have a smaller area of ballistic protection in order to have increased mobility
- Over three-quarters of Soldiers (78.3%) indicated they would rather have a complex design that supported high adjustability for body armor
- In two scenarios where IED threats are high and IED threats are low, a plate carrier is the desired level of protection for over 50% of the expert choice survey population (over 70% for when IED threats are low)
- *Compatibility with body armor* and *Ability to distribute load between shoulders and hips* are the two most important attributes of rucksacks according to the expert choice survey population
- *Adjustability of shoulder straps, waist belt and frame to fit torso size* and *Durability* are in the second most important category for attributes of rucksacks
- Nearly 75% of Soldiers expressed a preference for higher storage capacity at the cost of increase weight
- Over 80% of test participants (TPs) expressed a preference for high adjustability of rucksacks at the cost of complex design

LOAD CARRIAGE SURVEY RESULTS SUMMARY

- Equipment improvement requests:
 - Rucksack and body armor shoulder straps are priority to improve; more padding and better compatibility so that the rucksack shoulder straps don't slip over body armor shoulder straps, restricting range of motion of the arms
 - Load carriage equipment designed for females, e.g. smaller frames, shoulder straps that are closer together/more narrow, design that conforms to chest and hips
 - Cut outs in body armor shoulder pockets to better accommodate butt stocks for improved target acquisition
 - Redesign of rucksack waist-belts to better accommodate body armor
- Compatibility:
 - The two most frequently reported compatibility challenges (each over 50% of the total population) were for the following pairings of attributes:
 - Rucksack shoulder straps & acquiring a target
 - Rucksack shoulder straps & body armor
 - The following five pairings were reported as having compatibility problems by 38–42% of the total population:
 - Rucksack frame & rear ballistic plate
 - Rucksack waist-belt & fighting load
 - Acquiring a target & body armor
 - Rucksack shoulder straps & fighting load
 - Rucksack & tube hydration
 - The following five pairings were reported as having compatibility problems by 30–34% of the total population:
 - Rucksack waist-belt & lower soft armor
 - Body armor quick release & rucksack shoulder straps
 - Quick release shoulder buckle & rucksack shoulder straps
 - Rucksack waist-belt & secondary belts/sub-belts
 - Body armor quick release & fighting load/chest rig
- Equipment Sections:
 - Weapons & Slings
 - The M-4A1 Rifle/M-16A2 Rifle are carried by approximately 90% of Soldiers both during deployments and when not deployed.
 - The following weapons are carried 15–25% more frequently during deployments than when not deployed: 9mm Pistol, SAW, M-240, M-320 Grenade Launcher, M-203 Grenade Launcher, Shotgun and AT-4.
 - Weapon sling preferences between 1-point, 2-point and 3-point are all within 15% of each other, with 2-point slings preferred by 33% of Soldiers, 1-point preferred by 21%, and 3-point preferred by 18%.
 - Pistols & Holsters
 - Of the 2,645 Soldiers, only 15% (n=402) reported carrying pistols; approximately 25% of these Soldiers' MOSs are 19K (M1 Armor Crewman) and 11B (Infantryman). Note that there are only eight Soldiers who reported that they are Military Police; all eight MPs reported that they carry a pistol.
 - Of the 15% of the total population (n=402) that carry a pistol generally, 56% lanyard their pistol
 - Of the 15% of the total population (n=402) that carry a pistol generally, opinions on the importance for holsters to accommodate mounted sites, lasers, silencers etc. range from *not at all important* (32.6%) to *critically important* (9.0%) with 40% indicating this accommodation is *slightly/moderately important*

- Nearly half of these Soldiers (41%) indicate that a faster draw capability is *more important* than protection from the elements; 36% find them to be equally important; 10% indicate protection from the elements is more important than faster draw capability
 - Holster location preferences are comparable with 37% preferring hip/waist/belt, 32% preferring drop leg/thigh, and 20% preferring the chest
 - Of the 15% of the total population (n=402) that carry a pistol generally, less than half (n=164) reported carrying a pistol in combat on their last deployment
 - Of those 164 Soldiers that carried a pistol in combat, nearly 75% used a Black Hawk Serpa holster
 - Of those 164 TPs that carried a pistol in combat, 40% drew their pistol in combat on their last deployment
- Body Armor
- Improved Outer Tactical Vest (IOTV) Gen III is the most consistently worn body armor during deployments and when not deployed (by 35–45% of TPs)
 - The Solder Plate Carrier System (SPCS) is worn nearly just as often as IOTV Gen III during deployments (~45%), but is worn significantly less often when not deployed (by only 5–15% of TPs)
 - Auxiliary protection equipment was worn significantly more often when deployed than when not deployed:
 - Groin protector: 38% during deployments, ~15% when not deployed
 - Collar/yoke: 36% during deployments, ~15% when not deployed
 - DAPS: 23% during deployments, <5% when not deployed
 - PUG: 13% during deployments, <2% when not deployed
 - POG: 10% during deployments, <2% when not deployed
 - The SPCS is the most preferred body armor by over 35% of Soldiers; the second most preferred body armor is the IOTV Gen III by 15% of Soldiers
 - Individual body armor preferences were primarily driven by the following four attributes: Mobility/Agility (60%), Comfort (52%), Range of Motion (49%) and Weight (45%)
 - Individual body armor preferences were secondarily driven by the following: ability to effectively distribute load (19%), compatibility with other load carriage items (16%), area of coverage/protection (12%) and cost (<5%)
 - The SPCS and commercial body armor (all commercial body armor users combined) were the two most preferred body armor systems for the attributes of mobility/agility, comfort, range of motion and weight
 - Thirty percent of females prefer the Female IOTV compared to <1% of males. It is important to note that females only make up 7% of this test population. Focus group data revealed that very few females have had the opportunity to use the Female IOTV but have all anecdotally heard high praise from females that had used it. The females that had used the Female IOTV in these focus groups described it as the best body armor they had worn, citing improved fit particularly around the hips and chest.
 - In a scenario where IED threats are low and direct fire threats are high, 70% of Soldiers prefer less area of coverage in their body armor for increased mobility; In this same scenario, 70% of males also prefer less area of coverage for increased mobility compared to females who are nearly evenly split (55% more area of coverage for increased protection and 45% less area of coverage for increased mobility)
 - In a scenario where IED threats are high and direct fire threats exist, nearly 60% prefer more area of coverage in their body armor for increased protection; In this

same scenario, nearly 60% of males and over 75% of females also prefer more area of coverage in their body armor for increased protection

- Twenty percent of TPs use their body armor quick release mechanism to doff their body armor for convenience; 80% of these TPs feel that this convenience usage gives them more confidence in using their quick release in an emergency
- Less than 5% of the total population have used their quick release mechanism in an emergency to doff their body armor

➤ Rucksacks

- The MOLLE large is the most frequently used rucksack both when deployed and when not deployed by 80–85% of Soldiers
- The MOLLE assault pack is used by nearly 70% of Soldiers during deployments, ~55% when not deployed
- The MOLLE medium is used significantly more during deployments (by 55%) than when not deployed (by 20–30%)
- Seventy-five percent of Soldiers indicated that they can stand up straight when carrying the MOLLE assault pack; 25% indicated they can stand up straight when carrying the MOLLE medium; only 13% indicated they can stand up straight when carrying the MOLLE large
- Over 50% of Soldiers indicated that they need to lean forward slightly when carrying the MOLLE large; 25% indicated they need to lean forward significantly when carrying the MOLLE large
- The MOLLE large is preferred by nearly 50% of Soldiers for 72+ hour missions and by 33% for 24–72 hour missions; The MOLLE assault pack is preferred by nearly 40% of Soldiers for 1–12 hour missions and by 25% of Soldiers for 12–24 hour missions
- The MOLLE medium is preferred less than the MOLLE large for longer missions and less than the MOLLE assault pack for shorter missions with the exception of 12–24 hour missions where the MOLLE medium and MOLLE assault pack are preferred nearly equally (by ~25% of Soldiers)
- Nearly 50% of Soldiers indicated that if the Army were to issue a new rucksack to meet a capacity need that is not currently being met, that they would prefer a capacity between the MOLLE large and the MOLLE medium
- Twenty-five percent of Soldiers indicated that the currently issued rucksacks *do not* provide enough flexibility to meet operational needs
- When considering what items to pack for a 72 hour mission, a combined 45% of Soldiers indicated that they are either *not at all confident* or *slightly confident* in resupply; a combined 45% of Soldiers indicated that they are either *moderately confident* or *very confident* in resupply (10% of Soldiers indicated that this question does not apply to them)
- Soldiers were nearly evenly split on the idea having more access points to their main rucksack compartment at a higher durability risk (52%) compared to having fewer access points at a lower durability risk (47%)

➤ Load Carriage Vests

- Load carriage vest usage varies depending on whether Soldiers are deployed or not
- While the fighting load carrier (FLC) is the most frequently used vest (by 50–65% of Soldiers), it is used 15% less frequently when deployed (50%) than when not deployed (65%)
- Using no load carriage vest (mounting pouches directly to body armor) is more common during deployments (by 45% of Soldiers) than when not deployed (30%)

- The tactical assault panel (TAP) is used by 35% of Soldiers during deployments, but only by 10% when not deployed
- Commercial chest rigs are used by 10% or fewer Soldiers during deployments and when not deployed
- ALICE belt/suspenders are used by 10% of Soldiers when deployed but by less than 3% when not deployed
- One-quarter of Soldiers expressed no preference for any load carriage vest; 25% prefer not to wear a load carriage vest; 23% prefer the FLC; 14% prefer the TAP (note that focus group data supports that many Soldiers would like to use the TAP but do not have access to TAPs)
- The FLC supports users' operational needs better when worn without body armor compared to when worn *with* body armor; 75% indicated the FLC meets their operational needs when worn without body armor compared to only 50% indicating the FLC meets their operational needs when worn *with* body armor
- Belts/Sub-Belts
 - The majority of Soldiers (75%) have no preference for belts/sub-belts; however it is important to note from focus group data that secondary belts for load carriage are a relatively new concept for Soldiers, and those that have used secondary belts expressed that they are a key enabler to reduce bulk on the torso and achieve a flatter, slimmer profile by carrying equipment lower on the torso
 - One-third of Soldiers indicated that they *do* want secondary belts for load carriage equipment
 - Over 80% of Soldiers *do not* want ballistic protection incorporated into secondary belts at the cost of increased weight/bulk
- Hydration Equipment
 - The tube hydration system is the most frequently used piece of hydration equipment both during deployments and when not deployed (83–93% of Soldiers)
 - The one quart canteen is used by 43–53% of Soldiers during deployments and when not deployed
 - Disposable water bottles are used significantly more during deployments (by 55% of Soldiers) compared to when not deployed (25–30%)
 - Nalgene type hydration equipment are consistently used during deployments and when not deployed by ~17% of Soldiers
 - The tube hydration system is preferred by over 50% of Soldiers; all other hydration equipment is preferred by less than 10% each of Soldiers
 - Disposable water bottles are preferred by 24% of females compared to 14% of males
 - The attribute *volume of water* was the most frequently selected (by 50% of Soldiers) when asked which attributes were driving their preference for hydration equipment
- Pouches
 - M4 magazine pouches are the most frequently used pouch (by 86.5% of Soldiers)
 - Canteen pouches and hand grenade pouches are used by 69.6% and 63.8% of Soldiers respectively
 - The original IFAK and IFAK II are used by 49.1% and 42.2% of Soldiers respectively

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INDIVIDUAL LOAD CARRIAGE FRONT END ANALYSIS WARFIGHTER FEEDBACK

INTRODUCTION

The current Modular Lightweight Load-carrying equipment (MOLLE) has been in the field for over 15 years without a thorough assessment of the current and future load carriage needs of the Army being conducted. Rapid development and deployment of load carriage components and systems combined with integration requirements of body armor and other organizational and individual equipment significantly contribute to the overall load management challenge at the individual and squad level. The availability, purchase and use of commercial off the shelf (COTS) alternatives contribute to the complexity of this challenge space.

As a result, US Army Natick Soldier Center Research Development and Engineering Center (NSRDEC) in collaboration with the Product Manager – Soldier Clothing and Individual Equipment (PM-SCIE) initiated a comprehensive systems analysis of the current load bearing needs of the US Army from the Soldier's perspective.

From January 2016 to September 2016, 2,645 Soldiers from 11 locations participated in the Individual Load Carriage Front End Analysis data collection.

FOCUS GROUP METHODS DEMOGRAPHICS & RESULTS

TEST METHODS

To support the data collection for the Individual Load Carriage Front End Analysis, 300 Soldiers from 11 locations were requested. Focus groups were planned to be conducted with 10% of the total population. At each location, three 1-hour focus groups with 8–12 Soldiers each were planned to be conducted to achieve this.

Soldiers were selected to participate in the focus groups based on gender, rank and Military Occupational Specialty (MOS) from the available group of Soldiers that supported the load carriage survey with the overall goal of being generally representative of the survey population. When sufficient Soldiers were available, focus groups were conducted with specific user communities, e.g. all females, all medics, all infantry.

The goal of these focus groups was to mine qualitative data from a sub-set of the total population to discover prevalent themes of Soldiers' needs with regard to load carriage equipment. These focus groups were intended to be wide in scope in order to capture insights that could not be anticipated with a paper and pencil survey.

LIMITATIONS

Due to the limited time available at each data collection site (3 hour total for surveys and focus groups), focus group participants were selected primarily based on availability, and secondarily based on gender, rank and MOS. Due to the wide scope of interest and nature of qualitative data collection, only prevalent themes from these focus groups were focused on. Some specialty areas that only applied to a small minority of these participants may not be adequately represented in these data. As such, these qualitative findings are not exhaustive, but are limited to prevailing themes that are broadly applicable to load carriage. Note that some findings are specific to females, medics, assistant gunners and indirect fire infantrymen as prevalent themes did emerge within these sub-groups.

DEMOGRAPHICS

Supporting Units

Table 1 displays all units that participated in the focus groups.

Table 1. Participating Army Units in Focus Groups

Major Army Installation	Participating Army Units	Focus Groups Conducted (8–12 TPs per group)
		n
Ft. Bliss, TX	1st ABCT 1st AD 1-36 IN 4-17 IN 1st Sustainment Brigade (formerly 15 th) 4 th FMSU 4 th BSB	3
Ft. Drum, NY	1st BCT, 10th MTN DIV 2-22 IN 3-6 FA 10 BSB 3d BCT 10th Mountain 1-32 (3d BCT)	3
JBER, AK	4th BCT, 25th ID 1-40 CAV 1-501 PIR 2-377 PFAR 6 BEB 725 BSB 545 MP Co 673 Dental (DENTAC)	3
Fort Hood, TX	Unit data not available	3
Ft. Carson, CO	1st SBCT, 4th ID 1-38 IN 1-4 BSB 2-23 IN 4-4 ARB	-
Ft. Riley, KS	1st ABCT, 1st ID 2-34 AR 1-16 IN 1-5 FA 3-66 AR 1 ENG BN 101 BSB	1
Fort Stewart, GA	Unit data not available	3
JBLM, WA	62 MED BDE 47 th CSH 218 MDVSS 520 th AMSC 98 th CSC 102 FST 153 rd BSD 211 CTC 250 FST 54 MP CO 593 ESC 63 ORD 42nd MP BDE 13 th CSSB 508 MP BN 504 MP CO 170 MP CO 51 MP CO 571 MP CO 13th CSSB 542 SMC 513 TRANS CO 523 CTC	1
Schofield Barracks, HI	2d IBCT, 25ID 65 th BEB 1-14 IN 3d IBCT, 25 ID 2-27 th IN 2-35 IN 3-4 CAV	3
Fort Bragg, NC	Unit data not available	3
JRTC, LA	1st BN (ABN) 509th IN 3rd BCT 10th MTN DIV	-
Total	-	23

There were 242 Soldiers (9.1%) from the total population of 2,645 who participated in focus groups. Of the 242 Soldiers that participated in the focus groups, over 80% of ranks ranged from E-3 to E-6 (Table 2). Over 70% of these Soldiers were male; nearly 20% were female (Table 3). For the focus group population, the average years of service was 4.9 years, the average total months deployed was 9.5 months, and the average age was 26.9 years.

Table 2. Focus Group – Population Ranks

Rank	Focus Group Population	
	n	%
E-1	1	0.4
E-2	2	0.8
E-3	28	11.6
E-4	92	38.0
E-5	54	22.3
E-6	29	12.0
E-7	5	2.1
E-8	1	0.4
O-1	1	0.4
O-2	7	2.9
O-3	7	2.9
WO-2	2	0.8
Blank	13	5.4

83.9%

Table 3. Focus Group – Population Genders

Gender	Focus Group Population	
	n	%
Male	170	70.2
Female	44	18.2
Blank	28	11.6

Nearly one-third of focus group Soldiers' MOS were 11B; the second most frequently reported MOS was 68W, Combat Medic Specialist (9.9%). All other MOS's can be found in Table 4.

Table 4. Focus Group – Population MOS Detail

Focus Group Population			
MOS	MOS TITLE	n	%
11B	Infantryman	77	31.8
--	Blank	29	12.0
68W	Combat Medic Specialist	24	9.9
12B	Combat Engineer	16	6.6
19K	Armor Crewman	9	3.7
88M	Motor Transport Operator	9	3.7
19D	Cavalry Scout	6	2.5
13B	Cannon Crewmember	6	2.5
11C	Indirect Fire Infantryman	5	2.1
92Y	Unit Supply Specialist, Inventory Manager	5	2.1
11A	Infantry Officer	4	1.7
35F	Intelligence Analyst	4	1.7
25U	Signal Support Systems Specialist	4	1.7
15E	Unmanned Aircraft Systems Repairer	4	1.7
91B	Wheeled Vehicle Mechanic	4	1.7
91A	M1 Abrams Tank System Maintainer	3	1.2
25B	Information Technology Specialist	3	1.2
25Q	Multichannel Transmission systems Operator-	3	1.2
74D	Chemical, Biological, Radiological and Nuclear	2	0.8
12A	Engineer Officer	2	0.8
12N	Horizontal Construction Engineer	2	0.8
92F	Petroleum Supply Specialist	2	0.8
25C	Radio Operator-Maintainer	2	0.8
15W	Unmanned Aircraft Systems Operator	2	0.8
92A	Automated Logistical Specialist	1	0.4
91M	Bradley Fighting Vehicle System Maintainer	1	0.4
38B	Civil Affairs Specialist	1	0.4
29E	Electronic Warfare Specialist	1	0.4
35M	Human Intelligence Collector	1	0.4
11Z	Infantry Senior Sergeant	1	0.4
94A	Land Combat Electronic Missile System Repairer	1	0.4
68J	Medical Logistics Specialist	1	0.4
92M	Mortuary Affairs Specialist	1	0.4
94M	Radar Repairer	1	0.4
68P	Radiology Specialist	1	0.4
91H	Track Vehicle Repairer	1	0.4
88A	Transportation Officer	1	0.4
42A	Human Resources Specialist	1	0.4
92W	Water Treatment Specialist	1	0.4

FOCUS GROUP RESULTS

Section Summary

A total of 23 1-hour focus groups were conducted. Only the prevalent themes from the 23 hour of qualitative data are covered here.

- Unaware of existing equipment/hard to access existing equipment
- Inadequate training on how to use load carriage equipment, particularly adjustment features
- Sub-optimal fit of body armor from Central Issuing Facilities (CIFs)
- Body armor shoulder straps and rucksack shoulder straps are incompatible
- Medics, Assistant Gunners and Indirect Fire Infantrymen have unique load carriage requirements

Prevalent Theme 1

The Challenge: Unaware of existing equipment/hard to access existing equipment

One of the goals of this data collection was to identify challenges of existing load carriage equipment, to discover and articulate problems with equipment, and to potentially provide insights as to how improvements may be achieved. A prevalent theme from the focus groups was that many Soldiers are either unaware of the existence of some Army issued equipment, or that they are aware of it but have a difficult time obtaining it.

For example, female Soldiers clearly articulated the discomfort of available body armor, lacking in curves and causing significant bruising on the hips. When the Female Improved Outer Tactical Vest (IOTV) was raised by the focus group moderator, the majority of females were either unaware of its existence or had heard of it, but had never had the opportunity to obtain it. For the minority of females that *had* used the female IOTV, they had extremely praiseworthy remarks noting improved comfort overall with a strong preference to use the female IOTV over all previously used body armor systems.

The MOLLE Medium rucksack is well known among Soldiers, but is difficult to obtain. This results in many Soldiers using the MOLLE Large for field training exercises where the additional size is unnecessary and cumbersome. When bulk and reduced range of motion are consistent in equipment compatibility problems, forcing Soldiers to use a bulkier rucksack when a better suited Army issued rucksack exists contributes to the individual Soldier's load management challenge space unnecessarily.

In the majority of focus groups, Soldiers would raise challenges with the fighting load carrier (FLC), such as incompatibility with body armor, quick release mechanisms, and reduced range of motion. Either other Soldiers participating in the focus group or the focus group moderator would raise the tactical assault panel (TAP) to the group. When other Soldiers would bring the TAP into the conversation, those that had used it praised it for resolving many of the challenges identified with the FLC, such as better compatibility with body armor and improved range of motion. The majority of Soldiers either had never heard of the TAP or had heard positive remarks about the TAP but never had the opportunity to obtain it.

Lastly, a small minority of Soldiers use secondary belts to improve their individual load carriage. Those that use secondary belts praise them for reducing bulk on the torso and provides more flat space to carry equipment on the hips which improves their center of gravity as well as the ability to lay more flatly in the prone. Additionally, in the event one needs to dump their rucksack and/or body armor, the secondary belt continues to provide access to equipment. The challenge with secondary belts is one must have body armor that fits the individual well, meaning the bottom edge of the body armor is closer to the navel, rather than being too long. Further, the waist belt from the rucksack presents a compatibility challenge with secondary belts that can be resolved if the individual Soldier can achieve proper fit of the rucksack and rucksack waist belt. Those that use secondary belts explain that once good fit is achieved with body armor, and to a lesser degree with a rucksack, secondary belts are a key enabler to improve mobility and range of motion, reduce bulk on the torso, and provide better ease of access to equipment. The majority of Soldiers do not use secondary belts, either because they have never heard of them or because they are

unable to achieve good fit with the body armor size they were issued and with their rucksacks, making the idea of secondary belts too cumbersome to attempt to utilize.

Recommended Path Forward: Increase awareness of existing equipment and provide better access

Soldiers indicated that the main method by which they learn about new equipment is word of mouth from other Soldiers. This is an insufficient and unreliable method to spread awareness of new (or existing) equipment that may already provide significant improvements to individual Soldiers' load carriage challenges. Additionally, once Soldiers learn of an existing Army issued piece of equipment that may suit their needs better, they may not have access to obtain that equipment. With this problem state as is, the research and development community can create ideal, optimal equipment that would significantly improve the individual Soldier's load carriage capability, but would not actually reach the majority of end users. The methods by which to increase awareness and access to new Army issued equipment require further investigation by stakeholders best positioned to provide positive impact.

Prevalent Theme 2

The Challenge: Inadequate training on how to use load carriage equipment, particularly adjustment features

Outside of basic training, Soldiers indicated consistently that load bearing equipment training is largely up to the individual Soldier to pursue, which regularly translates into trial by error and self-teaching. However, the self-taught method often misses key features of adjustability. Some Soldiers are fortunate enough to have a fellow Soldier who is well versed in a particular piece of kit teach them how to utilize all of its features. Again, this method is unreliable and insufficient. Typical course correction occurs when a Soldier's kit set up is so visibly uneven or poorly fitting that they are pulled aside and provided instruction. Not only does this address only the most egregious examples, but this course correction is not an ideal teaching scenario to best utilize load bearing equipment, more an immediate *fix* to resolve a problem. Further, focus group participants highlighted that a Soldier well versed in how to adjust load bearing equipment will have a drastically different opinion on that piece of kit compared to a Soldier who has not been trained or who is self-taught, and that properly adjusted equipment to achieve good fit is paramount to performance. With this problem state as is, the research and development community can create optimal adjustability for load bearing equipment to achieve best fit for Soldiers, but this capability would only be utilized by a minority of Soldiers, leaving the remaining majority of Soldiers unnecessarily underserved by their equipment.

An additional factor contributing to this problem space is that the notion of 'best fit' is not equal in the minds of all Soldiers. In fact, the best fit is not considered at all by some Soldiers, who accept however a piece of kit fits when they put it on as 'acceptable'. It is when a fellow Soldier provides correction and instruction that that individual Soldier realizes the importance of best fitting load bearing equipment and the positive impact it has on their overall performance. This experience was relayed to the focus group moderately consistently, both from Soldiers that had been taught about the notion of best fit as well as from Soldiers who provided instruction and witnessed the realization of benefit from the Soldier receiving the instruction.

Recommended Path Forward: Standardize easily accessible training videos

When exploring this problem space during focus groups, Soldiers consistently highlighted end users' propensity to utilize YouTube videos to learn how to do a variety of things, including how to use equipment. Soldiers pointed out however that the YouTube videos on equipment may or may not be accurate and have a tendency towards the biases of the individual posting the video. Even with these flaws, turning to YouTube for information gathering remains popular due to habit and ease of access, especially in the field. When the focus group moderator canvassed for interest in an Army sponsored YouTube series on all of the features of individual pieces of load bearing equipment with a focus on

adjustability features, the vast majority of focus groups consistently supported this approach. The following attributes summarize the interests of the focus group participants:

- Army sponsored
- 3–5 min videos (shorter the better) each on one piece of equipment with a highlight on adjustability features, secondarily in performance features
- A combination of the lead engineer(s) responsible for that piece of equipment and an actual end user Soldier of that piece of equipment providing the talking points in the video. This ensures valid information as well as from a trusted voice (a fellow Soldier). Soldiers expressed if the videos were solely civilian engineers, the viewers would be less receptive to the content.
- Provide a link to the training video printed on the equipment (tag, fabric etc)
- Highlight the importance of best fit and positive impact on performance
- The host website host does not necessarily need to be YouTube, but the features of YouTube that are favored are habit and ease of accessibility

A benefit of this approach, in addition to ease and practicality, is that not every Soldier would need to watch the training videos. Instead, the information would more quickly transfer from peer to peer with the difference being that the quantity of well-informed Soldiers would be dramatically higher than it is now. This may be an enabler in a culture shift of the minority being the *under-informed*, rather than the current state where the majority is under-informed on all of the available features of load bearing equipment, adjustability in particular. If the majority of Soldiers are well informed on equipment capabilities and are aware of the notion and value of best fit, units would be more intrinsically motivated to ensure the small remainder of the under-informed Soldiers were either taught by a peer or sent a link to the particular training video(s) of relevance. With the current state, it is practically considered *acceptable* to self-teach, or to be left to ‘just figure it out’ as many Soldiers put it in focus groups, and operate sub-optimally.

Prevalent Theme 3

The Challenge: Sub-optimal fit of body armor from Central Issuing Facilities (CIFs)

Body armor is largely held by Soldiers as the center piece platform for how the individual Soldier manages their operational equipment. Fit of body armor in many ways defines the performance of a Soldier. Loosely fitting body armor sags and jostles when jogging, running or sprinting, which cost the Soldier more energy to move more slowly. Body armor that is too large can cause what Soldiers refer to as ‘the turtle effect’ where the individual turns their torso from side to side but the body armor stays in place, so the individual is moving inside of a ‘shell’ or a ‘case’. Soldiers very clearly articulate that they want their body armor to ‘move with them’. Lastly, body armor that is too long causes discomfort and can cause bruising of the hips for both males and females (but particularly for females). Body armor that is too long also causes restriction when taking a knee or sitting in a vehicle where the bottom of the plates dig into the tops of the thighs. That extra length also causes interference with other equipment that shares that real estate, such as secondary belts, rucksack waist belts, and hip mounted holsters.

However, the problem is not with the Army issued sizing (i.e. the dimensions of a small, medium or large). The problem is in pairing the best fit size body armor with the individual Soldier. Soldiers articulate that when they are sized for studies, they are always issued the correct size, but when they are issued equipment from a CIF, they may not receive the correct size.

After probing this topic further, the problem space was explained consistently across focus groups. CIFs are operated largely by civilian contractors with little background in the armed services. The measure of success for CIFs is the speed by which they equip Soldiers, not the accuracy of best size/fit. A contributing factor to this challenge space is that Soldiers typically arrive at CIFs in large numbers, causing a strain on the civilian contractors to operate as quickly as possible. In addition, the best size fit body armor may not be available, thus the ‘second best size’ will be issued with little recourse available to that Soldier to receive a best size fit later.

Recommended Path Forward: Reevaluate the CIF issuing process

The research and development community can provide an optimal sizing tariff for equipment, citing the well-established link between fit and performance. However, if the wrong size equipment is issued to a Soldier, the intended benefactors of all of the work previously performed on sizing will receive none of the benefits, and the existing problem of ‘poor fit’ will persist, regardless of the quality of the equipment the Army provides.

Therefore, it is paramount that investments are made to improve the methods by which Soldiers receive their equipment, with particular regard to equipment that needs to be sized to an individual. It is outside of the scope of this data collection to more clearly articulate how improvements can be implemented. However, three prevalent factors are inputs into this system: the number of Soldiers that arrive at the same time to receive equipment, the measure of success of the individuals operating the CIFs (speed vs accuracy), and the skill set required to determine what ‘best fit’ means for an individual Soldier. It is likely that several relevant stakeholders to this problem space are required to integrate knowledge, skills and abilities to achieve a best path forward.

Prevalent Theme 4

The Challenge: Body armor shoulder straps and rucksack shoulder straps

When asked about equipment compatibility, one area was consistent across focus groups regardless of MOS or duty position: body armor shoulder straps and rucksack shoulder straps. While this is a relatively straightforward compatibility challenge, it is applicable to the vast majority of Soldiers with negative impact to performance. The core of the challenge is that body armor shoulder straps cause rucksack shoulder straps to slide outwards from the upper traps towards the deltoids, causing range of motion restriction of the arms and numbness down the arms and into the hands.

Recommended Path Forward: Integrate development of body armor with the development of rucksacks

Body armor and rucksacks are the individual Soldier’s main platforms for load management. However, the design of one is not necessarily incorporated into the design of the other. The primary focus area for integration and improved compatibility is in the shoulder straps, particularly when wearing body armor and a rucksack. Additional focus areas include the interface between the lower back plate and the rucksack waist belt, as well as the bottom of the body armor vest and the rucksack waist belt. Many Soldiers experience a pressure point that causes pain in their lower back from the weight of the rucksack pressing into the lower back plate of the body armor through the rucksack waist belt. Some Soldiers achieve best fit where the rucksack waist belt sits below the bottom of the body armor directly on the Soldier’s back, also allowing the waist belt to wrap around the individual’s hips without wrapping over the bottom of the body armor. This is largely determined by the length of the body armor, where body armor that is *too long* down the torso is a main contributor to this challenge space. The positioning/adjustability of the rucksack waist belt is a second contributor in that body armor may be fitted well, but the rucksack waist belt sits too high, pressing into the back of the body armor. The best path forward to resolve the integration and compatibility challenges highlighted here is to integrate the development of body armor with the development of rucksacks earlier in the design phase. Currently, interface and compatibility between body armor and rucksacks is largely measured during limited user evaluations (LUEs) where the primary focus is on *one* of these two pieces of kit. While this helps document some of the challenges that arise from data collections, it only focuses on half of the problem space at a time.

Prevalent Theme 5

The Challenge: Medics, Assistant Gunners and Indirect Fire Infantrymen have unique load carriage requirements

While many individual Soldiers throughout these focus groups expressed some degree of interest in specialized equipment for their MOS, three user communities consistently described a challenge space

unique to their MOS: Medics, Assistant Gunners and Indirect Fire Infantrymen (Mortarmen). The challenge is similar for all three communities. Each is required to carry both their individual load as well as a second load that typically requires a second smaller rucksack or bag that is attached to or packed inside their primary rucksack. While cross loading is an available method to resolve this, this data collection's focus is primarily on the individual Soldier and identifying Soldiers' perspectives on challenges for the Army to prioritize addressing. As previously addressed in Prevalent Theme 1, while there may be existing load carriage equipment specifically for these communities, many are unaware they exist (this challenge space and recommended path forward are covered above). However, for Medics and Assistant Gunners that use either COTS items (a small minority of focus group test participants (TPs) and typically less than 5% from the quantitative data), or Army issued items to assist with their MOS specific 'second load', Soldiers articulate that they are essentially still left with two rucksacks to carry.

Recommended Path Forward: Further research is required specifically with Medics, Assistant Gunners and Indirect Fire Infantrymen to investigate potential solutions

The primary scope of this data collection is to identify priority challenges for the individual Soldier with regard to load carriage. Identifying the exact solution is beyond this scope. Therefore, the primary recommendation for this challenge space is further research with this specific problem at the center of the investigation. Although an all-inclusive rucksack designed specifically for each of these user communities was the majority preference from the TPs from these focus groups, these data do not adequately support the development of such items without further investigation.

EXPERT CHOICE SURVEY METHODS DEMOGRAPHICS & RESULTS

TEST METHODS

There were 300 Soldiers from 11 locations requested to support the data collection for the Individual Load Carriage Front End Analysis. After approximately 50% of the data were collected, a refined data collection instrument was to be developed to better quantify emerging themes to support prioritization of load carriage attributes and trade-offs. This refined data collection instrument is referred to as *the expert choice survey*. The target was to collect expert choice survey data primarily from more experienced Soldiers representing approximately 10% of the total population. Soldiers were selected primarily based on rank and experience from the available group of Soldiers that supported the load carriage survey.

The expert choice survey (Appendix A) is a nine page survey covering ranking and rating importance of attributes of load carriage for rucksacks and body armor, and a series of trade-off questions for pairings of attributes.

LIMITATIONS

Due to the limited time available at each data collection site (3 hour total for surveys and focus groups), the expert choice survey was only able to focus on body armor and rucksacks, as these were identified as the two primary pieces of equipment the individual Soldier relies on for load carriage.

DEMOGRAPHICS

A total of 218 Soldiers (8.2%) participated in the expert choice survey out of the total population of 2,645.

Supporting Units

Table 5 displays the units and locations that participated in the expert choice survey.

Table 5. Participating Army Units in Expert Choice Survey

Major Army Installation	Participating Army Units	Expert Choice Survey Respondents
		n
Ft. Bliss, TX	1 st ABCT 1 st AD 1-36 IN 4-17 IN 1 st Sustainment Brigade (formerly 15 th) 4th FMSU 4 th BSB	66
Ft. Drum, NY	1 st BCT, 10 th MTN DIV 2-22 IN 3-6 FA 10 BSB 3d BCT 10 th Mountain 1-32 (3d BCT)	-
JBER, AK	4 th BCT, 25 th ID 1-40 CAV 1-501 PIR 2-377 PFAR 6 BEB 725 BSB 545 MP Co 673 Dental (DENTAC)	20
Fort Hood, TX	Unit data not available	-
Ft. Carson, CO	1 st SBCT, 4 th ID 1-38 IN 1-4 BSB 2-23 IN 4-4 ARB	73
Ft. Riley, KS	1 st ABCT, 1 st ID 2-34 AR 1-16 IN 1-5 FA 3-66 AR 1 ENG BN 101 BSB	11
Fort Stewart, GA	Unit data not available	-
JBLM, WA	62 MED BDE 47th CSH 218 MDVSS 520th AMSC 98th CSC 102 FST 153 rd BSD 211 CTC 250 FST 54 MP CO 593 ESC 63 ORD 42 nd MP BDE 13 th CSSB 508 MP BN 504 MP CO 170 MP CO 51 MP CO 571 MP CO 13 th CSSB 542 SMC 513 TRANS CO 523 CTC	48
Schofield Barracks, HI	2d IBCT, 25ID 65 th BEB 1-14 IN 3d IBCT, 25 ID 2-27th IN 2-35 IN 3-4 CAV	-
Fort Bragg, NC	Unit data not available	-
JRTC, LA	1 st BN (ABN) 509 th IN 3 rd BCT 10 th MTN DIV	-
Total	-	218

Gender

Over 90% of the expert choice survey respondents were male (Table 6).

Table 6. Expert Choice Survey – Population Genders

Gender	Expert Choice Survey	
	n	%
Male	202	93.1
Female	15	6.9
Blank	-	-

Height/Weight

For the expert choice survey population, the average height was 5 ft 11 in with a range of 5 ft 0 in – 6 ft 5 in; the average weight was 181.4 lb with a range of 120–245 lb (Table 7).

Table 7. Expert Choice Survey – Population Heights and Weights

	Physical Demographics	
	Expert Choice Survey	
	Height	Weight
Mean	70.9 in/5 ft 11 in	181.4 lb
Standard Deviation	4.100	25.792
Range	60–77 in/5 ft 0 in–6 ft 5 in	120–245 lb
N	12	144

Rank

For the expert choice survey data, nearly 90% of TPs' ranks fell between E-4 and E-7, with over 50% reporting E-5 (Table 8).

Table 8. Expert Choice Survey – Population Ranks

Rank	Expert Choice Survey	
	n	%
E-1	-	-
E-2	4	1.8
E-3	-	-
E-4	21	9.6
E-5	116	53.3
E-6	45	20.6
E-7	14	6.4
E-8	1	0.5
O-1	4	1.8
O-2	11	5.0
O-3	-	-
WO-2	1	0.5
Blank	1	0.5

89.9%

Age/Years in Service/Deployments

The average age of the expert choice population was 28.8 years with a range of 18–47. The average years in service was 8 years with a range of 1–30. The average number of deployments was 2 deployments with a range of 1–10. The average number of months deployed was 19.8 with a range of 3–58 months. Table 9 shows descriptive statistics characterizing the expert choice survey population's years in service and deployment data.

Table 9. Expert Choice Survey – Population Years in Service and Deployments

Expert Choice Survey				
	Age	Years in Service	# of Deployments	Total Months Deployed
Mean	28.8	8.0	2.0	19.8
Standard Deviation	5.077	4.728	1.329	12.596
Range	18–47	1–30	1–10	3–58
n	218	218	168	168

Deployments Detail

Nearly one-quarter of the expert choice survey population reported having never been deployed; over 75% have been deployed. Nearly 40% have deployed as part of Operation Iraqi Freedom (OIF), and 60% have deployed as part of Operation Enduring Freedom (OEF). Over 10% of the expert choice survey

population has deployed in support of other missions. Note that the total percentage in Table 10 is greater than 100 as TPs were allowed to make multiple selections.

Table 10. Expert Choice Survey – Population Deployment Detail

Deployments	Expert Choice Survey	
	n	%
Never been deployed	50	22.9
Deployed OIF	81	37.2
Deployed OEF	131	60.1
Deployed Other	23	10.6

MOS

Table 11 displays only the MOS's that represented 1% of the *expert choice survey population* or greater. Less than half of TPs were 11B (45.0%). The second most frequently reported MOS was 11A, Infantry Officer (5.5%), followed by 68W, Combat Medic Specialist (5.0%). All other reported MOS's represented less than 5% of the total population and are displayed below.

Table 11. Expert Choice Survey – Population MOS Detail

Expert Choice Survey			
MOS	MOS TITLE	n	%
11B	INFANTRYMAN	98	45.0
11A	INFANTRY OFFICER	12	5.5
68W	COMBAT MEDIC SPECIALIST	11	5.0
91B	WHEELED VEHICLE MECHANIC	9	4.1
88M	MOTOR TRANSPORT OPERATOR	8	3.7
19K	M1 ARMOR CREWMAN	8	3.7
11C	INDIRECT FIRE INFANTRYMAN	7	3.2
92Y	UNIT SUPPLY SPECIALIST	6	2.8
13B	CANNON CREWMEMBER	4	1.8
25U	SIGNAL SUPPORT SYSTEMS SPECIALIST	4	1.8
42A	HUMAN RESOURCES SPECIALIST	3	1.4

Branch

For the expert choice survey population, over half of TPs reported their branch as Infantry (52.3%), followed by Medical (9.7%), Armor/Cavalry and Ordnance (7.4%), and Transportation (5.1%). All other reported branches represented less than 5% of the expert choice survey population and are displayed in Table 12.

Table 12. Expert Choice Survey – Population Branch Detail

Branch	Expert Choice Survey	
	n	%
Infantry	114	52.3
Medical	21	9.7
Armor/Cavalry	16	7.4
Ordnance	16	7.4
Transportation	11	5.1
Quartermaster	9	4.2
Military Police	8	3.7
Field Artillery	6	2.8
Signal	6	2.8
Military Intelligence	4	1.9
Adjutant General	3	1.4
Chemical	2	0.9
Finance	1	0.5

Duty Position

Table 13 displays only the reported duty positions that represented 1% or more of each population.

For the expert choice survey population, 25.2% of TPs' reported their duty position as Team Leader, followed by Squad Leader (21.4%), Section Leader (12.4%), and Platoon Sergeant (11.9%). All other duty positions represented less than 5% of the expert choice survey population.

Table 13. Expert Choice Survey – Population Duty Position

Duty Position	Expert Choice Survey	
	n	%
Team Leader	55	25.2
Squad Leader	47	21.4
Section Leader	27	12.4
Platoon Sergeant	26	11.9
Squad Member	8	3.8
Platoon Leader	8	3.8
Medic	4	1.9
Mortar Section Leader/Platoon Member	3	1.4
First Sergeant	3	1.4
Company Executive Officer	2	1.0
Sniper	2	1.0
Radio Telephone Operator	2	1.0

Mounted/Dismounted

Nearly 50% of the expert choice survey population (48.1%) indicated that the majority of their time is spent *dismounted*. Approximately 20% of the expert choice survey population (17.8%) indicated that the majority of their time is spent *mounted*. One-third of the expert choice survey population indicated that the majority of their time is equally split between mounted and dismounted. This is shown in Table 14.

Table 14. Expert Choice Survey – Population: Time Mounted/Dismounted

Majority of your time spent...	Expert Choice Survey	
	n	%
Mounted	38	17.4
Dismounted	103	47.2
Equally split	73	33.5
Blank	4	1.8

EXPERT CHOICE SURVEY RESULTS

Body Armor: Expert Choice Survey Data

Section Summary

This section includes rating and ranking data on attributes of body armor and attribute trade-offs from the expert choice survey.

- *Mobility/Ease of movement* and *Weight of body armor with hard plates* are the two most important attributes of body armor
- *Durability* and *Adjustability to fit body armor to individual torso size* are in the second most important category
- The majority of TPs (69%) indicated they would rather have a smaller area of ballistic protection in order to have increased mobility
- Over three-quarters of TPs (78.3%) indicated they would rather have a complex design that supported high adjustability for body armor
- In two scenarios where IED threats are high and IED threats are low, a plate carrier is the desired level of protection for over 50% of the expert choice survey population (over 70% for when IED threats are low)

Body Armor: Attribute Importance Ranking and Rating

TPs were asked to rank order, from most important (1), to least important (20) a total of 20 attributes of body armor. Then, TPs were asked to individually rate each attribute on a scale of zero (not at all important) to eight (extremely important). The scatter plot in Figure 1 shows the means for both ranking and rating data for all 20 attributes. Attributes are grouped by similar scores on the plot. The attribute names are displayed in Table 15 to correspond with their locations on the scatter plot. Attributes in the top left are rated and ranked as ‘most important’ on average; attributes in the bottom right are rated and ranked as ‘least important’ on average.

- 1 – *Mobility/Ease of movement* and *Weight of body armor with hard plates* are the two most important attributes of body armor according to the expert choice survey population.
- 2 – *Durability* and *Adjustability to fit body armor to individual torso size* are in the second most important category.
- 3 – *Compatibility with shouldering a weapon*, *Overall ease of use* and *Ventilation/Airflow between body and armor* are in the third most important category.
- 4 – The following eight attributes are in the fourth most important category: *Variety of sizes to choose from*, *Large area of ballistic protection*, *Quick donning*, *Quick emergency doffing*, *Ability to transfer load off shoulders to hips*, *Ability to directly mount fighting load pouches, ammo etc*, *Upper body extremity protection*, and *Compatibility with rucksack shoulder straps, frame and waist belt*.
- 5 – The following five attributes are in the lowest scoring group: *Quick routine doffing*, *Compatibility with FLC or TAP*, *Compatibility with tube hydration*, *Noise management*, and *Lower body extremity protection*.

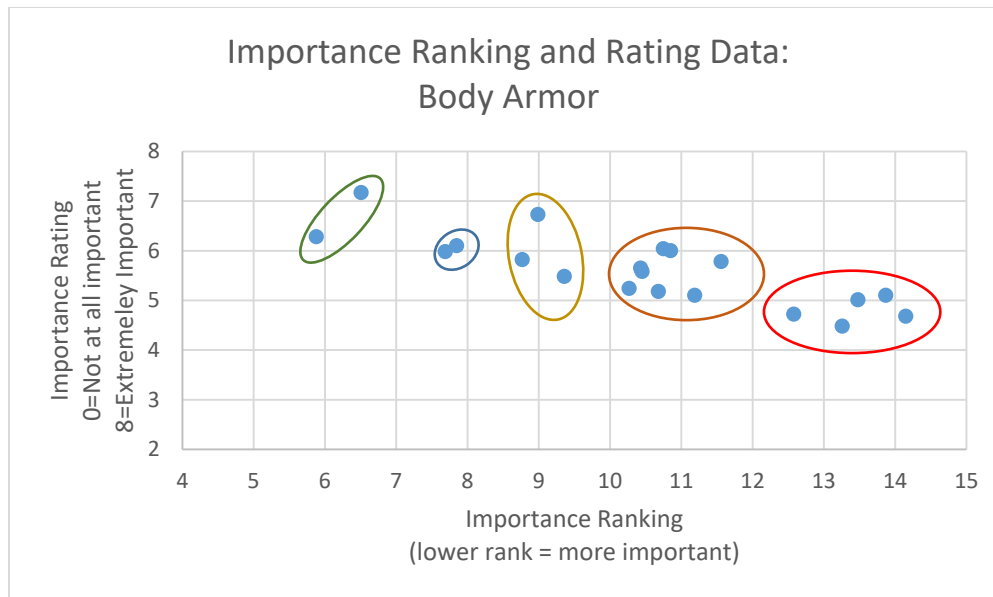


Figure 1. Expert Choice Survey Population – Body Armor Attribute Ranking/Rating

Table 15. Expert Choice Survey – Population: Body Armor Attribute Groupings

Green 1st group	Mobility/Ease of movement	Weight of body armor with hard plates		
Blue 2nd group	Durability	Adjustability to fit body armor to individual torso size		
Yellow 3rd group	Compatibility with shouldering a weapon	Overall ease of use	Ventilation/Airflow between body and armor	
Orange 4th group	-Variety of sizes to choose from -Large area of ballistic protection	-Quick donning -Quick emergency doffing	Ability to: -transfer load off shoulders to hips -directly mount fighting load pouches, ammo etc	-Upper body extremity protection -Compatibility with rucksack shoulder straps, frame and waist belt
Red 5th group	Quick routine doffing	Compatibility with: -FLC or TAP -tube hydration	Noise management	Lower body extremity protection

Importance Ratings Comparisons

The importance rating data from the expert choice survey is separated below to compare the following groups: all TPs from the expert choice survey, only those TPs that indicated that they have been to jump school, and only those TPs that indicated that they were actively on jump status at the time of taking this survey. On the scale in Figure 2, zero represents ‘not at all important’ and eight represents ‘extremely important’.

Generally, the mean importance rating for the 20 attributes were within half of a point of each other when comparing groups. The following attributes had notable differences (greater than half a point) when comparing their mean ratings:

- *Upper body extremity protection*: mean rating of 5.57 (jump school) compared to a mean rating of 6.29 (jump status)
- *Noise management*: mean rating of 4.48 (all TPs) compared to mean ratings of 5.14 (jump school) and 5.19 (jump status)
- *Quick donning*: mean rating of 4.29 (jump status) compared to mean ratings of 4.93 (jump school) and 5.1 (all TPs)

- *Compatibility with tube hydration*: mean rating of 3.81 (jump status) compared to mean ratings of 4.64 (jump school) and 5.1 (all TPs). This is the largest difference between mean ratings for all 20 attributes rated.
- *Quick routine doffing*: mean rating of 3.95 (jump status) compared to 4.69 (jump school) and 4.72 (all TPs)

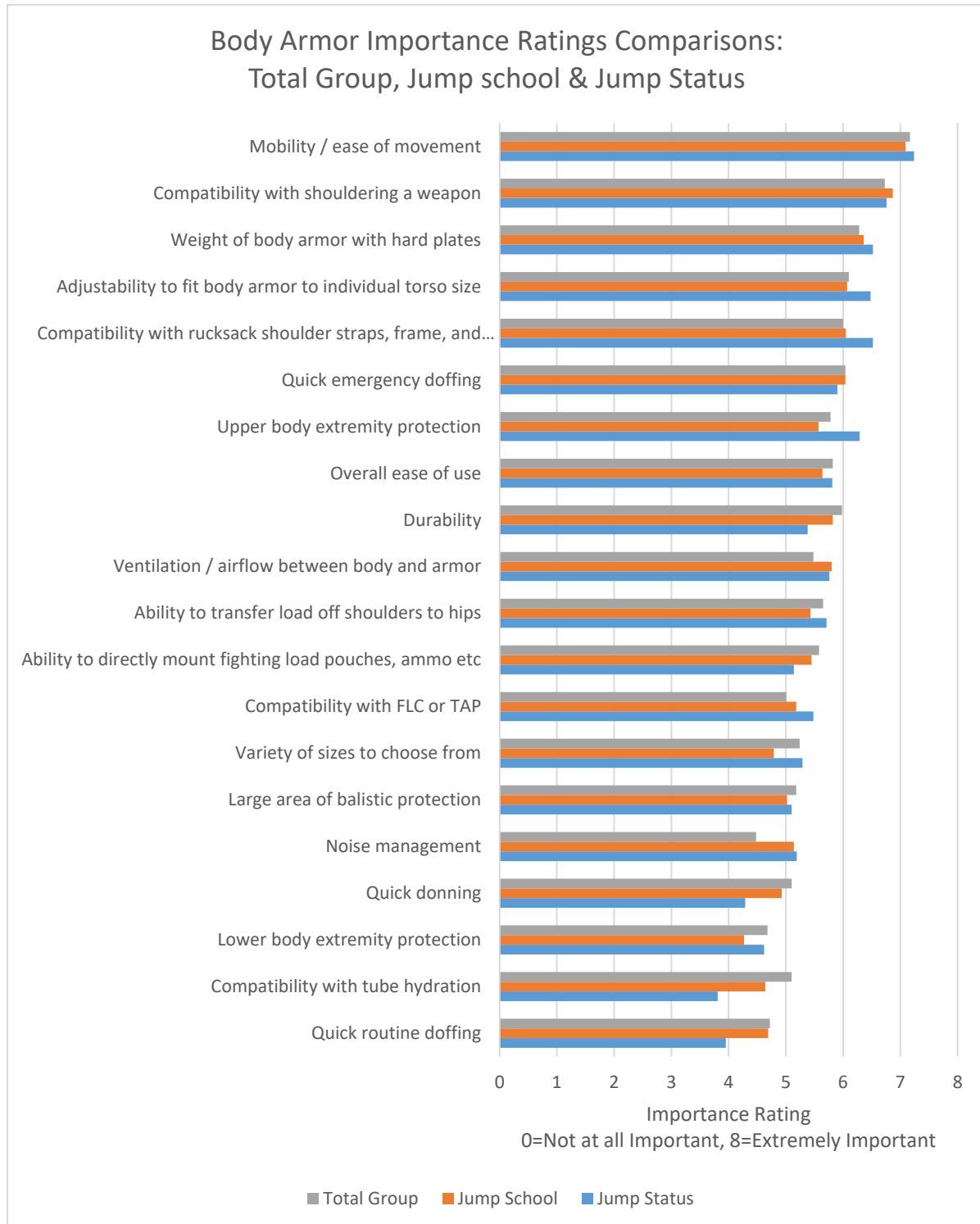


Figure 2. Expert Choice Survey Population – Body Armor Ratings Comparisons

Body Armor: Attribute Trade-Offs

TPs were asked to rate what they believed to be the ideal trade-off between pairings of attributes. Each attribute pairing included inter-related attributes, in that increasing one attribute would directly decrease the other. The scale used ranged from one to six, with the tail ends of the scale labelled with one attribute favored as much as possible over the paired attribute. There was no mid-point on the scale; therefore, TPs had to favor one attribute at least slightly over the paired attribute (i.e. a “3” or a “4” on the scale).

For Figure 3, 1–3 represent trade-offs favoring high mobility, 4–6 represent trade-offs favoring a larger area of ballistic protection.

The majority of TPs (69%) indicated they would rather have a smaller area of ballistic protection in order to have increased mobility.

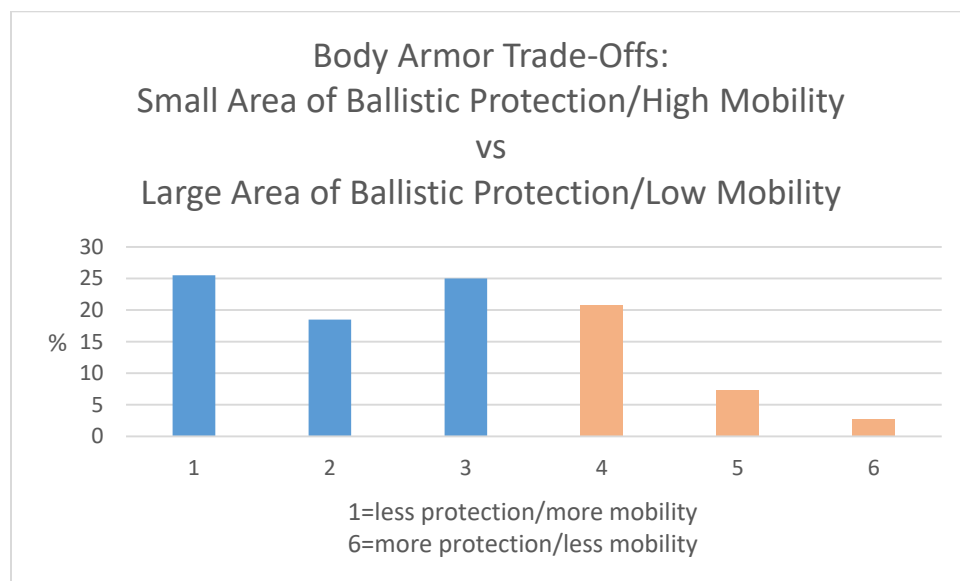


Figure 3. Expert Choice Survey Population – Body Armor Trade-Offs: Ballistic Protection & Mobility

For Figure 4, 1–3 represent trade-offs favoring simple design, 4–6 represent trade-offs favoring high adjustability.

Over three-quarters of TPs (78.3%) indicated they would rather have a complex design that supported high adjustability for body armor.

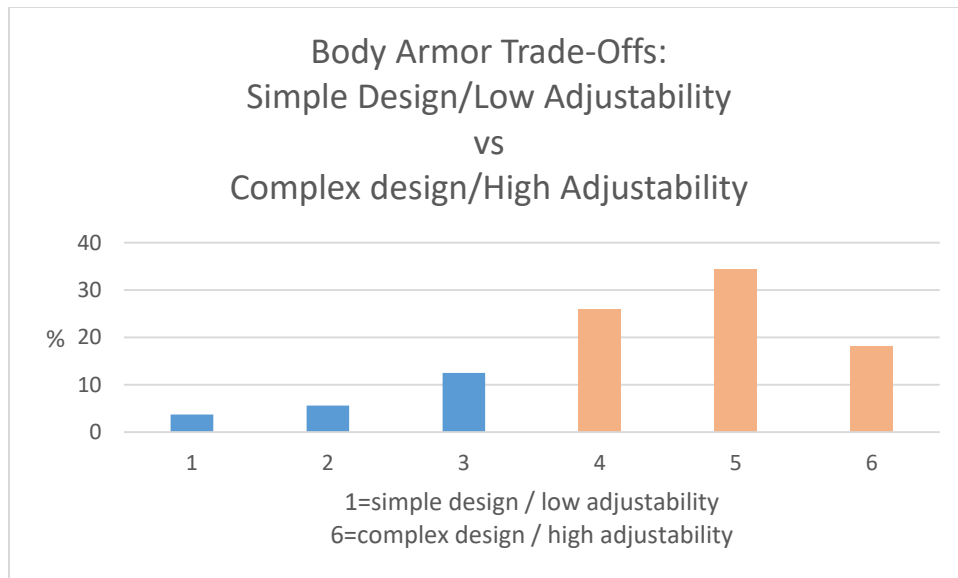


Figure 4. Expert Choice Survey Population – Body Armor Trade-Offs: Design & Adjustability

Area of Coverage vs Mobility (Expert Choice Population)

TPs were presented with two scenarios and provided five answers from which to select their preferred level of protection.

In one scenario, IED threats are low and direct fire threats are high. In a second scenario, IED threats are high and direct fire threats exist.

For both scenarios, a plate carrier was the most frequently selected level of protection (over 50% for high IED threat scenario and over 70% for low IED threat scenario). The option ‘full area of protection’ (e.g. IOTV with a Small Arms Protective Insert (SAPI)) was selected by approximately 20% of TPs for both scenarios. The option ‘maximum area of coverage with upper and lower extremity protection’ was selected by 20% of TPs for the high IED threat scenario and less than 10% for the low IED threat scenario. See Figure 5.

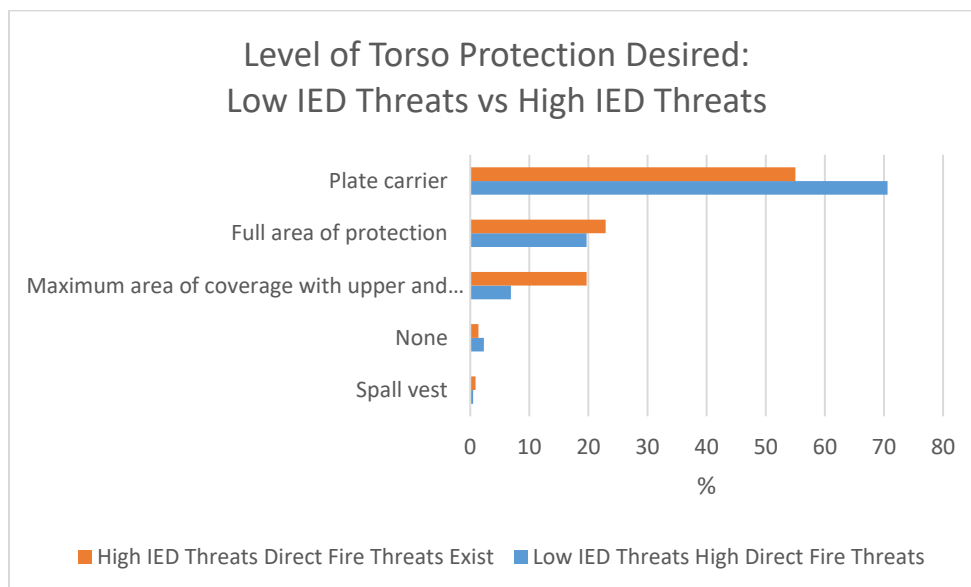


Figure 5. Expert Choice Survey Population – Body Armor Protection: IED Threat Levels

Rucksacks: Expert Choice Survey Data

Section Summary

This section includes rating and ranking data on attributes of rucksacks and attribute trade-offs from the expert choice survey.

- *Compatibility with body armor* and *Ability to distribute load between shoulders and hips* are the two most important attributes of rucksacks according to the expert choice survey population
- *Adjustability of shoulder straps, waist belt and frame to fit torso size* and *Durability* are in the second most important category
- Nearly 75% of TPs expressed a preference for higher storage capacity at the cost of increased weight
- Over 80% of TPs expressed a preference for high adjustability of rucksacks at the cost of complex design

Rucksacks: Attribute Importance Ranking and Rating

TPs were asked to rank order, from most important (1) to least important (16), a total of 16 attributes of rucksacks. Then, TPs were asked to individually rate each attribute on a scale of zero (not at all important) to eight (extremely important). The scatter plot in Figure 6 shows the means for both ranking and rating data for all 16 attributes. Attributes are grouped by similar scores on the plot. Attributes in the top left are rated and ranked as ‘most important’ on average; attributes in the bottom right are rated and ranked as ‘least important’ on average. Table 16 displays the attribute names to correspond with their locations on the scatter plot.

- 1 – *Compatibility with body armor* and *Ability to distribute load between shoulders and hips* are the two most important attributes of rucksacks according to the expert choice survey population.
- 2 – *Adjustability of shoulder straps, waist belt and frame to fit torso size* and *Durability* are in the second most important category.
- 3 – *Overall ease of use* and *Capacity of rucksack* are in the third most important category.
- 4 – *Waterproof* and *Water Repellency* are in fourth most important category
- 5 – The following six attributes are in the fifth most important category: *Compatibility with tube hydration*, *Compatibility with helmet*, *Quick Doffing*, *Quick Donning*, *Ventilation/Airflow between back and ruck*, and *Noise Management*.
- 6 – *Compatibility with airborne operations* and *Empty weight of the ruck* are the two lowest scoring attributes for importance.

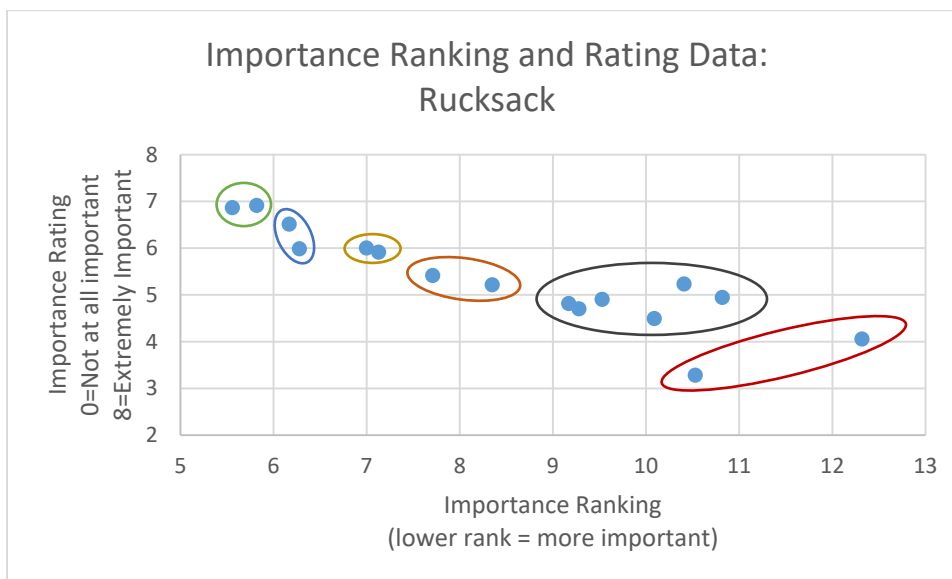


Figure 6. Expert Choice Survey Population – Rucksack Attribute Ranking/Rating

Table 16. Expert Choice Survey – Population: Rucksack Attribute Groupings

Green 1st group	Compatibility with body armor	Ability to distribute load between shoulders and hips		
Blue 2nd group	Adjustability of shoulder straps, waist belt and frame to fit torso size	Durability		
Yellow 3rd group	Overall ease of use	Capacity of rucksack		
Orange 4th group	Waterproof	Water repellency		
Grey 5th group	Compatibility with: -tube hydration -helmet	-Quick doffing -Quick donning	Ventilation/airflow between back and ruck	Noise management
Red 6th group	Compatibility with airborne operations	Empty weight of ruck		

Importance Ratings Comparisons

The importance rating data from the expert choice survey is separated below to compare the following groups: all TPs from the expert choice survey, only those TPs that indicated that they have been to jump school, and only those TPs that indicated that they were actively on jump status at the time of taking this survey. On the scale referenced below, zero represents ‘not at all important’ and eight represents ‘extremely important’.

Generally, the mean importance rating for the 16 attributes were comparable between the 3 groups with mean scores falling within half of a point of each other. The following attributes had notable differences (greater than half a point) when comparing their mean ratings:

- *Adjustability of shoulder straps, waist belt and frame to fit torso size*: mean rating of 7.05 (jump status) compared to a mean rating of 6.38 (jump school)
- *Water Repellency*: mean rating of 5.38 (jump status) compared to a mean rating of 4.86 (jump school)
- *Noise management*: mean rating of 5.18 (jump school) and 5.14 (jump status) compared to a mean rating of 4.49 (all TPs)
- *Compatibility with airborne operations*: a mean rating of 5.67 (jump status) compared to 5.04 (jump school) compared to 4.05 (all TPs)
- *Compatibility with tube hydration*: a mean rating of 5.23 (all TPs) compared to a mean rating of 4.57 (jump status)
- *Quick donning*: a mean rating of 5.21 (jump school) compared to a mean rating of 4.43 (jump status)
- *Compatibility with helmet*: a mean rating of 5.11 (jump school) and 4.94 (all TPs) compared to 4.29 (jump status)

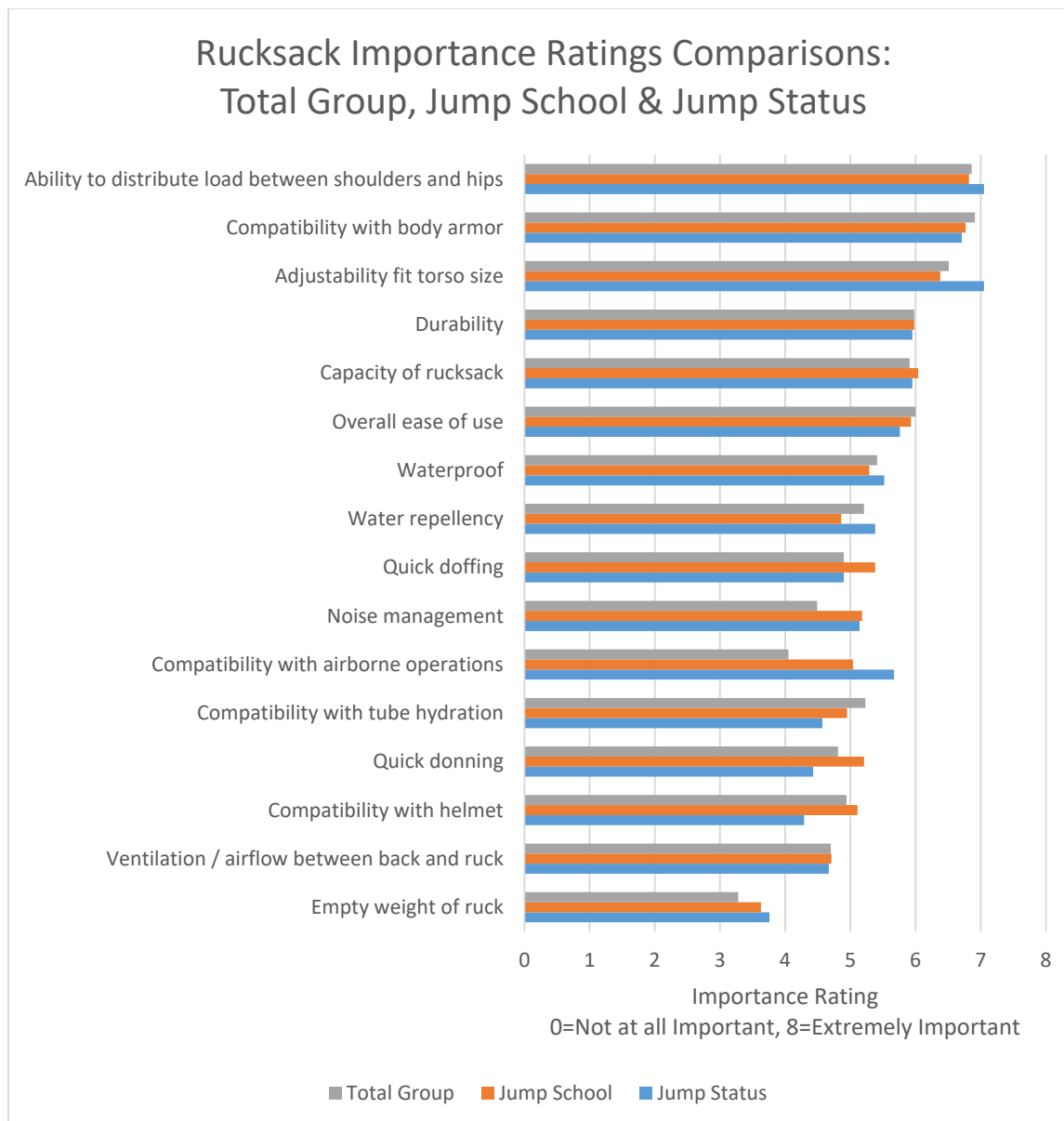


Figure 7. Expert Choice Survey Population – Rucksack Ratings Comparisons

Rucksacks: Attribute Trade-Offs

TPs were asked to rate what they believed to be the ideal trade-off between pairings of attributes. Each attribute pairing included inter-related attributes, in that increasing one attribute would directly decrease the other attribute. The scale used ranged from one to six, with the tail ends of the scale labelled with one attribute favored as much as possible over the paired attribute. There was no mid-point on the scale; therefore, TPs had to favor one attribute at least slightly over the paired attribute (i.e. a “3” or a “4” on the scale).

For the chart below, 1–3 represent trade-offs favoring low weight, and 4–6 represent trade-offs favoring high durability.

TPs are very nearly evenly split across the scale with a slight majority favoring higher durability at the cost of higher weight. When combining responses from 1–3 and from 4–6 into two groups, 56.4% favor

higher durability at the cost of higher weight; 43.6% favor lower weight at the cost of lower durability. Taken as a whole, these data support striking a balance between durability and weight, with a slight preference for a small increase to durability at the cost of a small increase to weight.

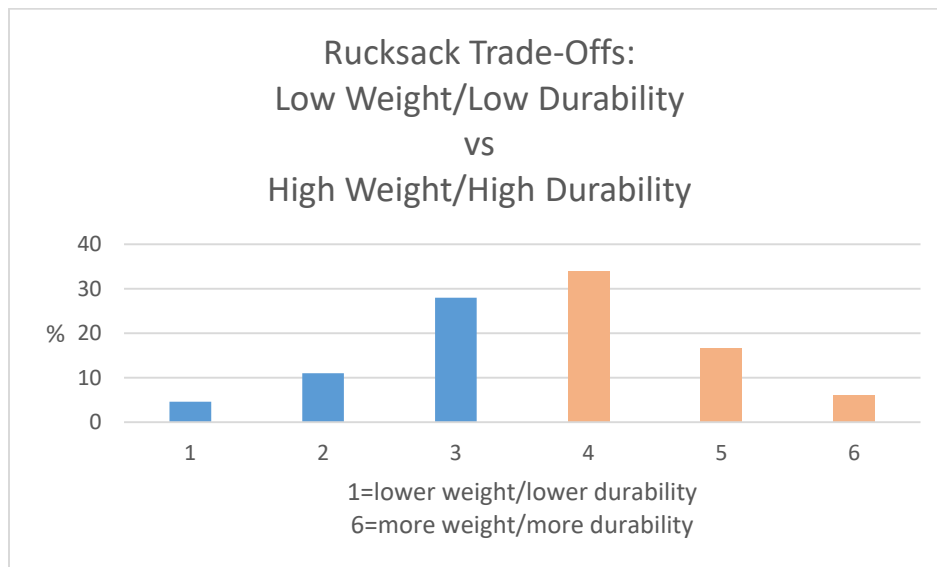


Figure 8. Expert Choice Survey Population – Rucksack Trade-Offs: Weight & Durability

For the chart below, 1–3 represent trade-offs favoring low weight, and 4–6 represent trade-offs favoring high water repellency.

A slight majority of TPs indicated favoring water repellency at the cost of higher weight. When combining responses from 1–3 and from 4–6 into two groups, 59.6% favor higher water repellency at the cost of higher weight; 40.4% favor lower weight at the cost of lower water repellency. Taken as a whole, these data support the feature of water repellency with a tolerance for a small increase to weight.

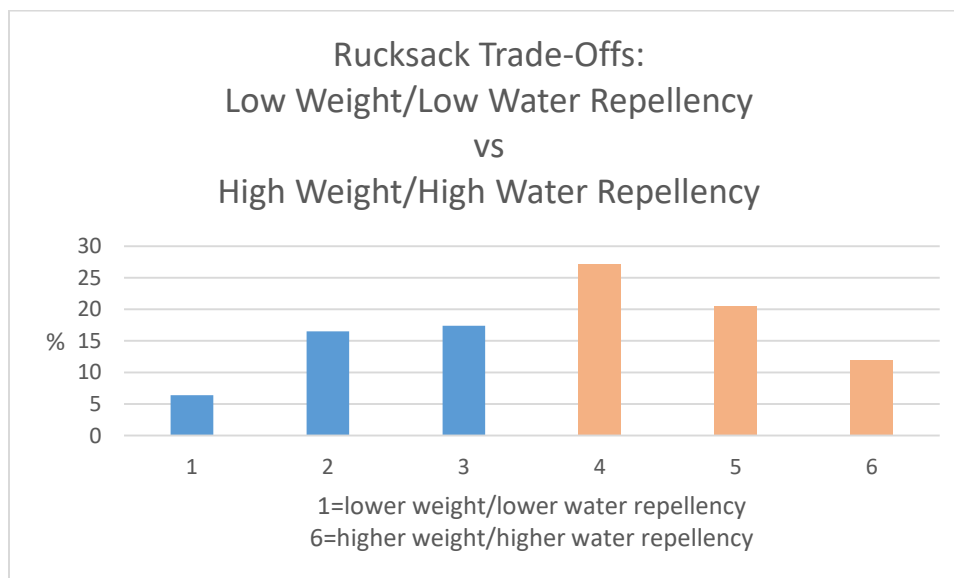


Figure 9. Expert Choice Survey Population – Rucksack Trade-Offs: Weight & Water Repellency

For the chart below, 1–3 represent trade-offs favoring low weight, and 4–6 represent trade-offs favoring high storage capacity.

Nearly 75% of TPs expressed a measure of 4–6 indicating a preference for higher storage capacity at the cost of increase weight. Less than 10% of TPs expressed a measure of “1” or “2”, indicating a moderate or strong preference for lower weight at the cost of less storage capacity. Taken as a whole, these data support achieving a high storage capacity accepting the cost of increased weight to do so.

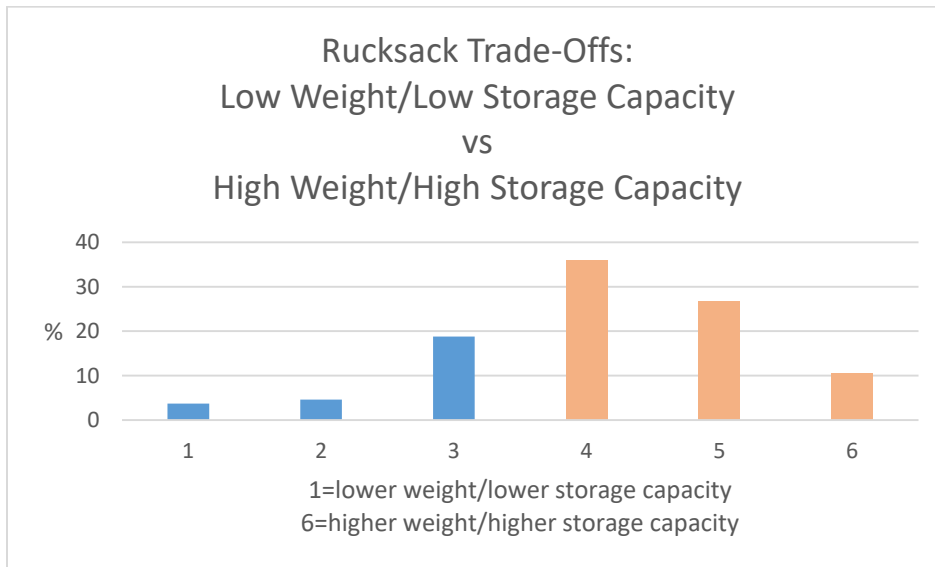


Figure 10. Expert Choice Survey Population – Rucksack Trade-Offs: Weight & Storage Capacity

For the chart below, 1–3 represent trade-offs favoring simple design, and 4–6 represent trade-offs favoring high adjustability.

Over 80% of TPs expressed a measure of 4–6 indicating a preference for high adjustability at the cost of complex design. Less than 10% of TPs expressed a measure of “1” or “2”, indicating a moderate or strong preference for simple design at the cost low adjustability. Taken as a whole, these data support achieving high adjustability at the cost of complex design to do so.

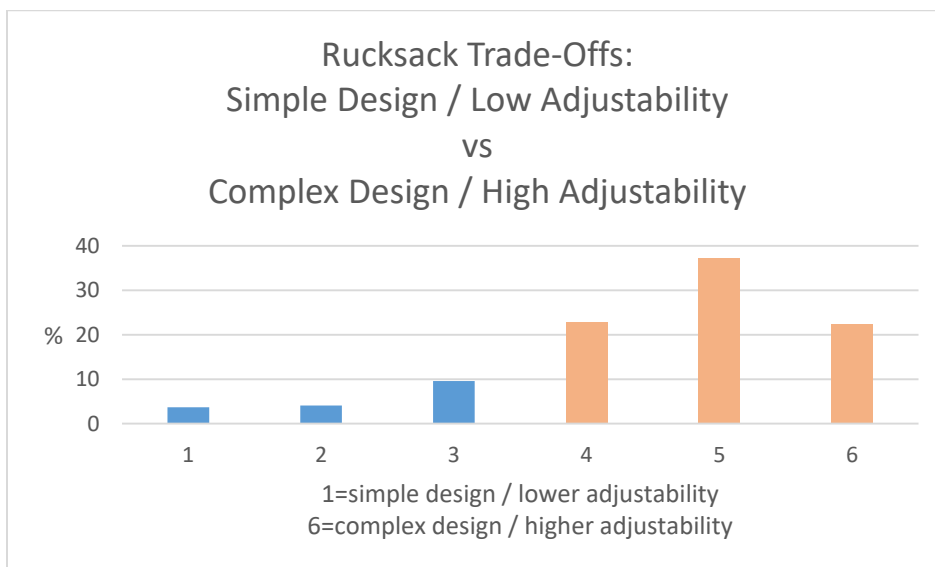


Figure 11. Expert Choice Survey Population – Rucksack Trade-Offs: Design & Adjustability

LOAD CARRIAGE SURVEY METHODS DEMOGRAPHICS AND RESULTS

METHODS

There were 300 Soldiers from 11 locations requested to support the data collection for the Individual Load Carriage Front End Analysis with a target of 3,300 Soldiers for the total population. Every Soldier (referred to as TP in this chapter) was to complete a 17 page survey (Appendix B) covering the following:

- Demographics
- Individual Spending on Load Carriage Equipment
- Equipment Compatibility
- Equipment Improvement Requests
- Weapons
- Body Armor Systems
- Rucksacks
- Load Carriage Vests
- Belts/Sub-belts
- Hydration Equipment
- Pouches

LIMITATIONS

Due to the wide scope of interest and limited time available at each data collection site (3 hours total for surveys and focus groups), the load carriage survey was not exhaustive of every possible question with regard to load management. Instead the survey's primary focus was on load carriage equipment of the individual Soldier.

DEMOGRAPHICS

Of the maximum target of 3,300 Soldiers, a total of 2,645 Soldiers completed the load carriage survey, 80.2% of potential maximum.

Supporting Units

Table 17 displays all units that participated in the load carriage survey.

Table 17. Participating Army Units – Load Management Survey

Major Army Installation	Participating Army Units	Total Survey Respondents	
		N	%
Ft. Bliss, TX	1st ABCT 1st AD 1-36 IN 4-17 IN 1st Sustainment Brigade (formerly 15th) 4th FMSU 4 th BSB	301	11.4
Ft. Drum, NY	1st BCT, 10th MTN DIV 2-22 IN 3-6 FA 10 BSB 3d BCT 10th Mountain 1-32 (3d BCT)	284	10.7
JBER, AK	4th BCT, 25th ID 1-40 CAV 1-501 PIR 2-377 PFAR 6 BEB 725 BSB 545 MP Co 673 Dental (DENTAC)	281	10.6
Fort Hood, TX	Unit data not available	264	10.0
Ft. Carson, CO	1st SBCT, 4th ID 1-38 IN 1-4 BSB 2-23 IN 4-4 ARB	264	10.0
Ft. Riley, KS	1st ABCT, 1st ID 2-34 AR 1-16 IN 1-5 FA 3-66 AR 1 ENG BN 101 BSB	246	9.3
Fort Stewart, GA	Unit data not available	232	8.8
JBLM, WA	62 MED BDE 47th CSH 218 MDVSS 520th AMSC 98th CSC 102 FST 153 rd BSD 211 CTC 250 FST 54 MP CO 593 ESC 63 ORD 42nd MP BDE 13 th CSSB 508 MP BN 504 MP CO 170 MP CO 51 MP CO 571 MP CO 13th CSSB 542 SMC 513 TRANS CO 523 CTC	231	8.7
Schofield Barracks, HI	2d IBCT, 25ID 65 th BEB 1-14 IN 3d IBCT, 25 ID 2-27th IN 2-35 IN 3-4 CAV	196	7.4
Fort Bragg, NC	Unit data not available	181	6.8
JRTC, LA	1st BN (ABN) 509th IN 3rd BCT 10th MTN DIV	165	6.3
Total	-	2645	100

Gender

Over 90% of the total population were male (Table 18).

Table 18. Load Management Survey – Population Genders

Gender	Total Population	
	N	%
Male	2453	92.7
Female	180	6.8
Blank	12	0.5

Height/Weight

The average height of the total population was 5 ft 9 in with a range of 4 ft 10 in–6 ft 11 in. The height of 50% of the total population fell within the range of 5 ft 8 in and 5 ft 11 in. The average weight of the total population was 177.6 lb with a range of 106–295 lb. The heights and weights of the TPs is shown in Table 19.

Table 19. Load Management Survey – Population Heights and Weights

Physical Demographics		
Total Population		
	Height	Weight
Mean	69.4 in/5 ft 9 in	177.6 lb
Standard Deviation	3.4876	27.3851
Range	58–83 in/4 ft 10 in – 6 ft 11 in	106–295 lb
N	1747	1734

Rank

Over 90% of all ranks from the total population fell between E-2 and E-6, with over 40% reporting E-4 (Table 20).

Table 20. Load Management Survey – Population Ranks

Total Population		
Rank	N	%
E-1	75	2.8
E-2	294	11.1
E-3	562	21.2
E-4	1096	41.4
E-5	356	13.5
E-6	139	5.3
E-7	47	1.8
E-8	9	0.3
O-1	15	0.6
O-2	39	1.5
O-3	12	0.5
WO-2	-	-
Blank	1	0.0

92.5%

Age/Years in Service/Deployments

The average age of the total population was 24.3 with a range of 18–52 years. The average years in service was 3.9 with a range of 0.5–33 years. The average number of deployments was less than 1 with a range of 0–10 deployments. The average number of months deployed was 5.1 with a range of 0–90 months. The full information can be found in Table 21.

Table 21. Load Management Survey – Mean Age, Years of Service and Deployments

Total Population				
	Age	Years in Service	# of Deployments	Total Months Deployed
Mean	24.23	3.9	<1	5.1
Standard Deviation	5.023	4.3410	1.100	10.349
Range	18–52	0.5–33	0–10	0–90
N	2623	2599	2630	2624

Deployments Detail

The majority of the total population (67.6%) indicated that they have never been deployed. Over 10% have deployed as part of OIF, and over 20% have deployed as part of OEF. Note that the percentage given in Table 22 is greater than 100, as TPs were allowed to make multiple selections.

Table 22. Load Management Survey – Deployment Details

Deployments	Total Population	
	N	%
Never been deployed	1789	67.6
Deployed OIF	284	10.7 (96.6% of these ranged from 1-3 deployments)
Deployed OEF	552	20.9 (99.0% of these ranged from 1-3 deployments)
Deployed Other	245	9.3

MOS

The table below displays only the MOS's that represented 1% of the *total population* or greater. Less than half of TPs were 11B (42.8%). The second most frequently reported MOS was 68W, Combat Medic Specialist (5.6%). All other reported MOS's represented less than 5% of the total population and are displayed in Table 23.

Table 23. Load Management Survey – Most Common MOS's

Total Population			
MOS	MOS TITLE	N	%
11B	INFANTRYMAN	1133	42.8
68W	COMBAT MEDIC SPECIALIST	147	5.6
19K	M1 ARMOR CREWMAN	123	4.7
11C	INDIRECT FIRE INFANTRYMAN	90	3.4
13B	CANNON CREWMEMBER	89	3.4
88M	MOTOR TRANSPORT OPERATOR	88	3.3
91B	WHEELED VEHICLE MECHANIC	88	3.3
19D	CALVARY SCOUT	80	3.0
12B	COMBAT ENGINEER	70	2.6
92Y	UNIT SUPPLY SPECIALIST	41	1.6
11A	INFANTRY OFFICER	38	1.4
25U	SIGNAL SUPPORT SYSTEMS SPECIALIST	36	1.4
13F	FIELD SUPPORT SPECIALIST	31	1.2

MOS: Gender Comparisons

When splitting the data of the total population by gender, there are drastically more males with the MOS Infantryman than females (over 45% males compared to less than 5% females). Females outnumber males by 5% or more for the following MOS's: Health Care Specialist, Motor Transport Operator, Unit Supply Specialist, Human Resource Specialist and Signal Support Systems Specialist. In contrast, there are nearly 5% more males with the MOS M1 Armor Crewman compared to females. Figure 12 only displays MOS's that were reported by at least 5% of either males or females.

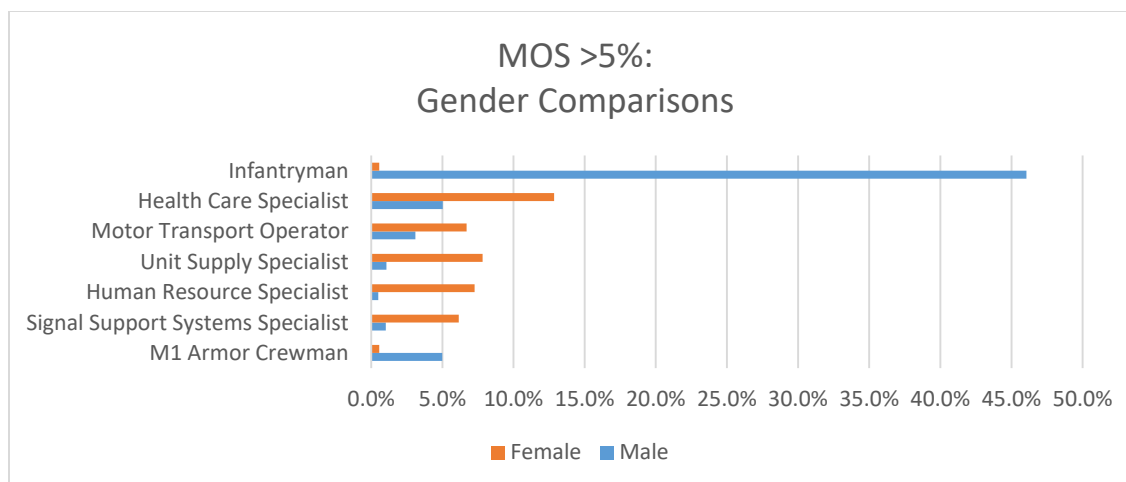


Figure 12. Load Management Survey – MOS Gender Comparisons

Branch

For the total population, nearly half of the TPs reported their branch as Infantry (47.7%), followed by Armor/Cavalry (9.0%), Ordnance (8.8%), Medical (7.8%) and Field Artillery (6.4%). All other reported branches represented less than 5% of the total population and are displayed in Table 24.

Table 24. Load Management Survey – Reported Military Branches

Branch	Total Population	
	N	%
Infantry	1262	47.7
Armor/Cavalry	239	9.0
Ordnance	232	8.8
Medical	205	7.8
Field Artillery	168	6.4
Engineer	92	3.5
Quartermaster	88	3.3
Transportation	85	3.2
Signal	80	3.0
Military Police	50	1.9
Logistics	30	1.1
Military Intelligence	29	1.1
Other	27	1.0
Adjutant General	20	0.8
Chemical	19	0.7
Aviation	6	0.2
Finance	3	0.1
Judge Advocate General	1	0.0
Chaplain Corps	1	0.0

Duty Position

Table 25 displays only the reported duty positions that represented 1% or more of each population.

For the total population, 41% of TPs' duty position was Squad Member, followed by Team Leader (16.3%), Squad Leader (6.6%) and Mechanic (5.1%). All other reported duty positions represented less than 5% of the total population.

Table 25. Load Management Survey – Reported Duty Positions

Duty Position	Total Population	
	N	%
Squad Member	1085	41.0
Team Leader	431	16.3
Squad Leader	174	6.6
Mechanic	135	5.1
Medic	103	3.9
Section Leader	90	3.4
Radio Telephone Operator	84	3.2
Platoon Sergeant	77	2.9
Gunner	40	1.5
Mortar Section Leader/Platoon Member	37	1.4
Driver	32	1.2
Platoon Leader	30	1.1
First Sergeant	-	-
Company Executive Officer	-	-
Sniper	-	-
Radio Telephone Operator	-	-

Mounted/Dismounted

Nearly 50% of the total population (48.3%) indicated that the majority of their time is spent *dismounted*. Approximately 20% indicated that the majority of their time is spend *mounted*. One-quarter of the total population indicated that their time is equally split between mounted and dismounted (Table 26).

Table 26. Load Management Survey – Time Mounted or Dismounted

Majority of your time spent...	Total Population	
	N	%
Mounted	563	21.3
Dismounted	1278	48.3
Equally split	686	25.9
Blank	118	4.5

When splitting the data of the total population by gender, males and females spend their time comparably between mounted and dismounted, with 4% more females reporting mounted and 6% fewer females reporting dismounted when compared to males (Figure 13).

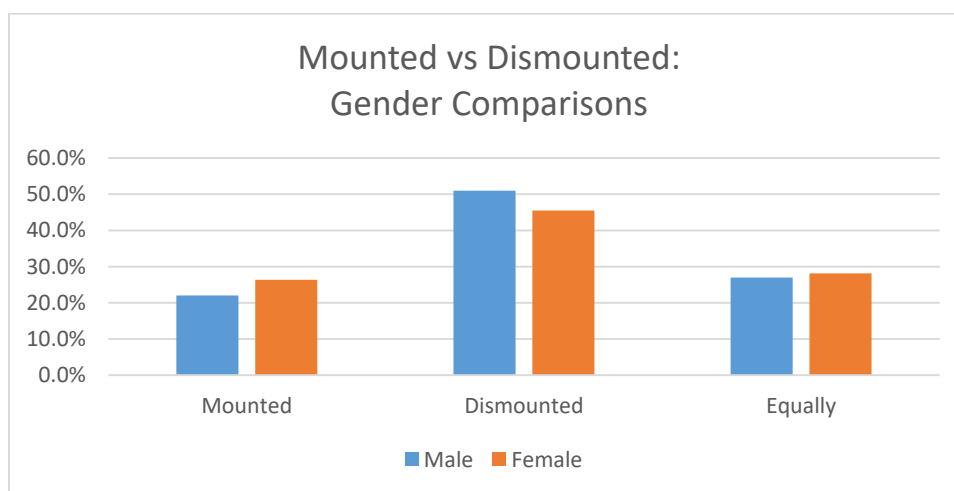


Figure 13. Load Management Survey – Mounted vs. Dismounted Gender Comparisons

Personal Money Spent on Load Carriage Equipment

When asked how much personal money TPs have spent on load carriage equipment over their military career, over half indicated they have spent less than \$100. One-third of TPs indicated that they have spent \$100–\$500 on load carriage equipment. Less than 10% have spent \$500–\$1000. Less than 5% have spent more than \$1000. See Figure 14.

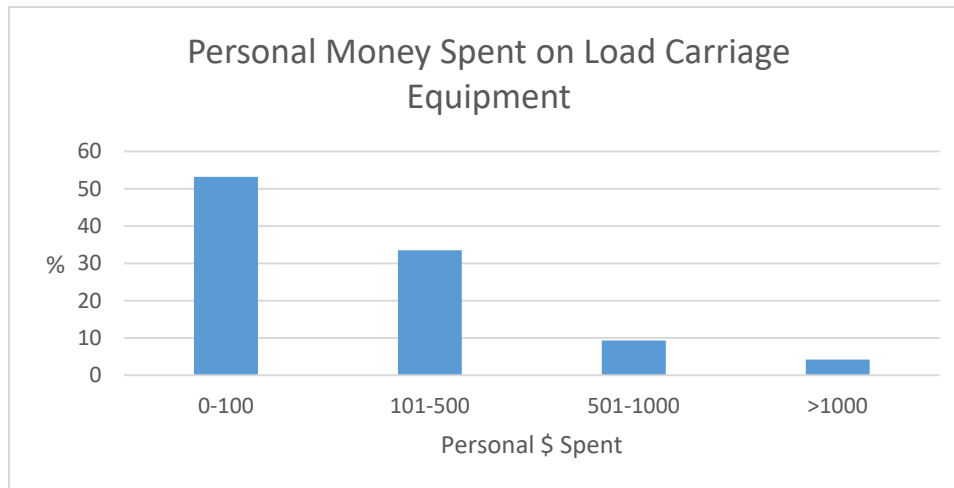


Figure 14. Load Management Survey – Personal Money Spent on Load Carriage Equipment

Table 27 displays these results in more detail. One-third of TPs indicated that they have spent zero dollars of personal money on load carriage equipment.

Table 27. Load Management Survey – Personal Money Spent on Load Carrying Equipment

Personal Money Spent on Load Carriage Equipment	N	%	
None	877	33.2	53.2%
< \$100	528	20.0	
\$101 - \$250	498	18.8	33.4%
\$251 - \$500	385	14.6	
\$501 - \$750	154	5.8	9.3%
\$751 - \$1000	92	3.5	
>\$1000	110	4.2	
Missing	1	0.0	

When splitting the data of the total population by gender and comparing personal money spent on load carriage equipment, nearly twice as many females spend zero dollars compared to males (53.9% compared to 31.7% respectively). For the range of \$1–\$99, males and females are nearly identical (20%). For all remaining ranges of increasing value, males outspend females by a range of 2.4% more (\$751–\$1000) to 7.2% more (\$251–\$500). The data are displayed in Figure 15.

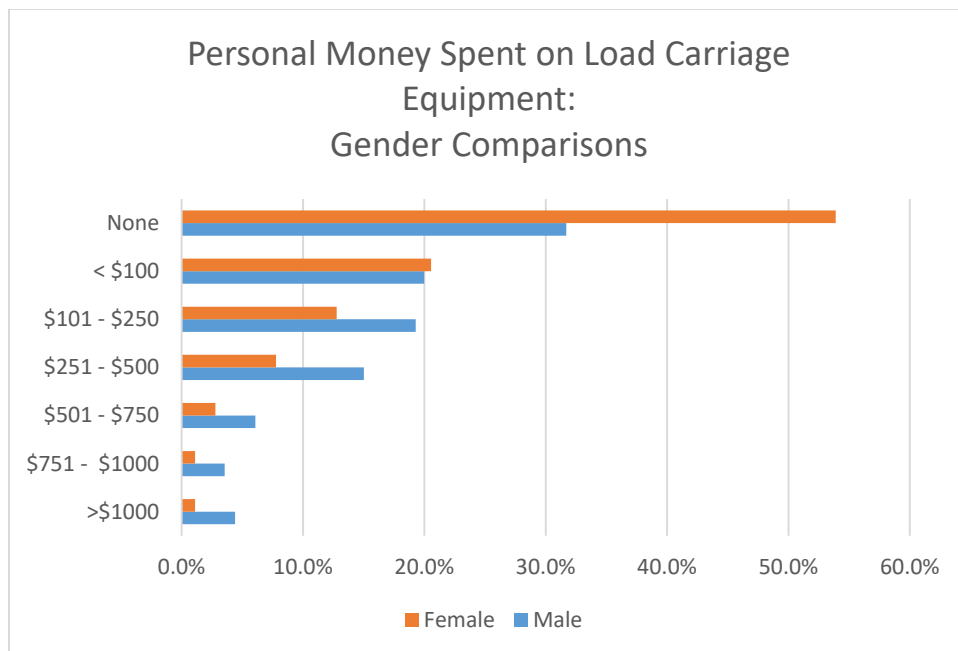


Figure 15. Load Management Survey – Personal Money Spent on Load Carriage Equipment by Gender

LOAD CARRIAGE SURVEY RESULTS

These results are from the 2,645 Soldiers that completed the load carriage survey. Soldiers are referred to as TPs in this section.

COMPATIBILITY PAIRINGS

Section Summary

This section covers the compatibility of 14 pairings of load carriage equipment.

- The two most frequently reported compatibility challenges (each over 50% of the total population) were for the following pairings of attributes:
 - Rucksack shoulder straps & acquiring a target
 - Rucksack shoulder straps & body armor
- The following five pairings were reported as having compatibility problems by 38–42% of the total population:
 - Rucksack frame & rear ballistic plate
 - Rucksack waist-belt & fighting load
 - Acquiring a target & body armor
 - Rucksack shoulder straps & fighting load
 - Rucksack & tube hydration
- The following five pairings were reported as having compatibility problems by 30–34% of the total population:
 - Rucksack waist-belt & lower soft armor
 - Body armor quick release & rucksack shoulder straps
 - Quick release shoulder buckle & rucksack shoulder straps
 - Rucksack waist-belt & secondary belts/sub-belts
 - Body armor quick release & fighting load/chest rig

TPs were presented with a series of pairings of equipment and asked to determine for each pairing if they were compatible with no problem, compatible but require modification/significant effort, or not compatible. TPs were also given the opportunity to select 'not applicable' if a particular equipment

pairing was not relevant to them. The chart below combines all answers for ‘compatible but requires a modification/significant effort’ and ‘no, these are not compatible’ and are treated as ‘compatibility challenges’.

The pairings of *rucksack shoulder straps & acquiring a target*, and *rucksack shoulder straps & body armor* are the two most frequently reported compatibility challenges, each over 50% of the total population. Note that rucksack shoulder straps are in both of the top compatibility challenge pairings. Focus group data supports that any equipment that shares space with the shoulder pocket creates a challenge for firm positioning of a butt stock when acquiring a target. Body armor that cuts away towards the chest helps provide more space, as well as rucksack shoulder straps that curve inward at the shoulder pocket. Additionally, the challenge created from rucksack shoulder straps and body armor is the rucksack shoulder straps tend to slide out towards the deltoids due to slippage over the body armor shoulder straps. This decreases a Soldier’s ability to raise their arms fully and can cause numbness down the arms and into the hands on ruck marches.

The following five pairings were indicated as compatibility challenges by 38–42% of the total population: *rucksack frame & rear ballistic plate*, *rucksack waist-belt & fighting load*, *acquiring a target & body armor*, *rucksack shoulder straps & fighting load*, and *rucksack & tube hydration*.

The following five pairings were indicated as compatibility challenges by 30–34% of the total population: *rucksack waist-belt & lower soft armor*, *body armor quick release & rucksack shoulder straps*, *quick release shoulder buckle & rucksack shoulder straps*, *rucksack waist-belt & secondary belts/sub-belts*, and *body armor quick release & fighting load/chest rig*.

See Figure 16 and Table 28 for details.

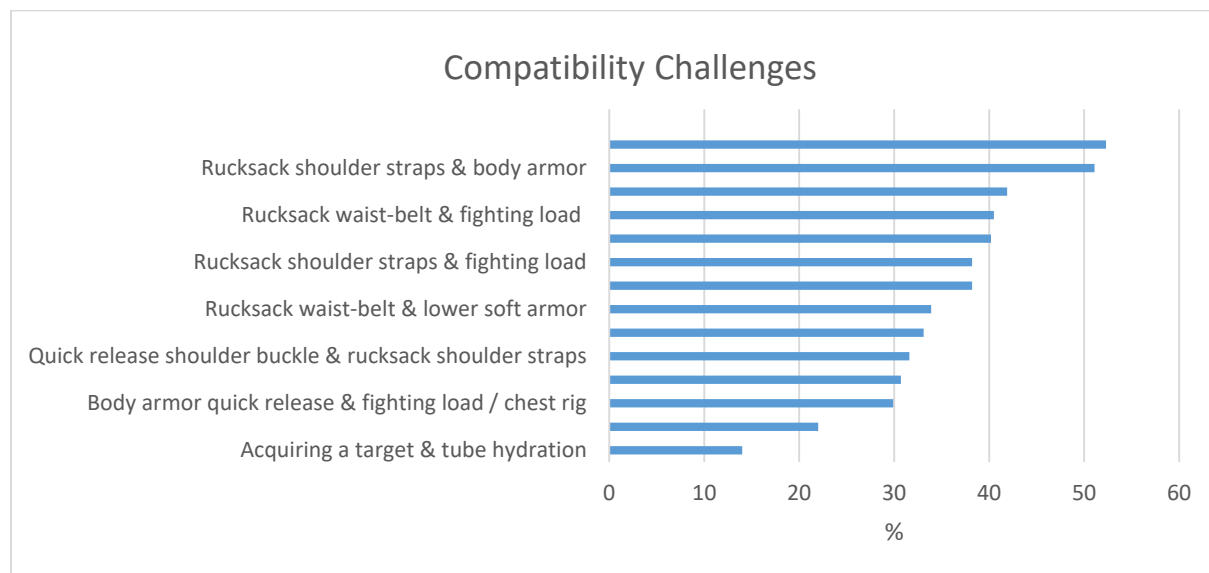


Figure 16. Load Management Survey – Equipment Pairing Compatibility Challenges

Table 28. Load Management Survey – Compatibility Challenges

Pairings compatible?	YES, with no problem %	Problematic/Incompatible %	N/A %
Rucksack shoulder straps & acquiring a target	28.9	52.3	18.9
Rucksack shoulder straps & body armor	36.7	51.1	12.2
Rucksack frame & rear ballistic plate	39.7	41.9	18.4
Rucksack waist-belt & fighting load	38.2	40.5	21.3
Acquiring a target & body armor	47.8	40.2	11.9
Rucksack & tube hydration	52.5	38.2	9.4
Rucksack shoulder straps & fighting load	47	38.2	14.8
Rucksack waist-belt & lower soft armor	37.9	33.9	28.2
Body armor quick release & rucksack shoulder straps	43.2	33.1	23.9
Quick release shoulder buckle & rucksack shoulder straps	39.4	31.6	29
Rucksack waist-belt & secondary belts/sub-belts	24.9	30.7	44.4
Body armor quick release & fighting load/chest rig	43.4	29.9	26.7
Acquiring a target & fighting load	63.6	22.0	14.4
Acquiring a target & tube hydration	72.9	14.0	13.1

TPs were asked to provide open ended feedback explaining any compatibility challenges they experienced with each equipment pairing from above. Table 29 displays qualitative summaries for each equipment pairing, as well as the percentage of TPs that expressed a compatibility challenge with each pairing.

Overall, the findings tend to focus on rucksack shoulder straps and body armor shoulder straps interfering with shouldering a weapon and getting a good sight picture. Additionally, rucksack shoulder straps tend to drift outwards towards the deltoids caused by the body armor shoulder straps, resulting in reduced range of motion and numb arms/fingers. Other general themes that are widely applicable to these equipment pairings cover bulk caused by equipment incompatibilities that reduces range of motion. Of note is the high frequency of use of tube hydration systems, and the reoccurring theme of the challenge presented by where to store the bladder so that it doesn't pop but can still be accessible.

Table 29. Load Management Survey – Compatibility Challenges Explanations

Equipment Pairings	Qualitative Summaries Explaining Compatibility Challenges		
Rucksack shoulder straps & Acquiring a target <i>Compatibility Challenge = 52.3%</i>	General Themes: -Bulky -Uncomfortable	Shoulder Straps: -Ruck shoulder strap is in the shoulder pocket where the buttstock should be -Cuts off circulation -Gets in the way of firing positions -Too bulky -Falls off frequently	Target Acquisition: -Limited range of motion/mobility/hard to maneuver -Can't aim/get good sight picture
Rucksack shoulder straps & Body armor <i>Compatibility Challenge = 51.1%</i>	General Themes: -Uncomfortable -Too bulky -Constantly adjusting -Doesn't fit right -Hard to move/lack of mobility -No range of motion	Body Armor: -Too bulky for the ruck	Shoulder Straps: -Lose circulation in your arms from digging into shoulders (too much pressure) -Rucksack shoulder straps fall off the armor very often (sits too far out on the body armor shoulder straps)
Rucksack frame & Rear ballistic plate <i>Compatibility Challenge = 41.9%</i>	General Themes: -Too bulky -Gets in the way -Too heavy	Rear Ballistic Plate: -Uncomfortable -Chaffing -Doesn't sit properly	Frame: -Uncomfortable -Not flexible enough -Frame fits curvature of spine but ballistic plate is straight (contradict each other causing pain, frame should be molded to the plate or vice versa) -Design causes plate to be pushed against back causing lower back pain/pressure
Rucksack waist-belt & Fighting load <i>Compatibility Challenge = 40.5%</i>	General Themes: -Uncomfortable -Bulky -Issues w/ fit -Chaffing -Too much weight -Mobility concerns -Too much going on/too many layers	Fighting Load: -FLC needs to be lifted to not interfere with waist-belt -FLC and ruck get in the way of each other -Buckle on low back of FLC rubbing	Waist belt: -Issues with belts overlapping -Belt doesn't fit over FLC -Belt interferes with access to ammo/sustainment pouches -Hard to put things on the ruck waist belt -Needs more adjustability (some say too tight, some say too loose)
Acquiring a target & Body armor <i>Compatibility Challenge = 40.2%</i>	General Themes: -Uncomfortable -Bulky -Body armor shoulder straps are too thick and too wide, taking up too much of the shoulder pocket	Armor: -Too big/heavy -Throws off target acquisition -Limits the soldier to not be able to perform all firing positions -Decreases mobility/maneuverability/range of motion	Target Acquisition: -Can't seat the buttstock -Can't get a good sight picture -IOTV makes shooting difficult
Rucksack & Tube hydration <i>Compatibility Challenge = 38.2%</i>	General Themes: -Uncomfortable -Unbalanced -Water leaks out -Tube hydration bladder needs designated spot (built in pouch or clip attachments were suggested) -Hose needs a hole through the shoulder strap to keep water in reach and accessible	Bladder: -Doesn't fit in ruck -Pops in the ruck under pressure -Gets dirty -Can't get water out because of the pressure of the ruck on the bladder	Hose: -Gets kinked/pinched -Isn't long enough -Falls out of reach often
Rucksack shoulder straps & Fighting load <i>Compatibility Challenge = 38.2%</i>	General Themes: -Uncomfortable -Bulky -Snags -Hard to move/limited mobility -FLC gets in the way	Shoulder Straps: -Loss of circulation/feeling in arms (digs into shoulders/causes pressure) -Need more padding -Need to be adjustable for comfort -Blocks access to mags/armor	

Table 29. Load Management Survey – Compatibility Challenges Explanations (continued)

Equipment Pairings	Qualitative Summaries Explaining Compatibility Challenges		
Rucksack waist-belt & Lower soft armor <i>Compatibility Challenge = 33.9%</i>	General Themes: -Uncomfortable -Issues w/ fit -Too bulky -Lower soft armor gets in the way -Concerned about mobility/range of motion	Waist Belt: -Can't clip because of armor -Pushes armor up or down if belt is worn -Chaffing -A lot of Soldiers don't use the waist belt	
Body armor quick release & Rucksack shoulder straps <i>Compatibility Challenge = 33.1%</i>	General Themes: -Too bulky -Uncomfortable -Body armor does not release entirely, back portion of armor held on by ruck	Shoulder Straps: -Access to quick release is blocked by rucksack shoulder straps -Pressure on shoulders	Quick Release: -Quick release gets stuck/won't quick release -Clip digs into shoulder (because ruck strap is over clip) -Hard to reach
Quick release shoulder buckle & Rucksack shoulder straps <i>Compatibility Challenge = 31.6%</i>	General Themes: -Too many straps going on -Armor won't quick release	Quick Release: -Access to quick release is blocked by FLC and ruck shoulder straps -Buckle digs into shoulders -Can't reach release	Shoulder Straps: -Straps dig into shoulders
Rucksack waist-belt & Secondary belts/sub-belts <i>Compatibility Challenge = 30.7%</i>	General Themes: -Chaffing -Uncomfortable -Snagging -Too bulky	Belts: -Belts need adjustability for comfort -Belts on belts is too tight (they both fall in the same place) -Don't need two belts	
Body armor quick release & Fighting load/chest rig <i>Compatibility Challenge = 29.9%</i>	General Themes: -Uncomfortable -Blocks access to armor	Quick Release: -Doesn't work with ruck/FLC/chest rig -Gets caught on FLC when dropping	
Acquiring a target & Fighting load <i>Compatibility Challenge = 22.0%</i>	General Themes: -Bulky -Uncomfortable -Not enough mobility -FLC gets in the way -Can't shoulder weapon -Awkward fitting		
Acquiring a target & Tube hydration <i>Compatibility Challenge = 14.0%</i>	General Themes: -Need more range of motion/mobility	Bladder: -Leaks -Pops	Hose: -Needs more accessibility (Bounces around, needs attachment point to keep accessible) -Gets pinched/kinked -Gets in the way of the buttstock

EQUIPMENT IMPROVEMENT REQUESTS

TPs had the opportunity to provide open ended feedback on load bearing equipment that they would like to see improved, and what improvements are most important to them. All open ended feedback was condensed into the four categories below summarizing Soldiers' requests.

General:

- Shoulder straps are a top priority to improve, both body armor and rucksack shoulder straps. Both need more padding and rucksack shoulder straps need to be redesigned so that they do not slip over body armor shoulder straps, restricting movement. The majority of the individual Soldier's load carriage weight is carried on the shoulders.

- Need female designed load carriage equipment (smaller frames, shoulder straps that are closer together/more narrow, design that conforms to chest and hips)

Body Armor:

- Better padding on IOTV straps
- Plate carrier should replace IOTV
- Make IOTV less bulky
- Get rid of IOTV
- Body armor redesigned to allow for all firing positions/Pocket for buttstock w/ IOTV
- Reduce size/weight of body armor

FLC:

- TAP should replace FLC
- FLC needs padding
- FLC should be integrated into a plate carrier
- Pocket for buttstock w/ FLC

Rucksacks:

- A ruck like tactical tailor or ALICE pack
- Add pouches for hydration/more sustainment pouches/ASIP radio pouches
- Capability to hold 10 or more rounds
- Wider mag pouches
- Redesign battle belts
- Better shoulder straps for ruck
- Metal frame in all rucks, plastic frames squeak when rucking

WEAPONS & SLINGS

Section Summary

This section covers weapons carried currently, during deployments, and preferred weapon slings.

- The M-4A1 Rifle/M-16A2 Rifle are carried by approximately 90% of TPs both during deployments and when not deployed.
- The following weapons are carried 15–25% more frequently during deployments than when not deployed: 9mm Pistol, SAW, M-240, M-320 Grenade Launcher, M-203 Grenade Launcher, Shotgun and AT-4.
- Weapon sling preferences between 1-point, 2-point and 3-point are all within 15% of each other, with 2-point slings preferred by 33% of TPs, 1-point preferred by 21%, and 3-point preferred by 18%.

Weapons Carried (Deployments and Currently)

TPs were asked to select all weapons they have carried during deployments, as well as what weapons they carry currently. Of the 2,645 TPs, 930 answered that they *have* been deployed and provided answers to weapons carried during deployments. Figure 17 displays three groups: weapons carried during deployments (for the 930 that have been deployed), weapons carried currently by those same 930 (for direct comparison), and the total population for weapons carried currently. The M-4/M-16 is the most consistently carried weapon for all three groups. Every weapon listed is carried more frequently during deployments than when not deployed. Notably, the 9mm, SAW and M-240 are reported by more than 30% of TPs as being carried during deployments compared to when not deployed (5%–15%).

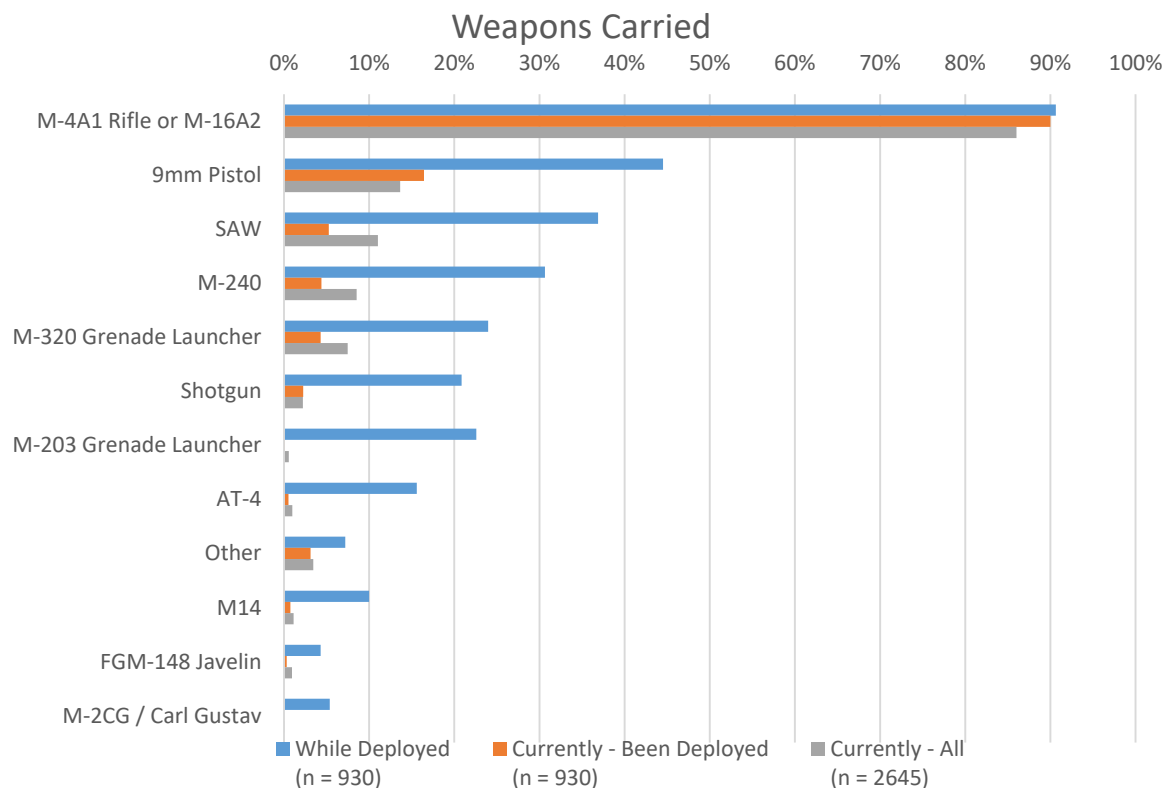


Figure 17. Load Management Survey – Weapons Carried

Preferred Weapon Sling

A 2-point sling is the most preferred weapon sling by one-third of the total population, followed by 21.3% preferring a 1-point sling. Nearly identical percentages of TPs are not sure which they prefer as those that prefer the 3-point sling (17.9% and 17.8% respectively). These data are available in Table 30.

Table 30. Load Management Survey – Preferred Weapon Sling for Individual Weapon

Preferred Weapon Sling For Your Individual Weapon	N	%
2-point	878	33.2
1-point	564	21.3
Not sure	468	17.9
3-point	471	17.8
N/A	192	7.3
Other	46	1.8

PISTOLS & HOLSTERS

Section Summary

This section covers pistol and holster usage currently and during deployments, and holster attributes.

- Of the 2,645 TPs, only 15% (n=402) reported carrying pistols; approximately 25% of these TPs' MOSs are 19K (M1 Armor Crewman) and 11B (Infantryman). Note that there are only eight TPs who reported that they are Military Police (MP); all eight MPs reported that they carry a pistol.
- Of the 15% of the total population (n=402) that carry a pistol generally, 56% lanyard their pistol.
- Of the 15% of the total population (n=402) that carry a pistol generally, opinions on the importance for holsters to accommodate mounted sites, lasers, silencers etc. range from *not at all important* (32.6%) to *critically important* (9.0%) with 40% indicating this accommodation is *slightly/moderately important*.

- Nearly half of these TPs (41%) indicate that a faster draw capability is *more important* than protection from the elements; 36% find them to be equally important; 10% indicate protection from the elements is more important than faster draw capability.
- Holster location preferences are comparable with 37% preferring hip/waist/belt, 32% preferring drop leg/thigh, and 20% preferring the chest.
- Of the 15% of the total population (n=402) that carry a pistol generally, less than half (n=164) reported carrying a pistol in combat on their last deployment.
- Of those 164 TPs that carried a pistol in combat, nearly 75% used a Black Hawk Serpa holster.
- Of those 164 TPs that carried a pistol in combat, 40% drew their pistol in combat on their last deployment.

Carry A Pistol (Generally)

Of the total population, only 15% report carrying pistols (Table 31).

Table 31. Load Management Survey – Percentage Carrying a Pistol

Do you carry a pistol?	N	%
Yes	402	15.2
No	2227	84.2
Missing	16	0.6

Table 32 below displays the MOS's for the TPs that indicated that they carry a pistol (only MOS's that represent 1% or more of this sub-population are displayed). Of the 402 TPs that indicated that they carry a pistol, 26.4% were M1 Armor Crewman, 24.4% were Infantryman, 12.9% were Combat Medic Specialists, and 5.5% were Cavalry Scouts. Note that although only eight MPs (2% of this sub-population) indicated that they carry a pistol, there are only eight MPs in the total population. Thus, MPs may be under-represented in this sub-population.

Table 32. Load Management Survey – MOS and Carrying a Pistol

Yes, Carry A Pistol			
MOS	MOS TITLE	N	%
19K	M1 ARMOR CREWMAN	106	26.4
11B	INFANTRYMAN	98	24.4
68W	COMBAT MEDIC SPECIALIST	52	12.9
19D	CAVALRY SCOUT	22	5.5
11A	INFANTRY OFFICER	17	4.2
11C	INDIRECT FIRE INFANTRYMAN	17	4.2
91B	WHEELED VEHICLE MECHANIC	17	4.2
31B*	MILITARY POLICE	8	2.0
88M	MOTOR TRANSPORT OPERATOR	4	1.0

Carry A Pistol (Deployments/Combat)

The data displayed in Table 33 are a subset of the total population: only the 402 TPs who indicated that they generally carry a pistol. Of those 402 TPs, less than half (40.8%) indicated that they carried a pistol in combat on their last deployment.

Table 33. Load Management Survey – Ever Carry Pistol on Last Combat Deployment?

On your last deployment, did you ever carry a pistol in combat?	N	%
Yes	164	40.8
No	188	46.8
Missing	50	12.4

Holsters

The data in Table 34 are only from the 164 TPs who indicated that they carried a pistol in combat on their last deployment. Of those 164 TPs, nearly three-quarters carried a Black Hawk Serpa holster, followed by 10.4% indicating that they carried a Safariland holster. Note the answers below are ‘select all’, so the total percentage is greater than 100%.

Table 34. Load Management Survey – Holsters Carried in Combat on Last Deployment

If yes, what holster did you carry?	N	%
Black Hawk Serpa	119	72.6
Safariland	17	10.4
Other	15	9.1
Ambidextrous Fabric Holster	11	6.7
G-Code	6	3.7

Pistol Drawn In Combat

The data in Table 35 are only from the 164 TPs who indicated that they carried a pistol in combat on their last deployment. Less than half (39.6%) indicated that they drew their pistol in combat on their last deployment.

Table 35. Load Management Survey – Pistol Drawn in Combat on Last Deployment

On your last deployment, did you ever draw your pistol in combat?	N	%
Yes	65	39.6
No	99	60.4

Pistol Lanyards

The data displayed in Table 36 are only from the 402 TPs who indicated that they carry a pistol. Over half of these TPs (56.2%) lanyard their pistol.

Table 36. Load Management Survey – Do You Lanyard Your Pistol

Do you lanyard your pistol?	N	%
Yes	226	56.2
No	72	17.9
N/A	52	12.9
Missing	52	12.9

Holster Accommodations

The data in Figure 18 are only from the 402 TPs who indicated that they carry a pistol. One-third of these TPs indicated that it is *not at all important* for their pistol holster to accommodate mounted sites, lasers, silencers, etc. One-fifth of these TPs indicated that it is *slightly important* for their pistol holster to accommodate these same items. Nearly the same percentage (19.9%) indicated that it is *very important* for their pistol holsters to accommodate these same items. Nearly 10% indicated that it is *critically important* that their pistol holsters accommodate mounted sites, lasers, silencers, etc.

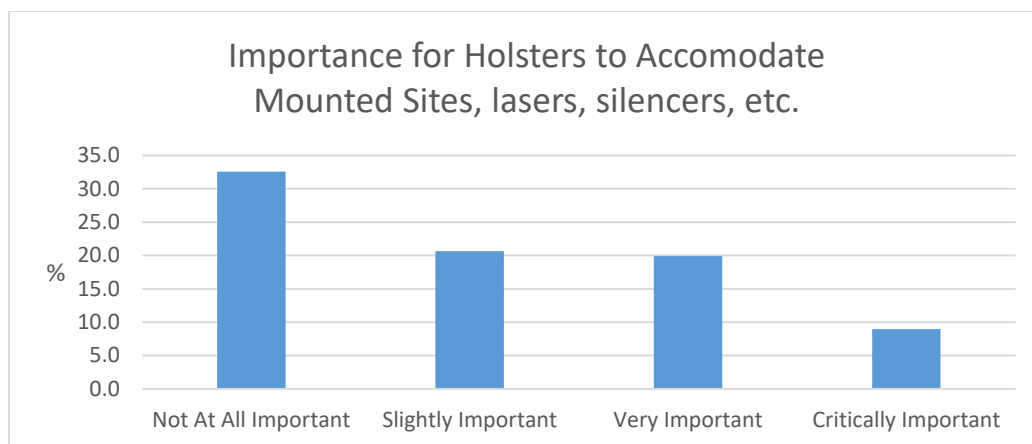


Figure 18. Load Management Survey – Importance for Holsters to Accommodate Mounted Sites, Lasers, Silencers, etc...

Faster Draw and Protection From The Elements

The following data are only from the 402 TPs who indicated that they carry a pistol. When asked which was more important, protection from the elements or faster draw capability, a combined 40.8% indicated that *faster draw capability* is *more important* than *protection from the elements*. See Figure 19 and Table 37 for details.

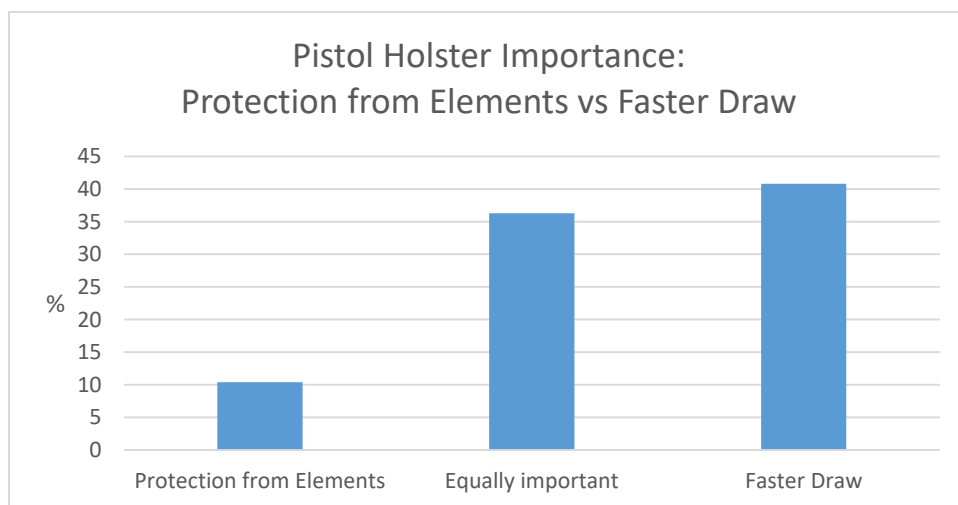


Figure 19. Load Management Survey – Pistol Holster Importance – Protection from Elements vs. Faster Draw

Table 37. Load Management Survey – Holster Preference – Faster Draw or Protection from the Elements?

Which is more important to you in a holster, faster draw capability or more protection from the elements?	N	%	% Combined	
Protection from elements much more important	15	3.7	10.4	Protection from elements
Protection from elements more important	27	6.7		
Equally important	146	36.3	40.8	Faster Draw
Faster draw more important	73	18.2		
Faster draw much more important	91	22.6		
N/A	20	5.0		
Missing	30	7.5		

Holster Location Preference

The following data are only from the 402 TPs who indicated that they carry a pistol. When asked which is the preferred location for holsters, 36.8% indicated that they prefer the hip/waist/belt, followed by 31.8% preferring drop leg/thigh, and 20.4% preferring the chest. See Figure 20 and Table 38 for details.

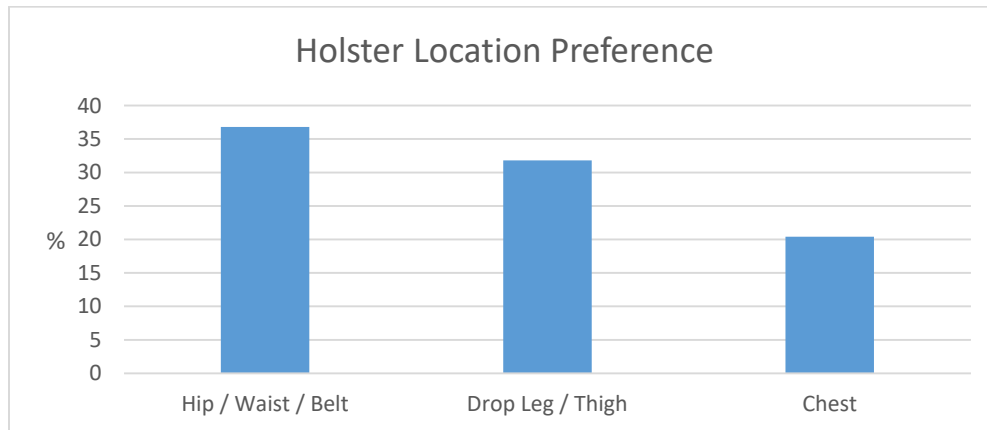


Figure 20. Load Management Survey – Holster Location Preference

Table 38. Load Management Survey – Where Do You Prefer to Locate Your Holster?

Where do you prefer to locate your holster?	N	%
Hip/Waist/Belt	148	36.8
Drop Leg/Thigh	128	31.8
Chest	82	20.4
Other	4	1.0
Missing	40	10.0

BODY ARMOR SYSTEMS

Section Summary

This section covers body armor worn currently and during deployments, body armor preferences, area of coverage and mobility, and quick release mechanisms.

- IOTV Gen III is the most consistently worn body armor during deployments and when not deployed (by 35–45% of TPs)
- The Solder Plate Carrier System (SPCS) is worn nearly just as often as IOTV Gen III during deployments (~45%), but is worn significantly less often when not deployed (by only 5–15% of TPs)
- Auxiliary protection equipment was worn significantly more often when deployed than when not deployed:
 - Groin protector: 38% during deployments, ~15% when not deployed
 - Collar/yoke: 36% during deployments, ~15% when not deployed
 - DAPS: 23% during deployments, <5% when not deployed
 - Protective Undergarment (PUG): 13% during deployments, <2% when not deployed
 - Protective Overgarment (POG): 10% during deployments, <2% when not deployed
- The SPCS is the most preferred body armor by over 35% of TPs; the second most preferred body armor is the IOTV Gen III by 15% of TPs
- Individual body armor preferences were primarily driven by the following four attributes: Mobility/Agility (60%), Comfort (52%), Range of Motion (49%) and Weight (45%)

- Individual body armor preferences were secondarily driven by the following: ability to effectively distribute load (19%), compatibility with other load carriage items (16%), area of coverage/protection (12%) and cost (<5%)
- The SPCS and commercial body armor (all commercial body armor users combined) were the two most preferred body armor systems for the attributes of mobility/agility, comfort, range of motion and weight
- The Female IOTV was preferred by 30% of females compared to <1% of males. It is important to note that females only make up 7% of this test population. Focus group data revealed that very few females have had the opportunity to use the Female IOTV but have all anecdotally heard high praise from females that had used it. The females that had used the Female IOTV in these focus groups described it as the best body armor they had worn, citing improved fit particularly around the hips and chest.
- In a scenario where IED threats are low and direct fire threats are high, 70% of TPs prefer less area of coverage in their body armor for increased mobility; in this same scenario, 70% of males also prefer less area of coverage for increased mobility compared to females who are nearly evenly split (55% more area of coverage for increased protection and 45% less area of coverage for increased mobility).
- In a scenario where IED threats are high and direct fire threats exist, nearly 60% prefer more area of coverage in their body armor for increased protection; in this same scenario, nearly 60% of males and over 75% of females also prefer more area of coverage in their body armor for increased protection.
- Twenty percent of TPs use their body armor quick release mechanism to doff their body armor for convenience; 80% of these TPs feel that this convenience usage gives them more confidence in using their quick release in an emergency.
- Less than 5% of the total population have used their quick release mechanism in an emergency to doff their body armor.

Body Armor Systems Worn (Deployments and Currently)

TPs were asked to select all body armor systems they have worn during deployments, as well as which body armor systems they wear currently. Of the 2,645 TPs, 919 indicated that they *have* been deployed and provided answers to body armor systems worn during deployments. Figure 21 displays three groups: body armor systems worn during deployments (for the 919 that have been deployed), body armor systems worn currently by those same 919 (for direct comparison), and the total population for body armor systems worn currently.

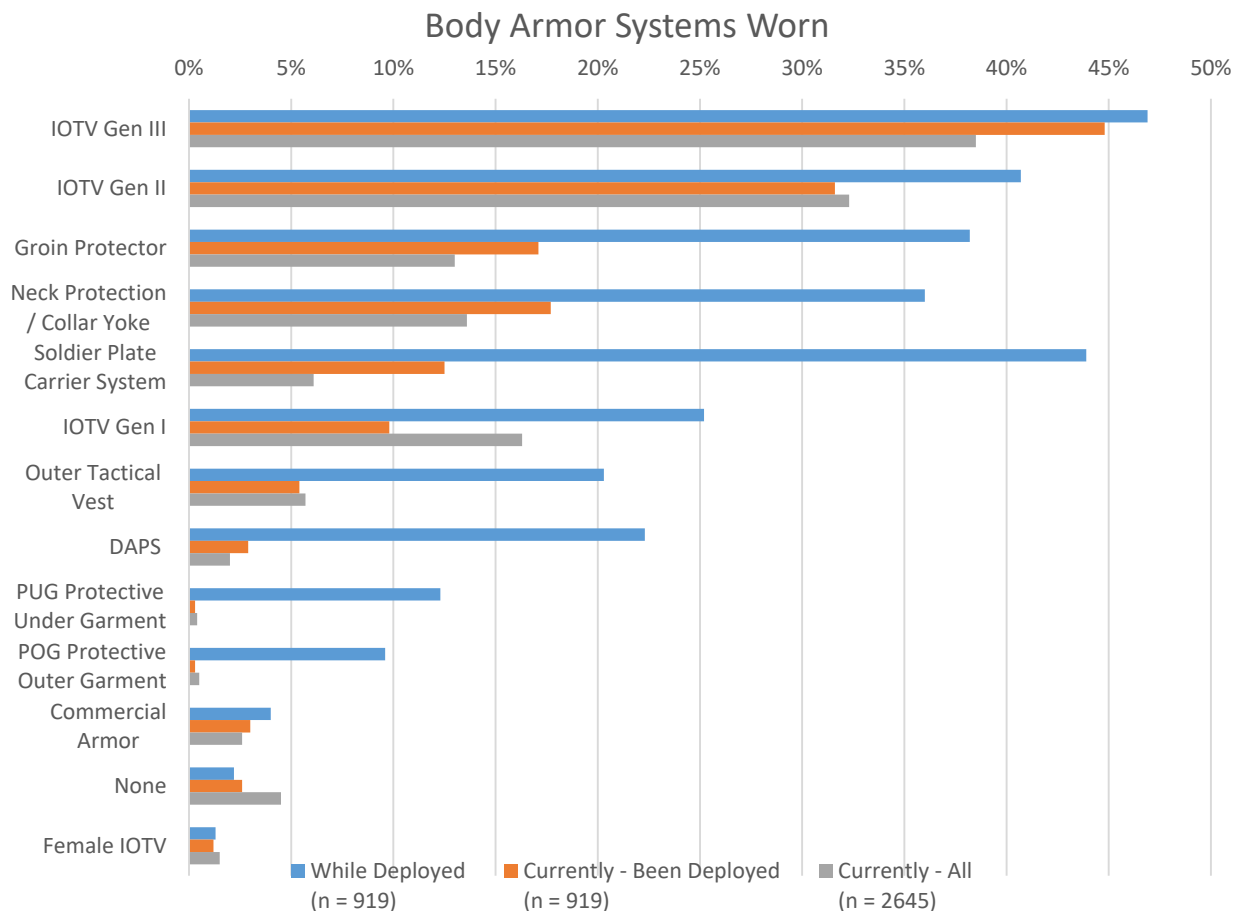


Figure 21. Load Management Survey – Body Armor Systems Worn

Deployments

IOTV Gen III, the SPCS, and IOTV Gen II were the three most frequently worn body armor systems during deployments, ranging between 41–47% of TPs who indicated they have been deployed. The groin protector and neck protection/collar yoke were reported as worn by 38% and 36% respectively of TPs during deployments, compared to 22% for the DAPS during deployments, and only 12% and 9% for the PUG and POG respectively during deployments.

Currently

When TPs answered for what they wear currently, IOTV Gen III and Gen II were the two most frequently reported at 39% and 32% respectively. The SPCS was reported as currently worn by only 6% of TPs. Note that these figures do not necessarily reflect preference, but are more an indication of what is available to Soldiers currently and during deployments.

Body Armor Preferences

The Soldier Plate Carrier System is preferred by over 35% of the total population. The second most preferred response was ‘I have no preference’ (23%), followed by IOTV Gen III (14.8%). See Figure 22 and Table 39 for more detail.

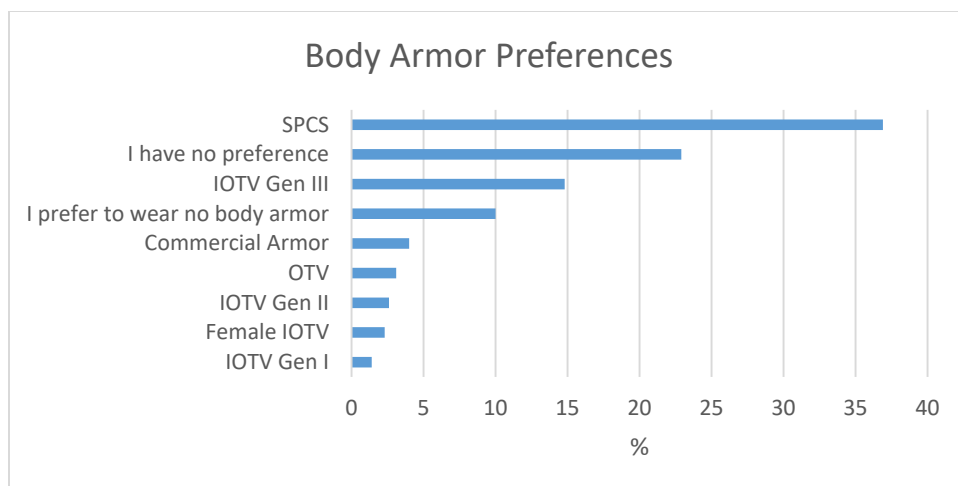


Figure 22. Load Management Survey – Body Armor Preferences

Table 39. Load Management Survey – Preferred Body Armor System?

Preferred Body Armor System?	N	%
SPCS	975	36.9
I have no preference	607	22.9
IOTV Gen III	391	14.8
I prefer to wear no body armor	265	10
Commercial Armor	107	4
OTV	81	3.1
IOTV Gen II	69	2.6
Female IOTV	61	2.3
Missing	51	1.9
IOTV Gen I	38	1.4

Attributes of Body Armor Preference

TPs were asked to select all attributes that contributed to their preference for the body armor they selected. The chart below displays an aggregate of all responses combined for attributes that contributed to body armor preference. Regardless of the specific body armor system selected, *mobility/agility* was the most frequently selected attribute for why any body armor system was preferred (59%), followed by *comfort* (53.4%), *range of motion* (49.1%), and *weight* (45.4%). See Figure 23 and Table 40 for more detail.

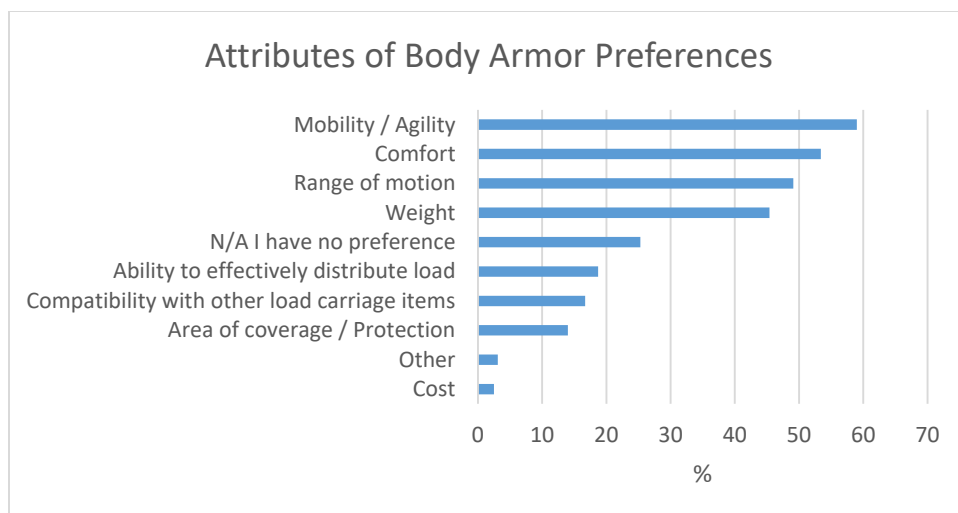


Figure 23. Load Management Survey – Attributes of Body Armor Preferences

Table 40. Load Management Survey – Why Did You Prefer the Body Armor System You Selected?

Why did you prefer the body armor you selected above?	N	%
Mobility/Agility	1560	59.0
Comfort	1413	53.4
Range of motion	1300	49.1
Weight	1202	45.4
N/A I have no preference	670	25.3
Ability to effectively distribute load	495	18.7
Compatibility with other load carriage items	443	16.7
Area of coverage/ Protection	371	14
Other	83	3.1
Cost	66	2.5

Body Armor Preference: By Attribute

The chart below displays each attribute and the percentage that each body armor system was preferred for that attribute. For those TPs that preferred commercial body armor or the SPCS, 70–90% of those preferences were based on mobility/agility, comfort, range of motion, and weight. For those TPs that preferred the Female IOTV, 70% preferred it for comfort and nearly 60% preferred it for mobility/agility. For those TPs that preferred OTV, over 75% preferred it for mobility/agility, over 60% preferred it for comfort, and over 50% preferred it for range of motion. See Figure 24 for more detail.

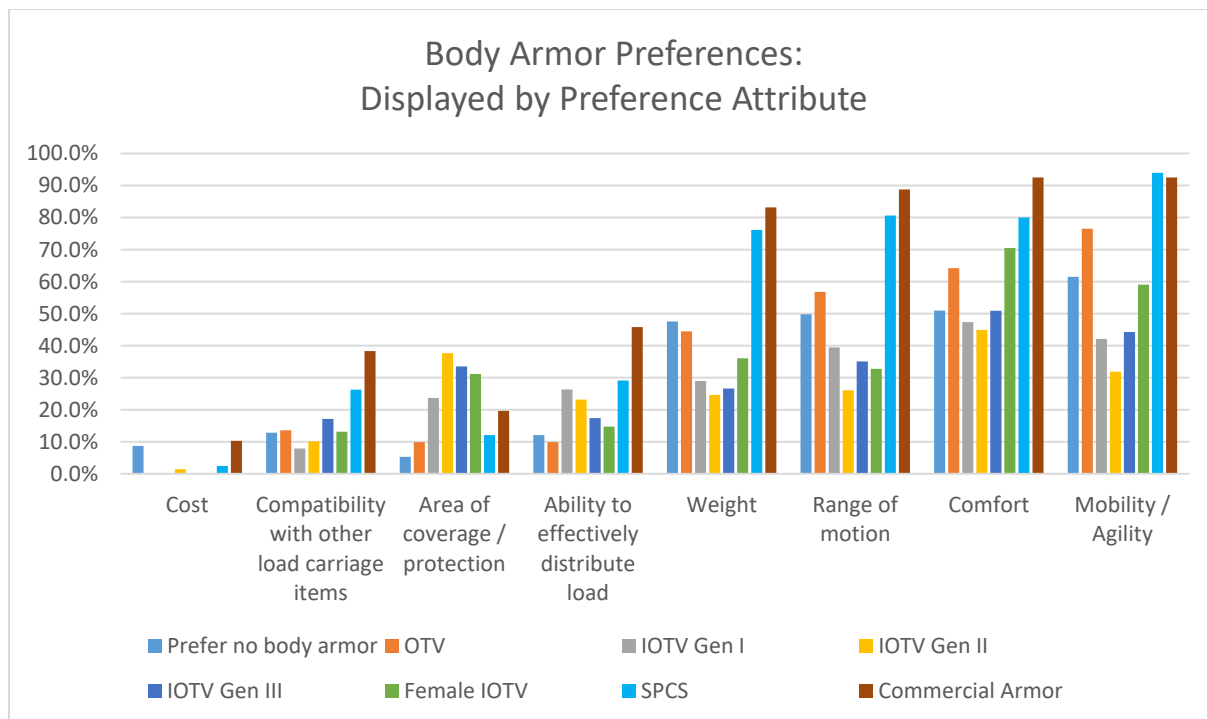


Figure 24. Load Management Survey – Body Armor Preferences: Displayed by Preference Attribute

Body Armor Preference: By Body Armor Type

Figure 25 displays each body armor system and the attributes for which it was preferred. For each body armor system, *comfort* and *mobility/agility* were the two most frequently cited attributes that contributed to preferring that body armor system, followed by *weight* and *range of motion*. IOTV Gen II, Gen III and Female IOTV were the three most preferred body armor systems (by 31–38%) for the attribute *area of coverage/protection*.

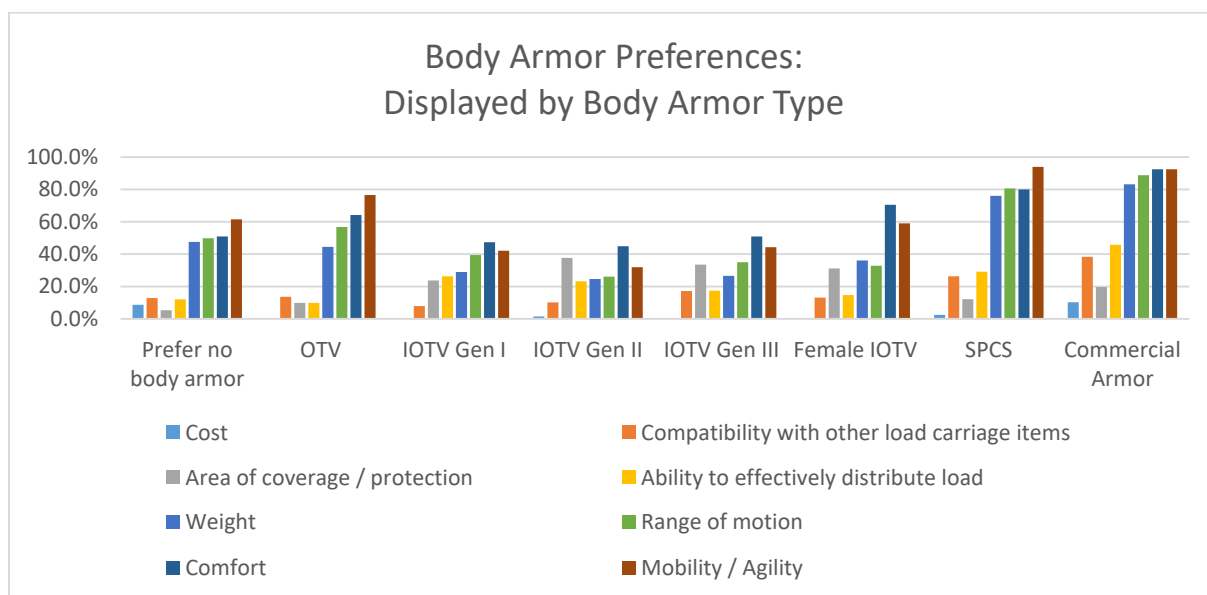


Figure 25. Load Management Survey – Body Armor Preferences: Displayed by Body Armor Type

Body Armor Preferences by Segmented Demographics

Mounted vs Dismounted

Figure 26 displays body armor preferences based on how TPs identified how they spend the majority of their time: mounted, dismounted, or equally split between mounted and dismounted. For all three groups, the SPCS was the most preferred body armor system by 33–40% of TPs. IOTV Gen III was preferred by nearly 20% of TPs that split their time equally between mounted and dismounted, and by TPs that spend the majority of their time mounted, but by just over 10% of TPs that spend the majority of their time dismounted.

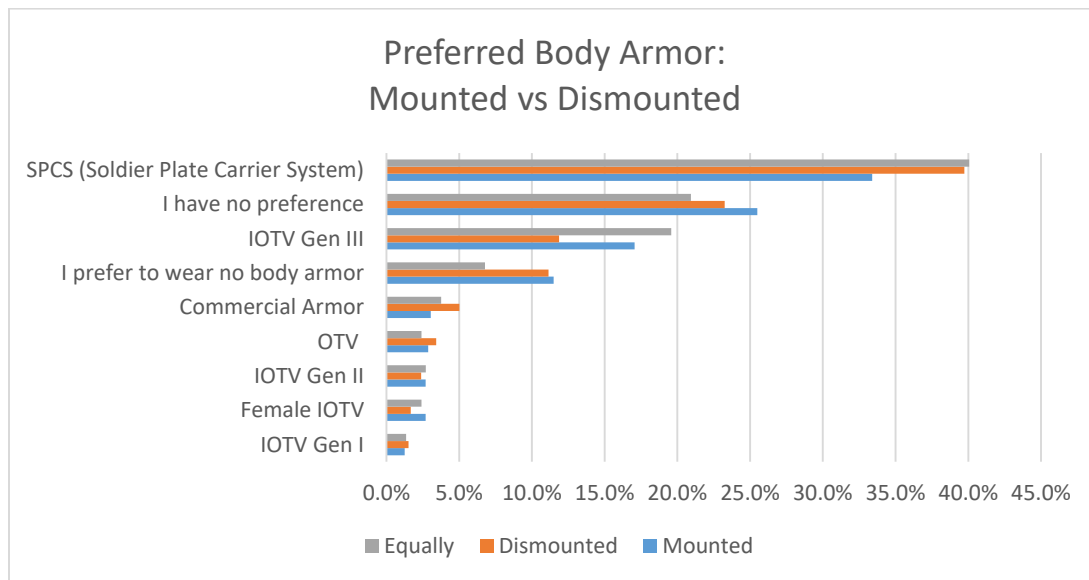


Figure 26. Load Management Survey – Preferred Body Armor: Mounted vs. Dismounted

Height Comparisons

The chart below displays body armor preferences based on TPs' height. The three height groups were determined by selecting the shortest 25% from this data set, the tallest 25%, and the middle 50%. These percentage cuts result in the following: 67 in or less (5 ft 7 in), 72 in or more (6 ft), and between 67 in and 72 in. When comparing these three height groups for body armor preferences, 33–43% of all three groups prefer the SPCS. Note that the tallest group (72 in or more) prefer the SPCS by approximately 5% more than the middle height group (68 in to 71 in), and approximately 10% more than the shortest group (67 in or less). This indicates that although the SPCS is the most preferred body armor system, taller Soldiers tend to prefer the SPCS more than shorter Soldiers. The middle height group and shortest group selected the response "I have no preference" by approximately 26% each, compared to 18% of the tallest group, indicating that taller Soldiers tend to have a stronger preference for body armor compared to average height or shorter Soldiers. IOTV Gen III was the second most preferred body armor by all three groups, ranging from 13–14% of TPs. Commercial body armor was preferred by less than 5% of all three groups, as well as OTV, IOTV Gen II and IOTV Gen I. Notably, none of the TPs in the tallest group prefer the Female IOTV and only 1% of the middle height group prefer the Female IOTV, compared to 6% of the shortest group. This is largely explained by the fact that females tend to be in the shortest group. See Figure 27.

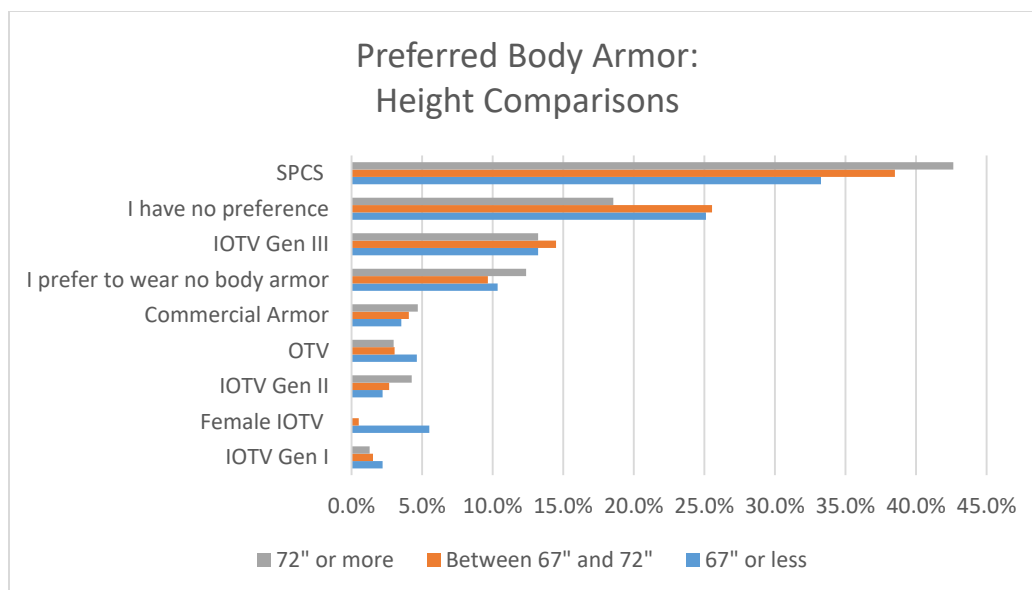


Figure 27. Load Management Survey – Preferred Body Armor: Height Comparisons

Gender Comparisons

When comparing body armor preferences by gender, the SPCS is preferred by 40% of males compared to 7% of females. The Female IOTV is preferred by 31% of females and by less than 1% of males. The next most frequently selected response is “I have no preference”, selected by 30% of females and 23% of males. Note that the focus group data revealed that the majority of females either do not know that Female IOTV exists or have never had access to it. It is possible that if more females had access to the Female IOTV, that it would be the preferred body armor by more females. IOTV Gen III was preferred by 16% of males compared to 8% of females. See Figure 28.

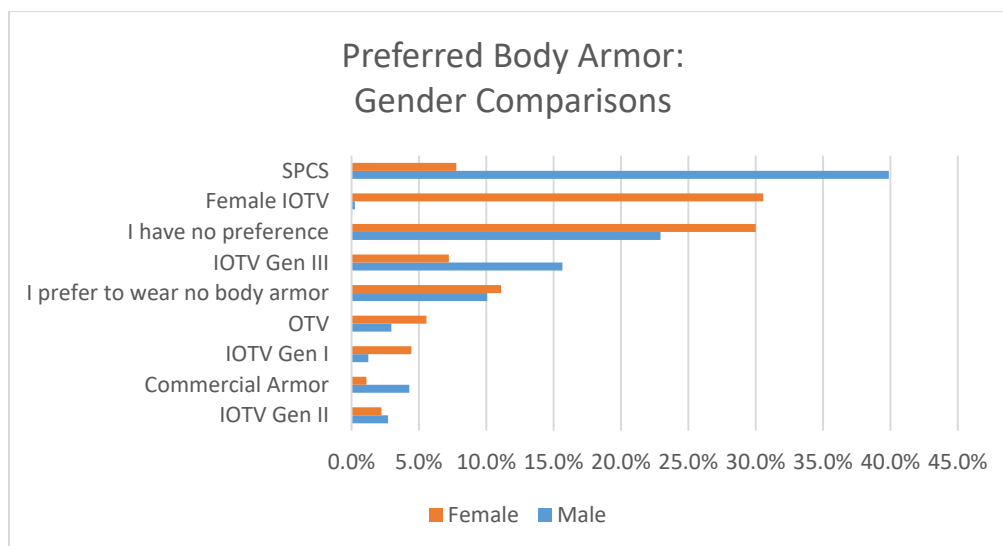


Figure 28. Load Management Survey – Preferred Body Armor: Gender Comparisons

Medics vs Non-Medics

When comparing medics to non-medics, both groups nearly equally prefer the SPCS by approximately 37%. Medics and non-medics nearly equally express no preference (25% and 23% respectively). IOTV Gen III is the second most preferred body armor system by 15% of non-medics and 12% of medics. IOTV Gen II was preferred by twice as many medics (6%) than non-medics (3%). See Figure 29.

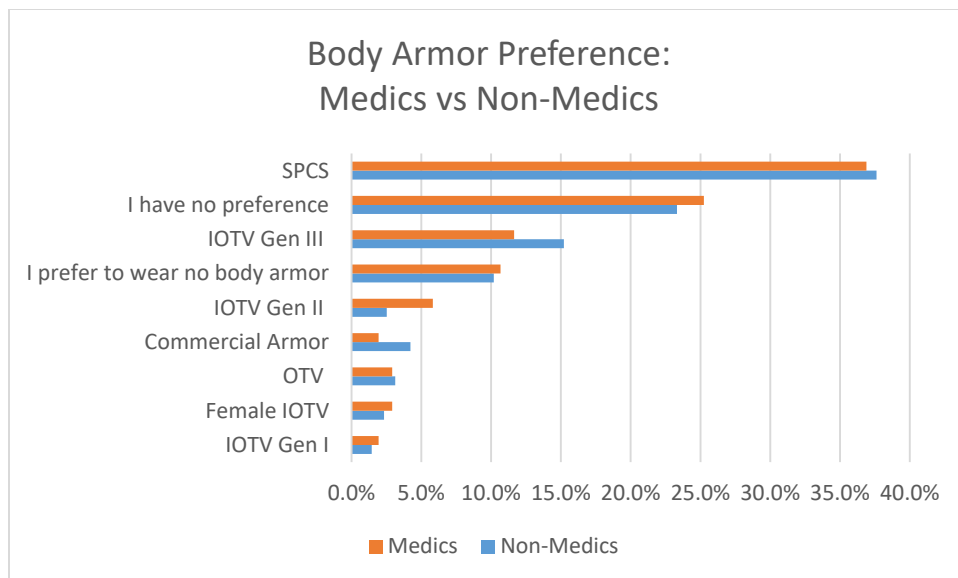


Figure 29. Load Management Survey – Body Armor Preference: Medics vs. Non-Medics

Area of Coverage vs Mobility (Total Population and Comparisons)

TPs were presented with two scenarios and asked if they preferred more area of coverage for increased protection or less area of coverage for increased mobility.

In one scenario, IED threats are low and direct fire threats are high. In this scenario, 70% of the total population preferred less area of coverage for increased mobility compared to 28.7% preferring more area of coverage for increased protection. See Figure 30.

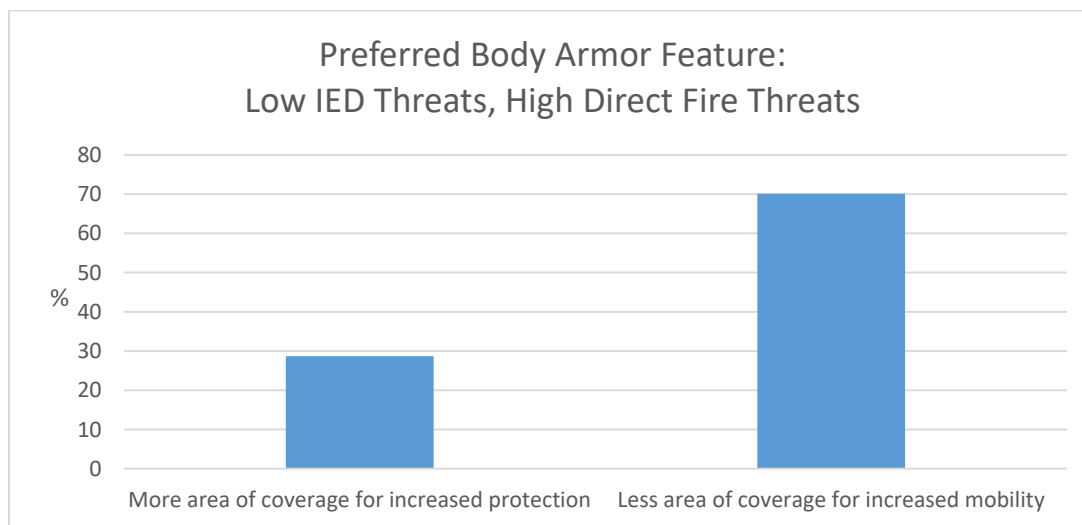


Figure 30. Load Management Survey – Preferred Body Armor Feature: Low IED Threats, High Direct Fire Threats

Figure 31 displays the responses to this same scenario but comparing males and females. Males' responses are nearly identical to Figure 30 (over 70% preferring less area of coverage for increased mobility). However, the females are nearly evenly split, with 55% preferring more area of coverage for increased protection compared to 45% preferring less area of coverage for increased mobility.

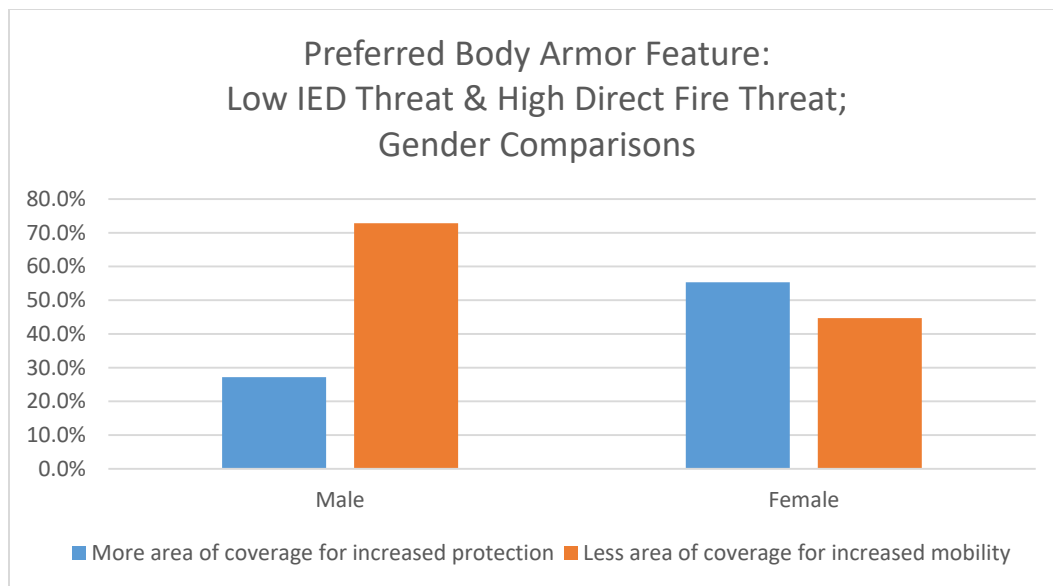


Figure 31. Load Management Survey – Preferred Body Armor Feature: Low IED Threat & High Direct Fire Threat; Gender Comparisons

In another scenario, IED threats are high and direct fire threats exist. In this scenario, nearly 60% of the total population prefer more area of coverage for increased protection compared to 40% preferring less area of coverage for increased mobility. See Figure 32.

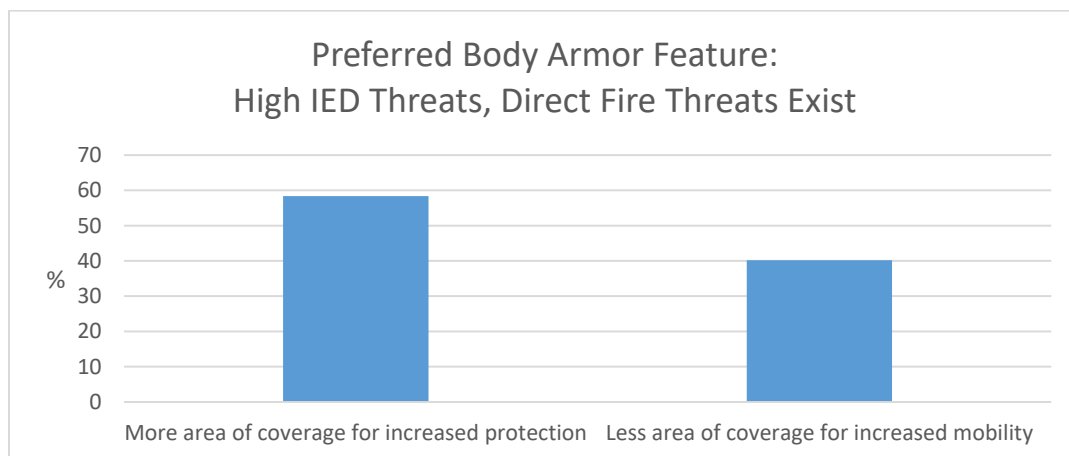


Figure 32. Load Management Survey – Preferred Body Armor Feature: High IED Threats, Direct Fire Threats Exist

Figure 33 displays the responses to this same scenario but comparing males and females. For both genders in this scenario, more area of coverage for increased protection is selected more frequently than less area of coverage for increased mobility, but by more females (nearly 80%) compared to males (nearly 60%).

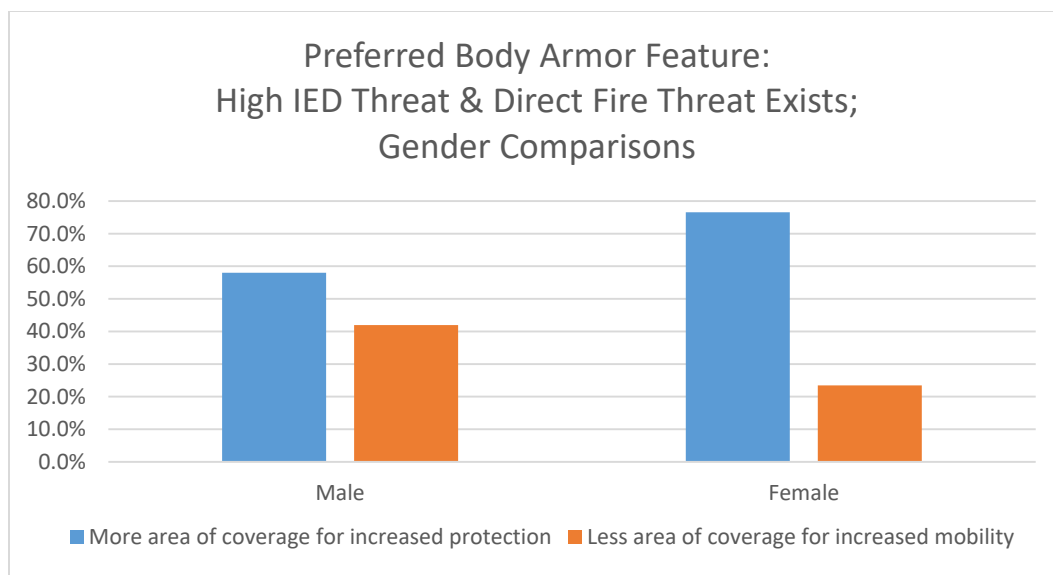


Figure 33. Load Management Survey – Preferred Body Armor Feature: High IED Threat & Direct Fire Threat Exists: Gender Comparisons

Quick Release Mechanisms

20% of the total population indicated that they use quick release mechanisms to doff their body armor for convenience (Table 41).

Table 41. Load Management Survey – Used Quick Release Mechanism to Doff Body Armor for Convenience?

Used quick release mechanism to doff body armor for convenience	N	%
Yes	530	20.0
No	2098	79.3
Missing	17	0.6

Of the 20% of the total population that indicated they use quick release mechanisms to doff their body armor for convenience, nearly 80% of those TPs indicated that using quick release mechanisms for convenience gave them more confidence to use quick release mechanisms in an emergency (Table 42).

Table 42. Load Management Survey – Using Quick Release Mechanism for Convenient Doffing Give More Confidence to Use Quick Release in an Emergency?

Does using quick release mechanism for convenient doffing give you more confidence to use your quick release in an emergency?	N	%
Yes	419	79.1
No	48	9.1
Not Sure	37	7.0
Missing	26	4.9

Less than 5% of the total population indicated that they have used their quick release mechanism to emergency doff their body armor (not including practice/training) (Table 43).

Table 43. Load Management Survey – Did You Use Quick Release Mechanism to Emergency Doff Body Armor?

Used quick release mechanism to emergency doff body armor (not including practice/training)	N	%
Yes	113	4.3
No	2512	95.0
Missing	20	0.8

Quick Release: Speed of Release vs Speed of Reassembly

When asked which was a more important attribute for quick releases, speed of release or speed of reassembly, only 11.6% indicated that speed of reassembly is more important. A comparable percentage indicated that both of these attributes were equally important (45.5%) and that speed of release was more important (36.8%). See Figure 34 and Table 44 for more detail.

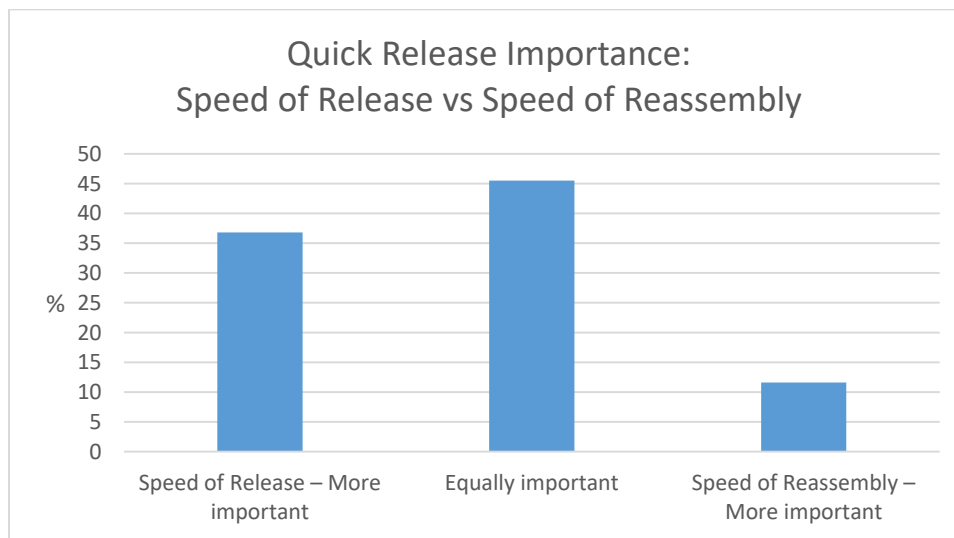


Figure 34. Load Management Survey – Quick Release Importance: Speed of Release vs. Speed of Reassembly

Table 44. Load Management Survey – More Important for Quick Release Mechanism – Speed of Release or Speed of Reassembly

Which is more important to you in a quick release mechanism, speed of release or speed of reassembly?	N	%	% Combined	
Speed of Release – Much more important	547	20.7	36.8	Speed of Release
Speed of Release – More important	425	16.1		
Equally important	1204	45.5		
Speed of Reassembly – More important	181	6.8	11.6	Speed of Reassembly
Speed of Reassembly – Much more important	126	4.8		
Missing	162	6.1		

Quick Release and Shoulder Discomfort

Nearly 25% of the total population indicated that they have experienced discomfort in the shoulder area of their body armor as the result of a quick release buckle that was located near the shoulder. See Table 45 for detail.

Table 45. Load Management Survey – Ever Experienced Shoulder Discomfort Due to a Quick Release Buckle?

Have you ever experienced discomfort in the shoulder area of your body armor as the result of a quick release buckle?	N	%
Yes	626	23.7
No	1142	43.2
N/A never used a quick release mechanism with a buckle in the shoulder	853	32.2
Missing	24	0.9

RUCKSACKS

Section Summary

This section covers rucksacks used currently and during deployments, rucksack impact on balance, rucksack preferences based on mission durations, new rucksack capacity preferences, and confidence in resupply.

- The MOLLE large is the most frequently used rucksack both when deployed and when not deployed by 80–85% of TPs.
- The MOLLE assault pack is used by nearly 70% of TPs during deployments, ~55% when not deployed.
- The MOLLE medium is used significantly more during deployments (by 55%) than when not deployed (by 20–30%).
- Seventy-five percent of TPs indicated that they can stand up straight when carrying the MOLLE assault pack; 25% indicated they can stand up straight when carrying the MOLLE medium; only 13% indicated they can stand up straight when carrying the MOLLE large.
- Over 50% of TPs indicated that they need to lean forward slightly when carrying the MOLLE large; 25% indicated they need to lean forward significantly when carrying the MOLLE large.
- The MOLLE large is preferred by nearly 50% of TPs for 72+ hour missions and by 33% for 24–72 hour missions; The MOLLE assault pack is preferred by nearly 40% of TPs for 1–12 hour missions and by 25% of TPs for 12–24 hour missions.
- The MOLLE medium is preferred less than the MOLLE large for longer missions and less than the MOLLE assault pack for shorter missions with the exception of 12–24 hour missions where the MOLLE medium and MOLLE assault pack are preferred nearly equally (by ~25% of TPs).
- Nearly 50% of TPs indicated that if the Army were to issue a new rucksack to meet a capacity need that is not currently being met, that they would prefer a capacity between the MOLLE large and the MOLLE medium.
- Twenty-five percent of TPs indicated that the currently issued rucksacks *do not* provide enough flexibility to meet operational needs.
- When considering what items to pack for a 72 hour mission, a combined 45% of TPs indicated that they are either *not at all confident* or *slightly confident* in resupply; a combined 45% of TPs indicated that they are either *moderately confident* or *very confident* in resupply (10% of TPs indicated that this question does not apply to them).
- TPs were nearly evenly split on the idea having more access points to their main rucksack compartment at a higher durability risk (52%) compared to having fewer access points at a lower durability risk (47%).

Rucksacks Worn (Deployments and Currently)

TPs were asked to select all rucksacks they have worn during deployments, as well as which rucksacks they wear currently. Of the 2,645 TPs, 947 indicated that they *have* been deployed and provided answers to rucksacks worn during deployments. Figure 35 displays three groups: rucksacks worn during deployments (for the 947 that have been deployed), rucksacks worn currently by those same 947 (for direct comparison), and the total population for rucksacks worn currently.

The MOLLE large is the most frequently used rucksack by 80% or more of all three groups. The second most frequently used rucksack during deployments was the MOLLE assault pack (nearly 70% of those that deployed), followed by the MOLLE medium (over 50% of those that deployed). The MOLLE assault pack is currently used by over 50% of total population. The MOLLE medium is currently used by 20% of the total population. The ALICE large was used by 15% of TPs during deployments, and by less than 10% currently. The ALICE medium was used by nearly 10% of TPs during deployments, and by less than 5% currently. Commercial rucksacks accounted for 5% or less for all three groups. Note that the MOLLE 4000 was only issued for test and evaluation purposes during the period of data collection for this effort.

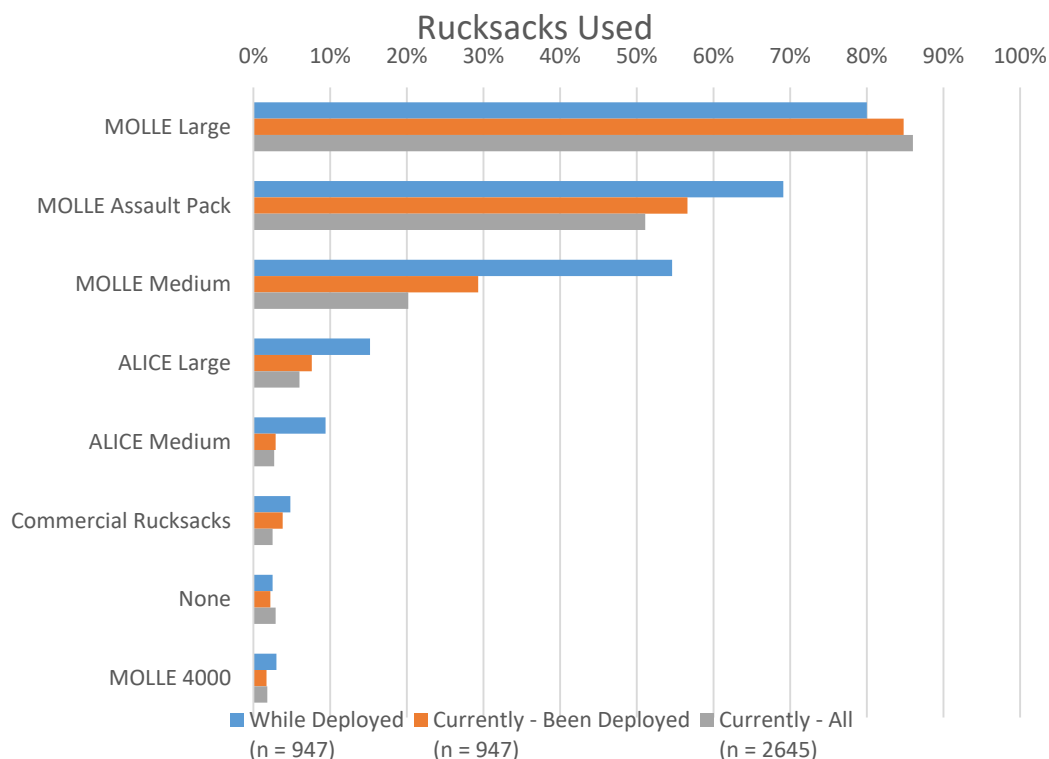


Figure 35. Load Management Survey – Rucksacks Used

MOLLE Rucksacks' Impact on Balance

TPs were asked to rate the impact of the MOLLE large, MOLLE medium and MOLLE assault pack on their balance. Nearly 75% of TPs indicated that they were able to stand straight up when carrying the MOLLE assault pack. Over 50% of TPs indicated that they need to lean forward slightly when carrying the MOLLE large, and nearly 25% of TPs indicated that they need to lean forward significantly when carrying the MOLLE large. See Figure 36 and Table 46 below for more detail.

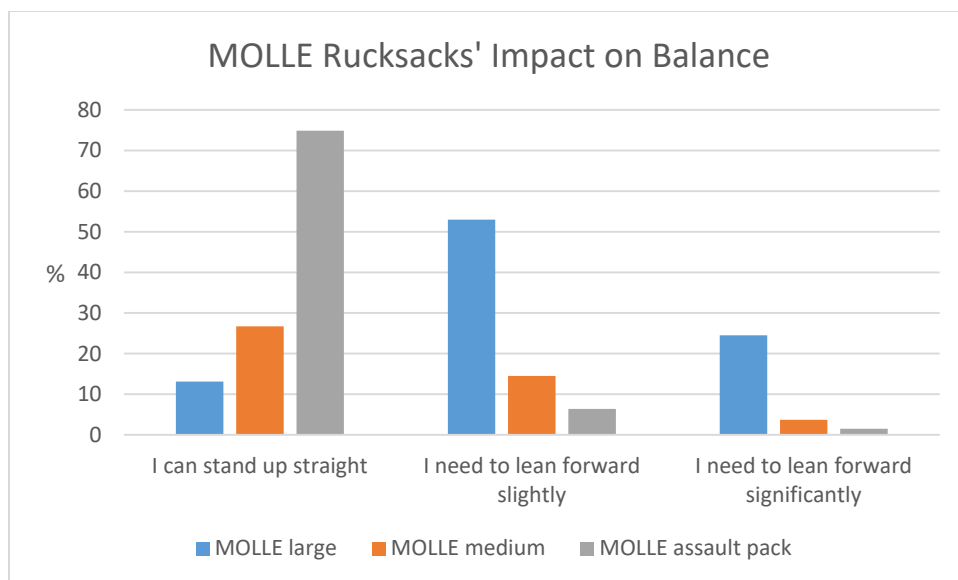


Figure 36. Load Management Survey – MOLLE Rucksacks' Impact on Balance

Table 46. Load Management Survey – Balance When Carrying MOLLE Large, MOLLE Medium and MOLLE Assault Pack

How is your balance affected when carrying the MOLLE large rucksack?	N	%
I can stand up straight	346	13.1
I need to lean forward slightly	1402	53.0
I need to lean forward significantly	647	24.5
N/A	234	8.8
Missing	16	0.6
How is your balance affected when carrying the MOLLE medium rucksack?	N	%
I can stand up straight	706	26.7
I need to lean forward slightly	384	14.5
I need to lean forward significantly	99	3.7
N/A	1442	54.5
Missing	14	0.5
How is your balance affected when carrying the MOLLE assault pack?	N	%
I can stand up straight	1982	74.9
I need to lean forward slightly	169	6.4
I need to lean forward significantly	40	1.5
N/A	444	16.8
Missing	10	0.4

Rucksack Preferences for Mission Durations

TPs were asked which rucksack they prefer for the following mission durations: 1–12 hour, 12–24 hour, 24–72 hours, and 72 hour or more. The MOLLE assault pack was preferred by nearly 40% of TPs for 1 to 12 hour missions and by 25% of TPs for 12–24 hour missions. The MOLLE large was preferred by nearly 50% of TPs for 72+ hour missions and nearly 35% of TPs for 24–72 hour missions. See Figure 37 and Tables 48–51 for more detail. Less than 5% of TPs preferred a commercial rucksack for all four mission durations. The majority of these TPs indicated that the currently issued Army rucksacks *do* meet their needs.

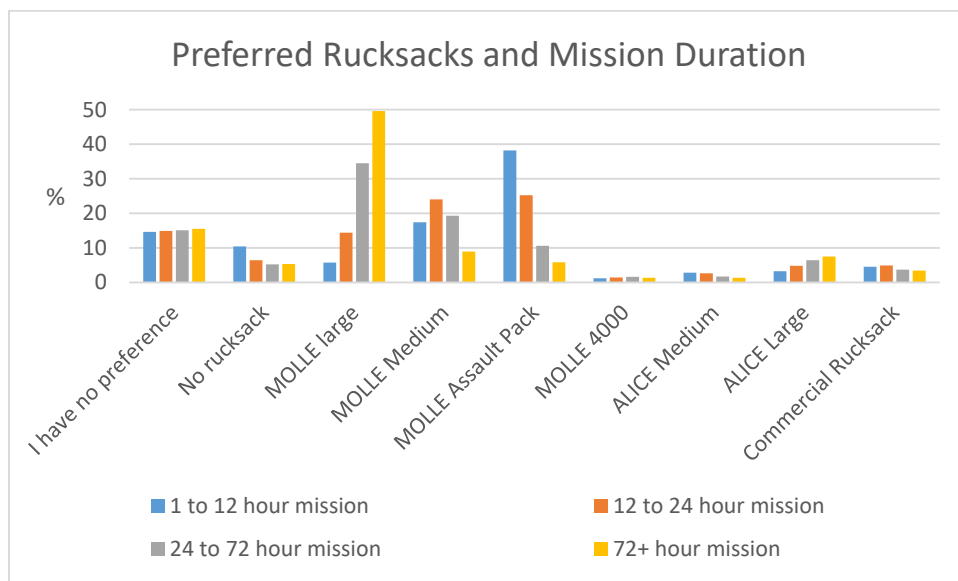


Figure 37. Load Management Survey – Preferred Rucksacks and Mission Duration

Table 47. Load Management Survey – Preferred Rucksack for a 1 to 12 hour Mission?

Which is your preferred rucksack for a 1–12 hour mission?	N	%
I have no preference	387	14.6
No rucksack	275	10.4
MOLLE large	150	5.7
MOLLE Medium	461	17.4
MOLLE Assault Pack	1010	38.2
MOLLE 4000	31	1.2
ALICE Medium	74	2.8
ALICE Large	85	3.2
Commercial Rucksack	119	4.5
Missing	53	2.0

Table 48. Load Management Survey – Preferred Rucksack for a 12 to 24 hour Mission?

Which is your preferred rucksack for a 12–24 hour mission?	N	%
I have no preference	393	14.9
No rucksack	168	6.4
MOLLE large	380	14.4
MOLLE Medium	636	24.0
MOLLE Assault Pack	666	25.2
MOLLE 4000	38	1.4
ALICE Medium	70	2.6
ALICE Large	126	4.8
Commercial Rucksack	129	4.9
Missing	39	1.5

Table 49. Load Management Survey – Preferred Rucksack for a 24 to 72 hour Mission?

Which is your preferred rucksack for a 24–72 hour mission?	N	%
I have no preference	399	15.1
No rucksack	138	5.2
MOLLE large	912	34.5
MOLLE Medium	510	19.3
MOLLE Assault Pack	281	10.6
MOLLE 4000	41	1.6
ALICE Medium	45	1.7
ALICE Large	170	6.4
Commercial Rucksack	98	3.7
Missing	51	1.9

Table 50. Load Management Survey – Preferred Rucksack for a 72+ hour Mission?

Which is your preferred rucksack for a 72+ hour mission?	N	%
I have no preference	411	15.5
No rucksack	141	5.3
MOLLE large	1311	49.6
MOLLE Medium	235	8.9
MOLLE Assault Pack	153	5.8
MOLLE 4000	35	1.3
ALICE Medium	35	1.3
ALICE Large	199	7.5
Commercial Rucksack	91	3.4
Missing	34	1.3

Rucksack Preferences by Segmented Demographics

Mounted vs Dismounted

Figures 38 to 41 display rucksack preferences for four mission durations based on how TPs identified themselves for how they spend the majority of their time: mounted, dismounted, or equally split between mounted and dismounted.

For 1–12 hour missions, the majority of all three groups prefer the MOLLE Assault Pack (38–41%). The largest difference between these three groups is for the MOLLE Medium, preferred by 16% of the dismounted group compared to 21% of the mounted group.

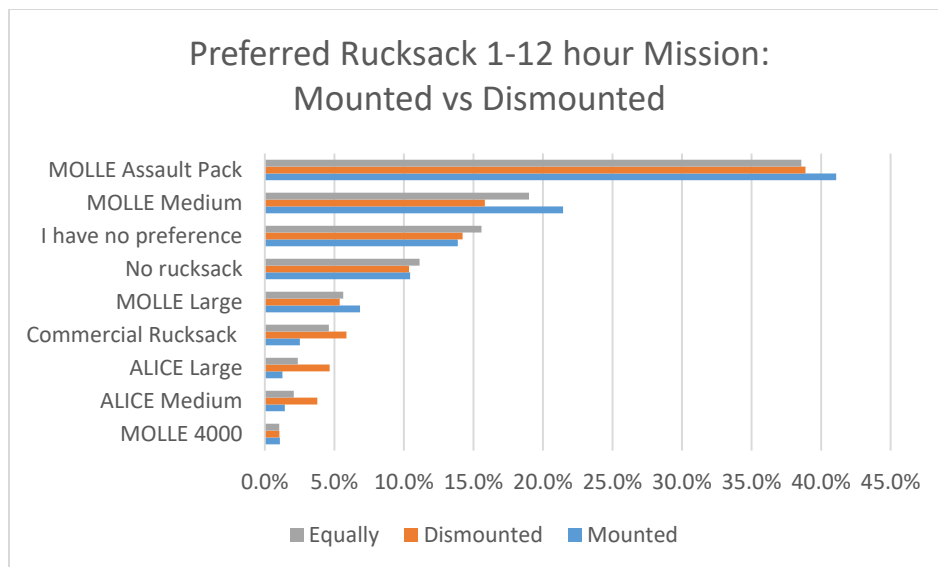


Figure 38. Load Management Survey – Preferred Rucksack 1-12 hour Mission: Mounted vs. Dismounted

For 12–24 hour missions, the MOLLE Assault Pack and MOLLE Medium were the two most preferred rucksacks, although there are small differences between the three groups. More TPs in the ‘equally mounted/dismounted’ group prefer the MOLLE Medium (28.5%) than the MOLLE Assault Pack (23.9%). In contrast, the MOLLE Assault pack was preferred by more TPs in the mounted and dismounted groups (27.9% and 25.6% respectively) than MOLLE Medium (25.6% and 23.9% respectively). For all three groups, the MOLLE Large was the third most preferred ruck for a 12–24 hour mission, preferred by 18.8% of the mounted group, 14.3% of the dismounted group, and 12% of the ‘equally mounted/dismounted’ group. The ALICE Large was preferred by 7.2% of the dismounted group compared to only 1.3% of the mounted group. See Figure 39.

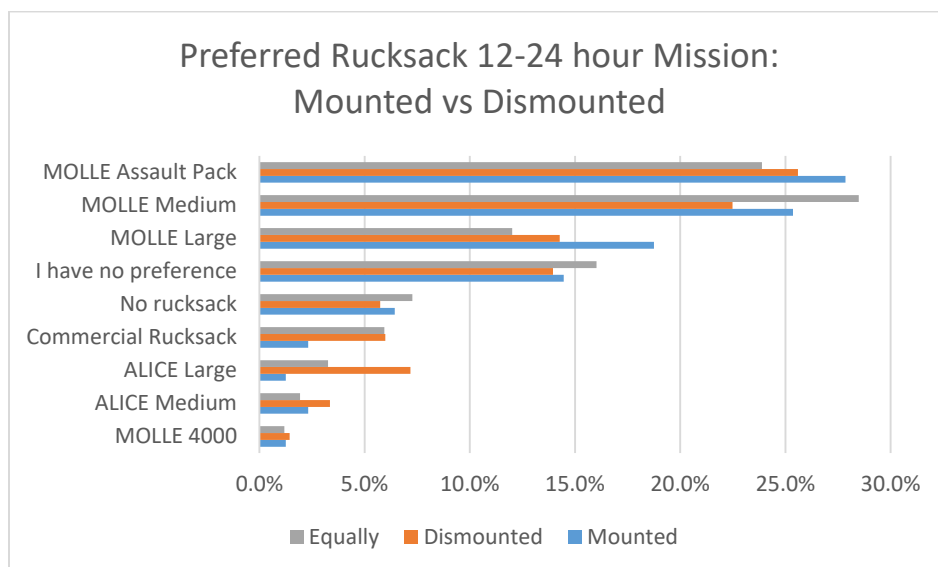


Figure 39. Load Management Survey – Preferred Rucksack 12-24 hour Mission: Mounted vs. Dismounted

For 24–72 hour missions, the MOLLE Large was the most preferred ruck by all three groups ranging from 31% (‘equally mounted/dismounted’) to 41% (mounted). The MOLLE Medium was the second

most preferred ruck by all three groups, ranging from 17% (dismounted) to 23% ('equally mounted/dismounted'). Approximately 10% of all three groups prefer the MOLLE Assault pack for 24 to 72 hour missions. Assault Pack and MOLLE Medium were the two most preferred rucksacks, although there are small differences between the three groups. More TPs in the 'equally mounted/dismounted' group prefer the MOLLE Medium (28.5%) than the MOLLE Assault Pack (23.9%). In contrast, the MOLLE Assault pack was preferred by more TPs in the mounted and dismounted groups (27.9% and 25.6% respectively) than MOLLE Medium (25.6% and 23.9% respectively). For all three groups, the MOLLE large was the third most preferred ruck for a 12 to 24 hour mission, preferred by 18.8% of the mounted group, 14.3% of the dismounted group, and 12% of the 'equally mounted/dismounted' group. The ALICE Large is preferred by nearly 10% of the dismounted group compared to only 3% and 4.2% of the mounted and 'equally mounted/dismounted' groups respectively. See Figure 40.

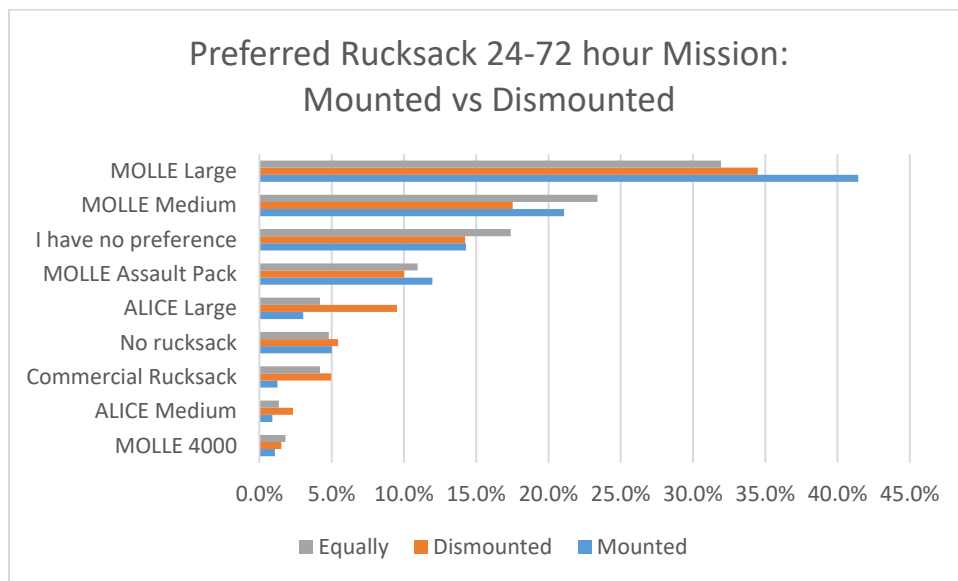


Figure 40. Load Management Survey – Preferred Rucksack 24-72 hour Mission: Mounted vs. Dismounted

For 72+ hour missions, the MOLLE Large was the most preferred ruck by all three groups ranging from 48% ('equally mounted/dismounted') to 56.4% (mounted). Approximately 15% of all three groups express 'no preference' for 72+ hour missions. The second most preferred ruck for the dismounted group is the ALICE Large (10.9%) compared to 'equally mounted/dismounted' and mounted groups whose second most preferred ruck is the MOLLE Medium (approximately 10% each). See Figure 41.

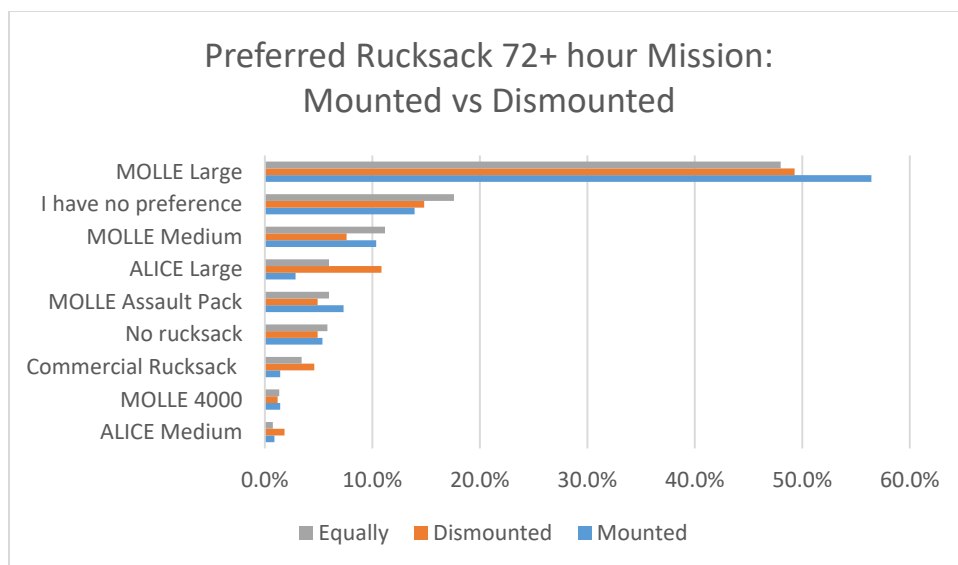


Figure 41. Load Management Survey – Preferred Rucksack 72+ hour Mission: Mounted vs. Dismounted

New Rucksack Capacity Preference

Nearly 50% of the total population (n=1200) indicated that if the Army were to issue a new rucksack to meet a capacity need that is not currently being met, they would prefer a capacity between the MOLLE Large and the MOLLE Medium. The second most frequently indicated response was that the currently available range of capacity meets users' operational needs (25%). See Figure 41 and Table 52 for detail.

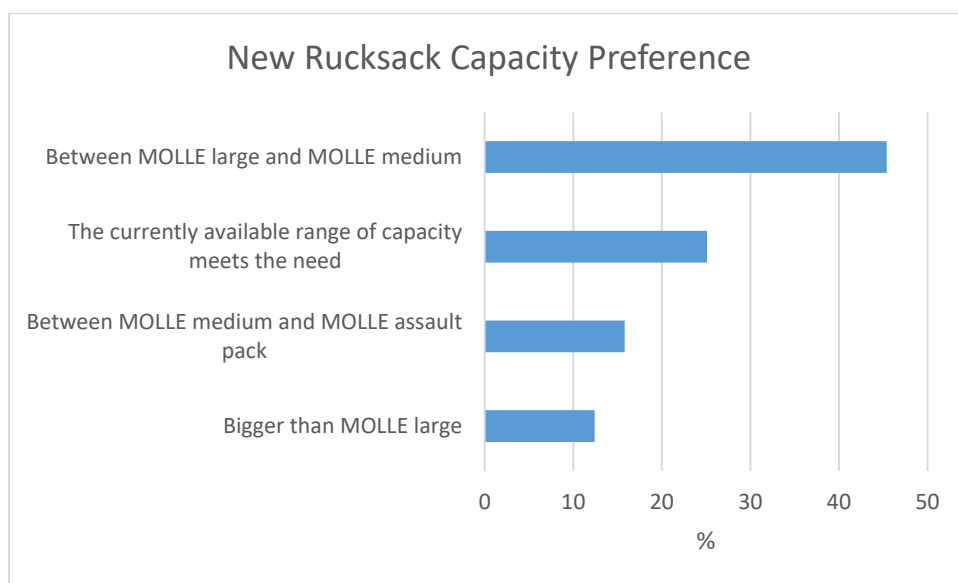


Figure 42. Load Management Survey – New Rucksack Capacity Preference

Table 51. Load Management Survey – If the Army Issued a New Rucksack to Meet a Capacity Need Currently Not Met, What Size Should it be?

If the Army were to issue a new rucksack to meet a capacity need that is not currently being met, what size should it be?	N	%
Between MOLLE Large and MOLLE Medium	1200	45.4
The currently available range of capacity meets the need	663	25.1
Between MOLLE Medium and MOLLE Assault Pack	418	15.8
Bigger than MOLLE Large	329	12.4
Missing	35	1.3

Nearly three-quarters of the total population indicated that the currently issued rucksacks provide the flexibility to meet operational requirements; 25% indicated that they *do not*. Note that focus group data revealed that not all Soldiers have easy access to the currently issued rucksacks. In particular, the MOLLE Medium is a desired rucksack that is difficult for Soldiers to access when not deployed, resulting in use of the MOLLE Large when a smaller rucksack would meet the need during a field training exercise.

Table 52. Load Management Survey – Do Currently Issued Rucksacks Provide the Flexibility to Meet Operational Requirements?

Do the currently issued rucksacks provide the flexibility to meet operational requirements?	N	%
Yes	1919	72.6
No	677	25.6
Missing	49	1.9

New Rucksack Capacity Preferences by Segmented Demographics

Mounted vs Dismounted; Height Comparisons; Medics vs Non-Medics

Figure 43-45 display new rucksack capacity preferences for three different segments of the total population: mounted, dismounted, or equally split between mounted and dismounted, height comparisons, and medics vs non-medics.

For all three of these segmentations, all groups responded similarly in that over 40% of all sub-groups indicated that a new Army issued rucksack capacity should be between the MOLLE Large and the MOLLE Medium. For all of these sub-groups, the second most frequently selected response was that the currently available range of capacity meets users' operational needs (over 20% for all). The only notable difference between sub-groups was for height comparisons: see Figure 43.

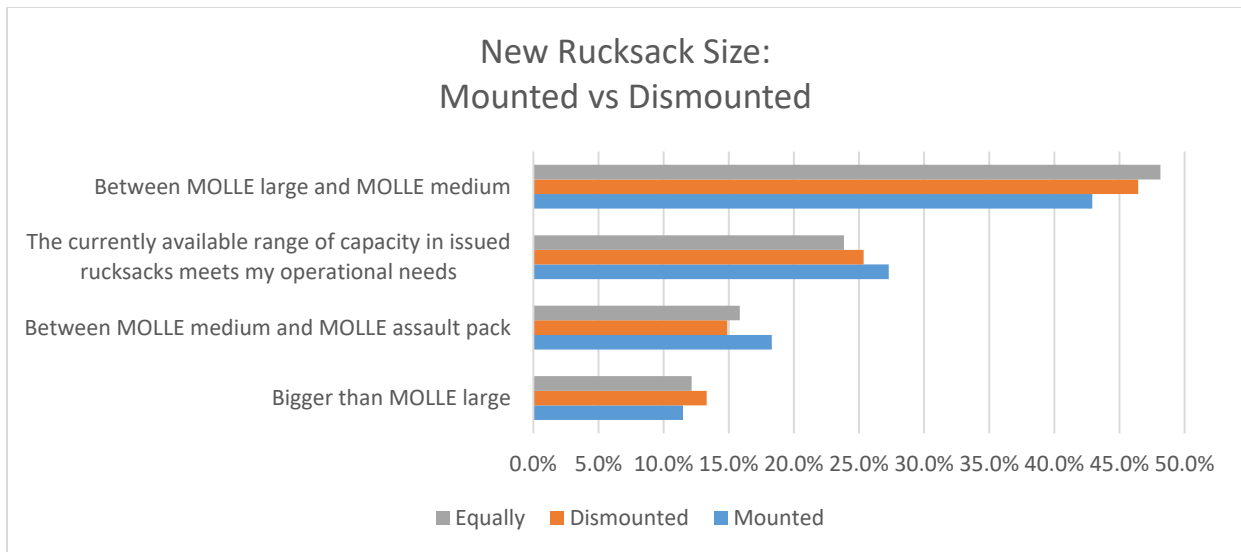


Figure 43. Load Management Survey – New Rucksack Size: Mounted vs. Dismounted

Note that for height comparisons, nearly 25% of the 67 in or less group expressed a new capacity preference between the MOLLE Medium and the MOLLE Assault Pack, compared to nearly 15% for those in the tallest group (72 in or more) and the medium height group (between 67 in and 72 in).

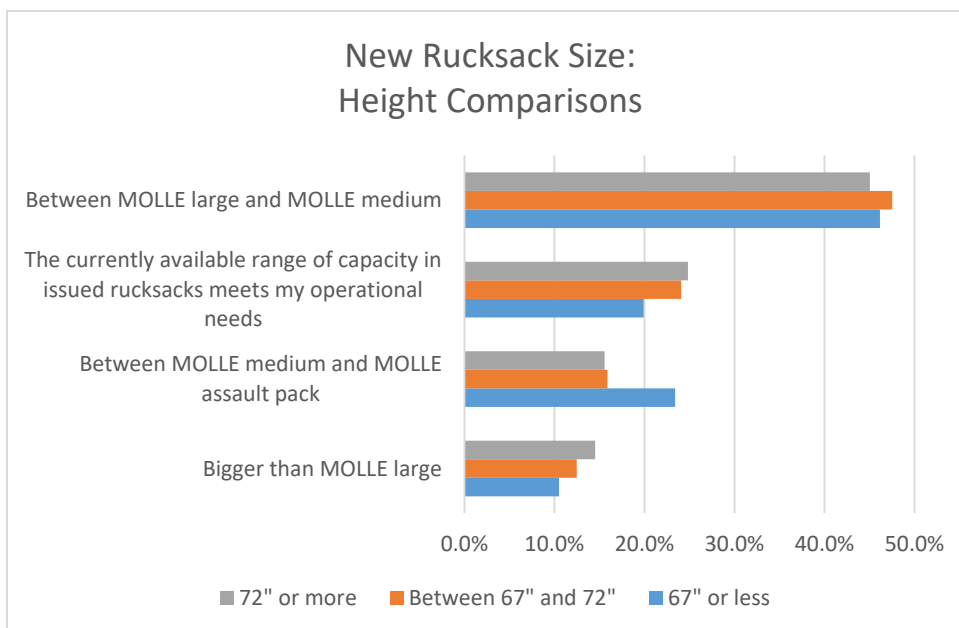


Figure 44. Load Management Survey – New Rucksack Size: Height Comparisons

Medics and non-medics have the same preferences for new rucksack capacities, which are the same as the total population.

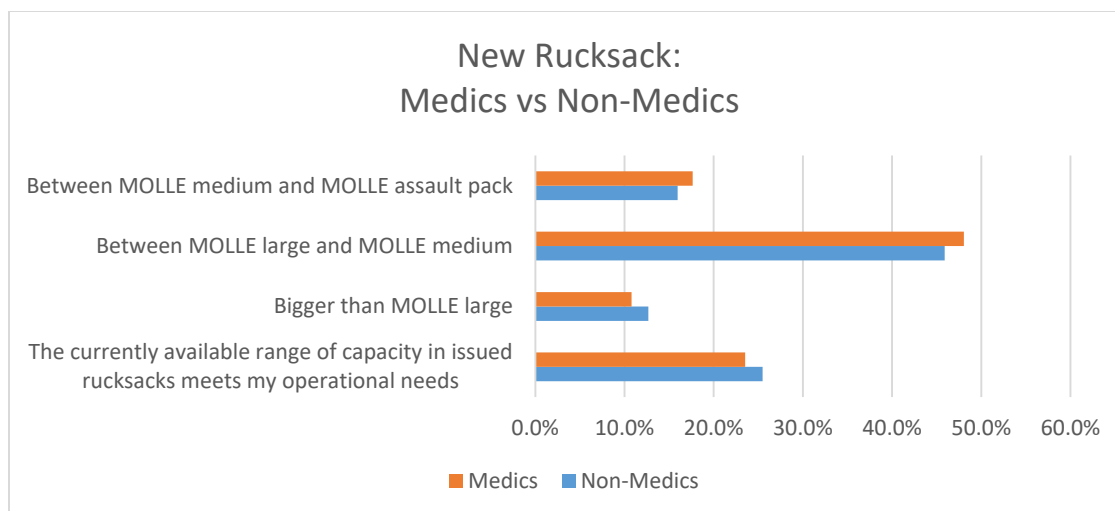


Figure 45. Load Management Survey – New Rucksack: Medics vs. Non-Medics

Confidence in Resupply

When considering what items to pack for a 72 hour mission, 10% of TPs indicated that they are *very confident* in resupply, in contrast to 15.8% of TPs that indicated they are *not at all confident* in resupply. Approximately one-third of TPs indicated that they are either *slightly* or *moderately* confident in resupply when considering what items to pack for a 72 hour mission. Note that 10% of TPs indicated that this question is not applicable to them. See Figure 46 and Table 54.

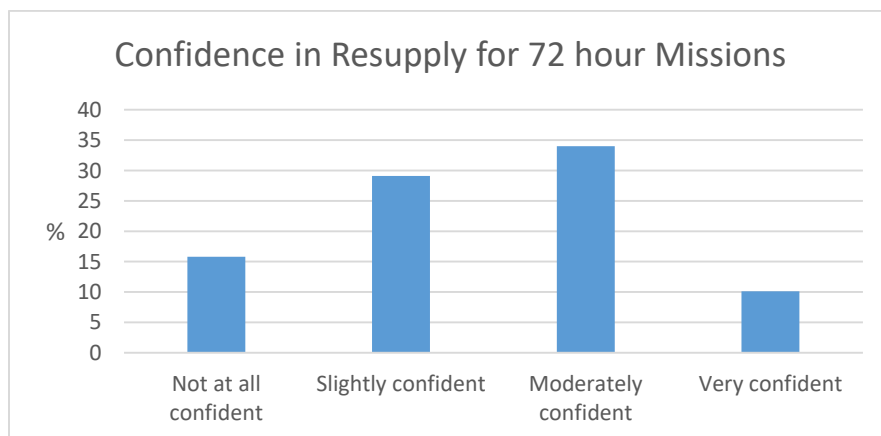


Figure 46. Load Management Survey – Confidence in Resupply for 72 hour Missions

Table 53. Load Management Survey – When Considering Items to Pack for a 72 hour Mission, How Confident Are you in Resupply?

When considering what items you will pack for a 72 hour mission, how confident are you in resupply?	N	%
Not at all confident	418	15.8
Slightly confident	770	29.1
Moderately confident	898	34.0
Very confident	266	10.1
N/A	272	10.3
Missing	21	0.8

Rucksack Access Points and Risk

The total population was nearly evenly split on the idea of having more access points to the main compartment of their rucksack with a higher durability risk for closure blow outs (51.9%) compared to fewer access points to the main compartment with a lower durability risk (47.4%). See Table 55.

Table 54. Load Management Survey – Rucksack Preference for Multiple Access Points vs. Fewer Access Points

Multiple access points to main compartment (higher risk) vs Fewer access points (lower risk)	N	%
More access/higher risk	1374	51.9
Fewer/lower risk	1253	47.4
Missing	18	0.7

LOAD CARRIAGE VESTS

Section Summary

This section covers load carriage vests used currently and during deployments, load carriage vest preferences, operational needs, and load carriage vests worn with and without body armor.

- Load carriage vest usage varies depending on whether Soldiers are deployed or not.
- While the FLC is the most frequently used vest (by 50–65% of TPs), it is used 15% less frequently when deployed (50%) than when not deployed (65%).
- Using no load carriage vest (mounting pouches directly to body armor) is more common during deployments (by 45% of TPs) than when not deployed (30%).
- The TAP is used by 35% of TPs during deployments, but only by 10% when not deployed.
- Commercial chest rigs are used by 10% or fewer TPs during deployments and when not deployed.
- ALICE belt/suspenders are used by 10% of TPs when deployed but by less than 3% when not deployed.
- One-quarter of TPs expressed no preference for any load carriage vest; 25% prefer not to wear a load carriage vest; 23% prefer the FLC; 14% prefer the TAP (note that focus group data supports that many Soldiers would like to use the TAP but do not have access to TAPs).
- The FLC supports user's operational needs better when worn without body armor compared to when worn *with* body armor; 75% indicated the FLC meets their operational needs when worn without body armor compared to only 50% indicating the FLC meets their operational needs when worn *with* body armor.

Load Carriage Vests Worn (Deployments and Currently)

TPs were asked to select all load carriage vests they have worn during deployments, as well as which load carriage vests they wear currently. Of the 2,645 TPs, 874 indicated that they *have* been deployed and provided answers to load carriage vests worn during deployments. Figure 47 displays three groups: load carriage vests worn during deployments (for the 874 that have been deployed), load carriage vests worn currently by those same 874 (for direct comparison), and the total population for load carriage vests worn currently.

The FLC is the most frequently worn load carriage vest by nearly 50% of TPs when they were deployed, over 50% of those same TPs currently, and by nearly 65% of the total population currently. The second most frequently selected answer was 'no load carriage vest, I mount pouches directly to my body armor'. This answer was selected by over 45% of TPs when they were deployed, over 30% of those same TPs currently, and 30% of the total population currently. The TAP was selected by nearly 35% of TPs when they were deployed. However, only 15% of those same TPs use the TAP currently, and less than 10% of the total population uses the TAP currently. Focus group data reveals that the TAP is a highly liked piece of kit by Soldiers that have used it, but that it is either not well known or hard to access for many Soldiers. Commercial chest rigs account for 10% or less of load carriage vests worn by TPs during

deployments and worn currently. Note that the ALICE belt/suspenders have been worn by 10% of TPs during deployments, but by less than 2% currently.

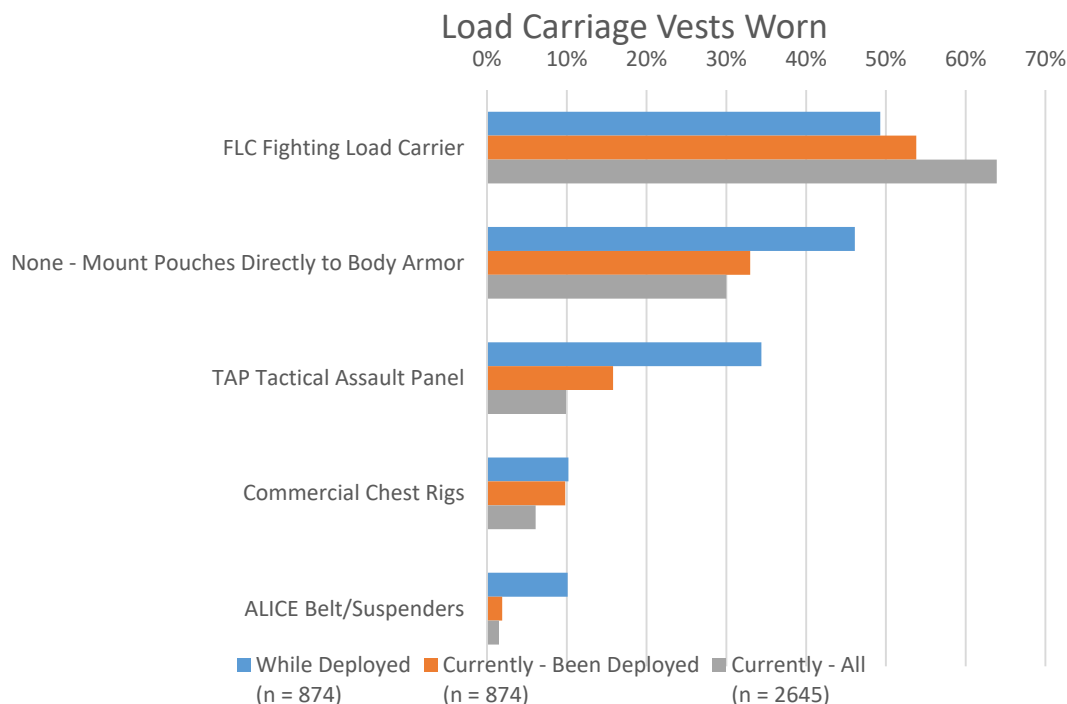


Figure 47. Load Management Survey – Load Carriage Vests Worn

Load Carriage Vest Preferences

Figure 48 shows that the three most frequently selected preferences each accounted for approximately 25% of TPs: No preference (25.8%), Prefer to wear no load carriage vest (24.4%), and the FLC (23.3%). The TAP was preferred by nearly 15% of TPs. Note that focus group data support that many Soldiers either do not know about the TAP or have difficulty getting access to the TAP, but that it is a highly liked piece of kit by Soldiers that have it. Commercial load carriage vests account for less than 8% of preferences of the total population. Of the 7.8% of TPs that prefer commercial load carriage vests, the majority indicated that the currently issued load carriage vests *do* meet their operational needs. The ALICE belt/suspenders is preferred by less than 3% of the total population.

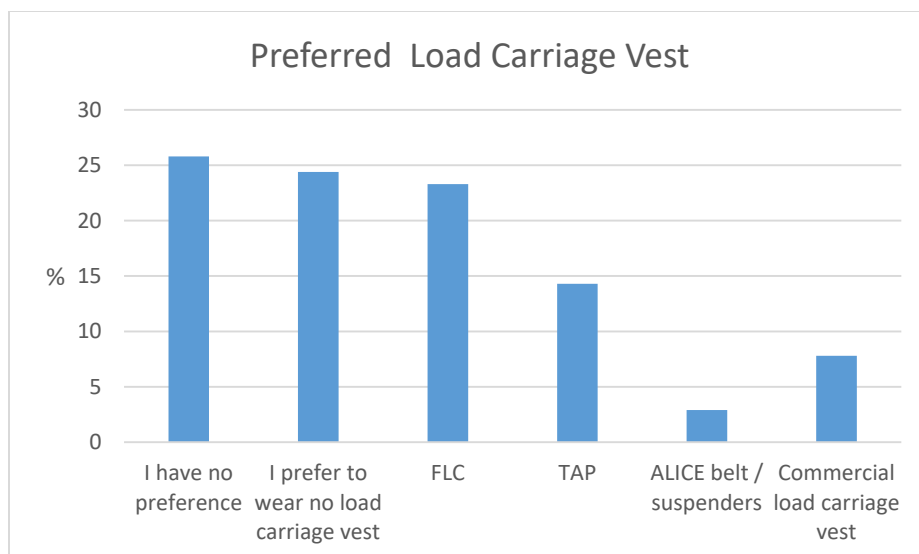


Figure 48. Load Management Survey – Preferred Load Carriage Vest

Load Carriage Vest Preferences by Segmented Demographics

Mounted vs Dismounted

Figure 49 displays load carriage vest preferences based on how TPs identified themselves for how they spend the majority of their time: mounted, dismounted, or equally split between mounted and dismounted. Approximately 25% of all three groups expressed that they have no preference for load carriage vests, and comparable percentage indicated they prefer to wear no load carriage vest. However, there are small differences between the three groups for preferring to wear no load carriage vest; 27.6% of the ‘equally’ group compared to 23.3% of the dismounted group. For the mounted group, the FLC is the most frequently selected answer for load carriage vest preference by nearly 30% of TPs in that group, compared to only 21% of the ‘equally’ group and dismounted group. The TAP was preferred by approximately 15% of all three groups. Commercial load carriage vests are most frequently preferred by the dismounted group (10%), compared to the ‘equally’ group by 7.7%, and 4.1% by the mounted group, indicating that the more time a Soldier spends, the more likely they are to prefer a commercial load carriage vest.

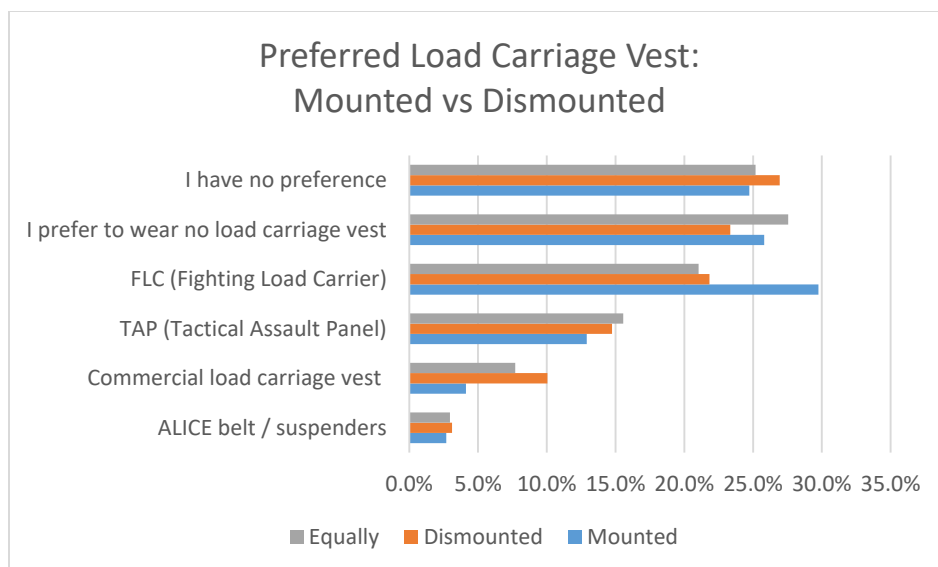


Figure 49. Load Management Survey – Preferred Load Carriage Vest: Mounted vs. Dismounted

Height Comparisons

Figure 50 displays load carriage preferences based on TPs' height. The three height groups were determined by selecting the shortest 25% from this data set, the tallest 25%, and the middle 50%. These percentage cuts result in the following: 67 in or less (5 ft 7 in), 72 in or more (6 ft), and between 67 in and 72 in. Over 30% of the shortest group expressed no preference, compared to over 26% of the medium height group and 23% of the tallest group. The FLC is the most preferred load carriage vest by the shortest group (28%), by 25% of the medium height group, and by 20% of the tallest group. The tallest group most frequently indicated that they prefer to wear no load carriage vest (25%), compared to 24% of the medium height group and 21% of the shortest group. The TAP is preferred most frequently by the tallest group (14.5%), followed by the medium height group (13.1%), and by 10% of the shortest group. Nearly 12% of the tallest group prefer commercial load carriage vests, compared to 7.5% of the medium height group and 6.8% of the shortest group. Approximately 5% or less of all three groups prefer the ALICE belt/suspenders. See Figure 50.

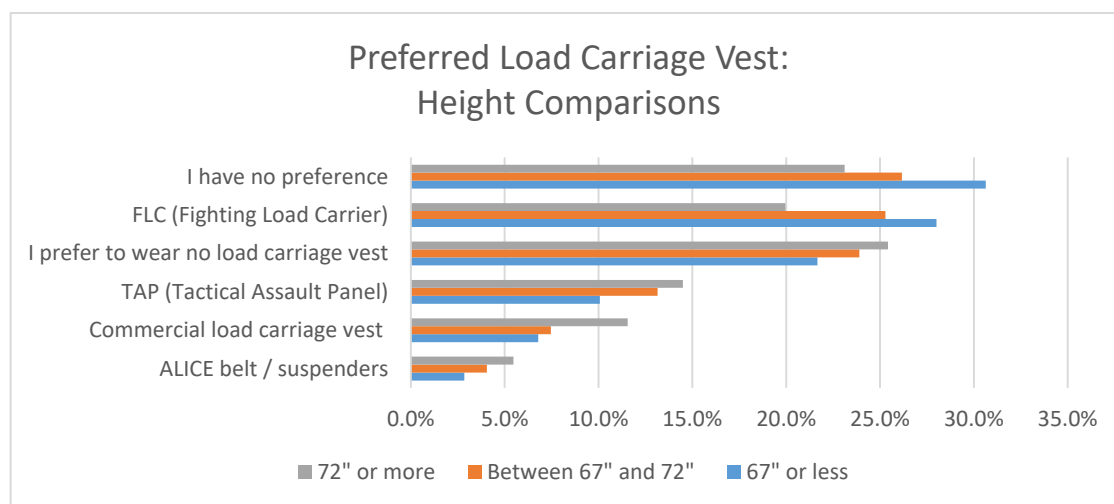


Figure 50. Load Management Survey – Preferred Load Carriage Vest: Height Comparisons

Gender Comparisons

Figure 51 displays load carriage vest preferences based on gender. Nearly 35% of females have no preference, compared to approximately 25% of males. Nearly 35% of females prefer the FLC, compared to nearly 25% of males. Nearly 25% of both males and females prefer to wear no load carriage vest. Fifteen percent of males prefer the TAP compared to 8% of females. Eight percent of males prefer commercial load carriage vests compared to 1% of females. Three percent of males prefer the ALICE belt/suspenders compared to 0.6% of females. See Figure 51.

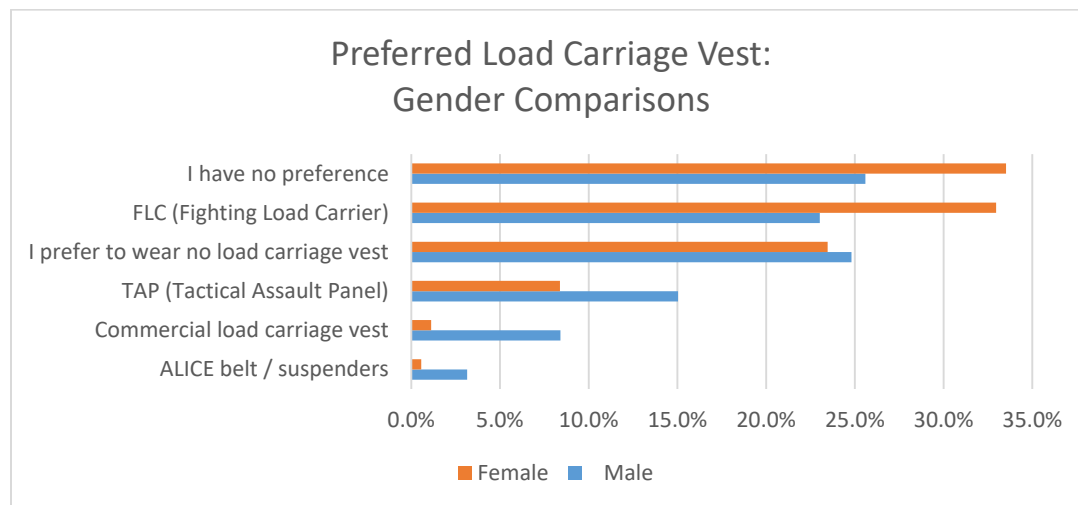


Figure 51. Load Management Survey – Preferred Load Carriage Vest: Gender Comparisons

Medics vs Non-Medics

Figure 52 displays load carriage vest preferences comparing medics to non-medics. Over 30% of medics prefer the FLC compared less than 25% of non-medics. Approximately the same percentage of medics and non-medics express no preference (25%) or prefer to wear no load carriage vest (25%). Nearly 15% of medics prefer the TAP compared to just over 10% of non-medics. A comparable percentage of medics and non-medics prefer commercial load carriage vests (7%). No medics prefer the ALICE belt/suspenders compared to 3% of non-medics. See Figure 52.

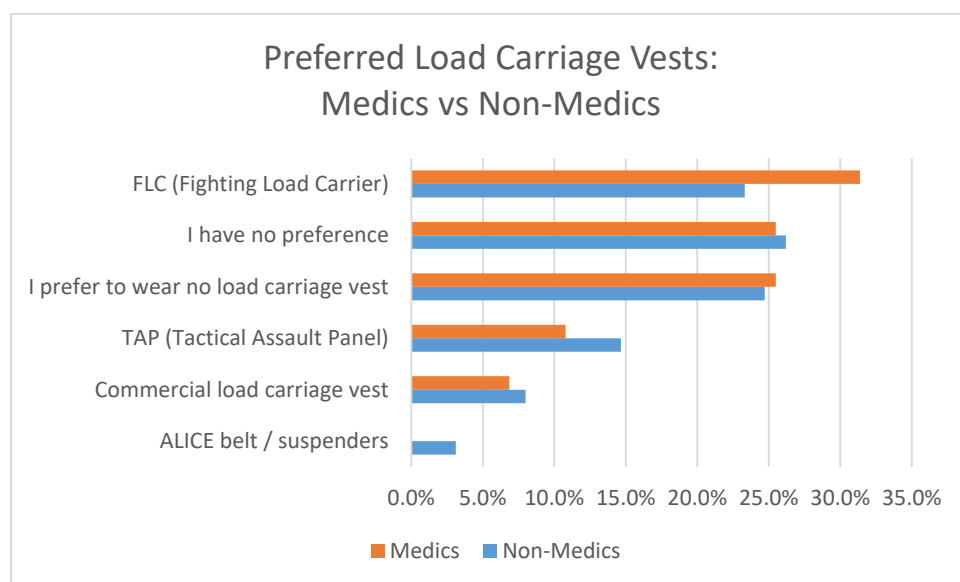


Figure 52. Load Management Survey – Preferred Load Carriage Vests: Medics vs. Non-Medics

Load Carriage Vest Preference: By Attribute

Figure 53 displays each attribute and the percentage that each load carriage vest was preferred for that attribute. TPs that prefer commercial load carriage vests express that their preference is based on all eight attributes provided more than any other group of TPs that preferred a different load carriage vest. Among the eight attributes, comfort, mobility/agility, range of motion and ability to effectively distribute load were the four most frequently selected attributes for preference for TPs that preferred commercial load carriage vests, ranging from 70%–90%. For all five load carriage vest preference selections, mobility/agility was the most frequently selected attribute contributing to that preference; cost was the least frequently selected attribute contributing to load carriage vest preference. See Figure 53 for detail.

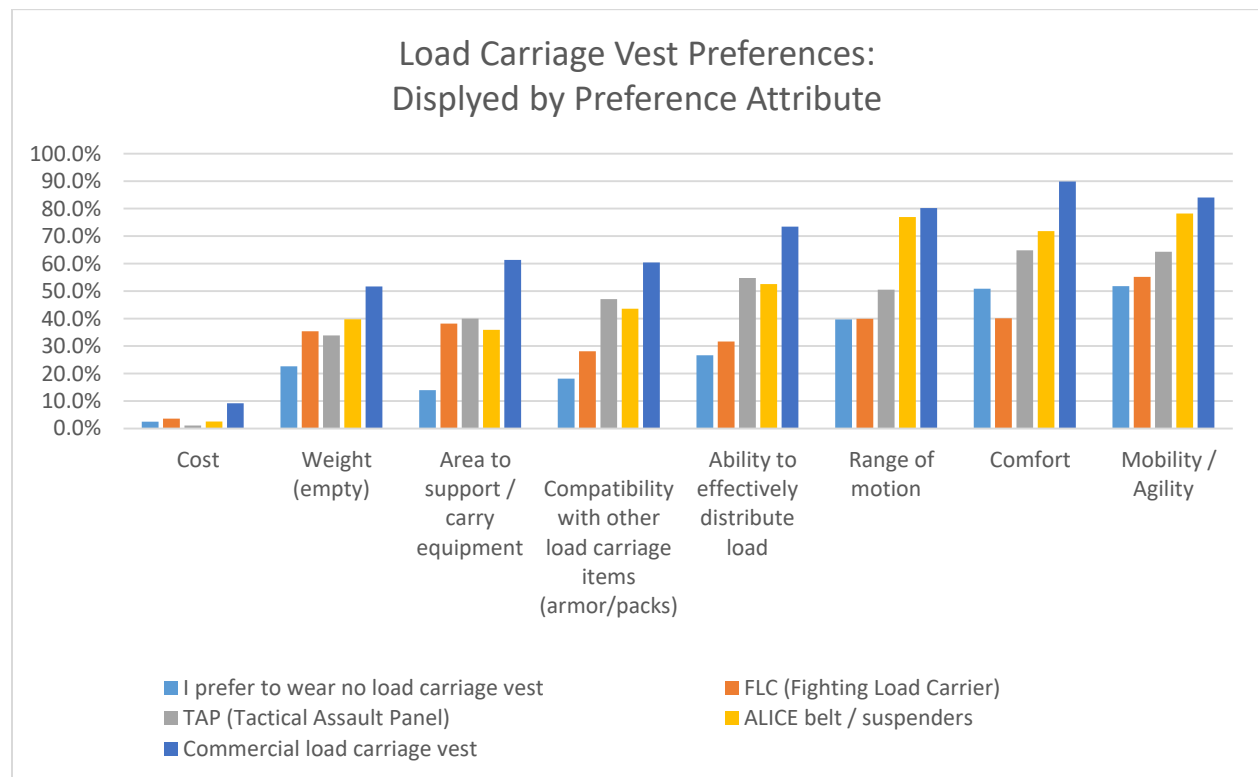


Figure 53. Load Management Survey – Load Carriage Vest Preferences: Displayed by Preference Attribute

Load Carriage Vest: By Load Carriage Vest Type

Figure 54 displays each load carriage vest and the attributes for which it was preferred. Generally, mobility/agility and comfort are the most frequently selected attributes contributing to load carriage vest preference, followed by range of motion and the ability to effectively distribute load. See chart below for more detail.

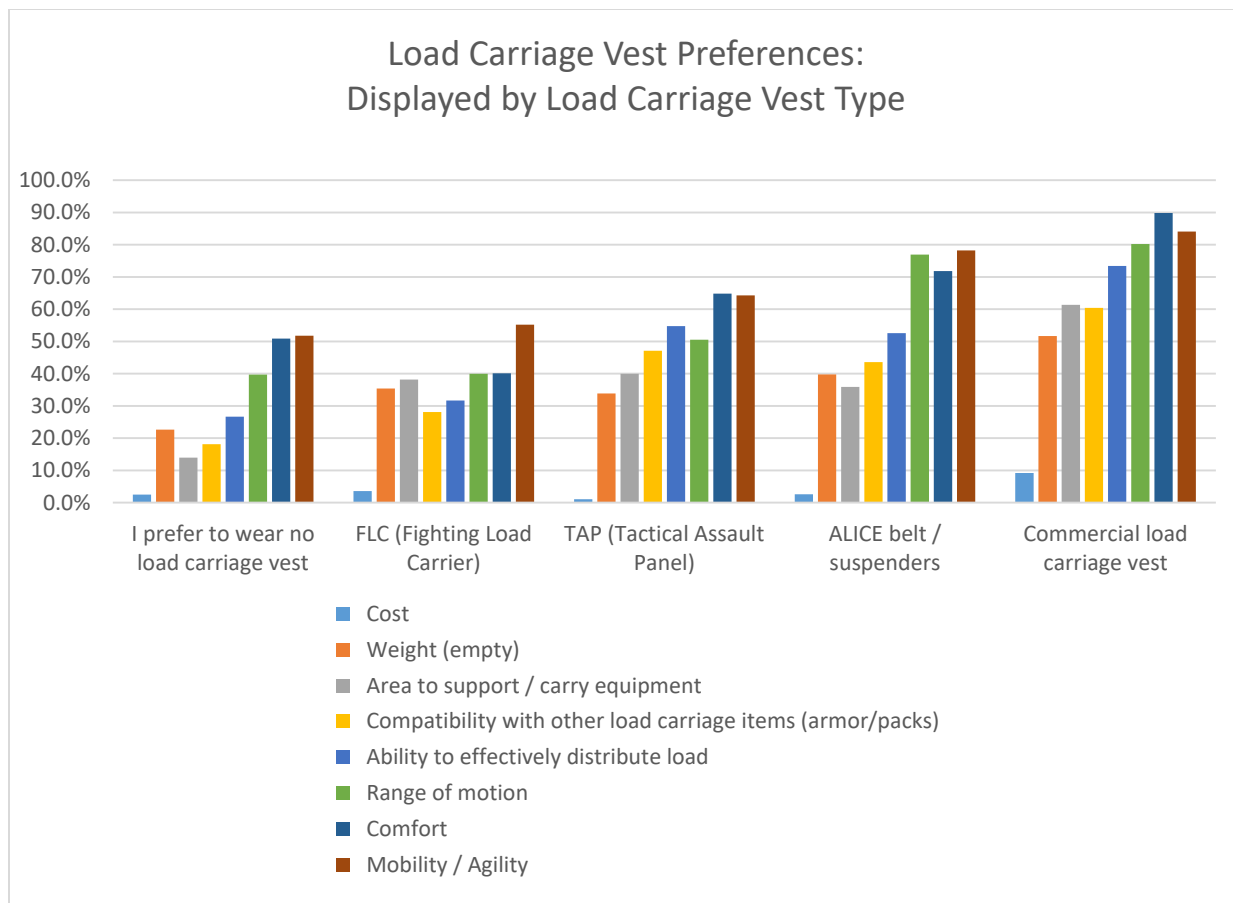


Figure 54. Load Management Survey – Load Carriage Vest Preferences: Displayed by Load Carriage Vest Type

Fighting Load Carrier and Operational Needs

TPs were asked if the FLC meets their operational needs when wearing body armor, and when *not* wearing body armor (Table 56 and Table 57).

Just over half (52.4%) of TPs indicated that the FLC *does* support users' operational needs when wearing body armor, compared to 76.3% when *not* wearing body armor.

In contrast, 31.8% of TPs indicated that the FLC *does not* support their operational needs *when wearing body armor*, in comparison to 9.9% indicating that the FLC *does not* support their operational needs when *not* wearing body armor.

A comparable number of TPs indicated *I don't know* for both questions (14.6% with body armor, 13.0% without body armor).

These data indicate that the FLC supports users' operational needs better when worn without body armor than when worn with body armor.

Table 55. Load Management Survey – Does FLC Support Your Operational Needs when Wearing Body Armor?

Does FLC support your operational needs when wearing body armor?	N	%
Yes	1386	52.4
No	842	31.8
I don't know	387	14.6
Missing	30	1.1

Table 56. Load Management Survey – Does FLC Support Your Operational Needs when NOT Wearing Body Armor?

Does FLC support your operational needs when NOT wearing body armor?	N	%
Yes	2018	76.3
No	263	9.9
I don't know	345	13.0
Missing	19	0.7

BELTS/SUB-BELTS

Section Summary

This section covers belt/sub-belt interests and preferences, and ballistic protection in belts/sub-belts.

- The majority of TPs (75%) have no preference for belts/sub-belts; however, it is important to note from focus group data that secondary belts for load carriage are a relatively new concept for Soldiers, and those that have used secondary belts expressed that they are a key enabler to reduce bulk on the torso and achieve a flatter, slimmer profile by carrying equipment lower on the torso
- One-third of TPs indicated that they *do* want secondary belts for load carriage equipment
- Over 80% of TPs *do not* want ballistic protection incorporated into secondary belts at the cost of increased weight/bulk

Belts/Sub-belts Preferences

Nearly 75% of TPs do not have a preference for a particular belt/sub-belt. Focus group data reveals that the majority of TPs have never worn or used belts/sub-belts. Over 10% of TPs indicate that they prefer to wear no belt/sub-belt. Only a combined 12.2% of TPs indicated a preference for a particular kind of belt/sub-belt. Of those, 7.1% prefer the FLC belt and 5.1% prefer commercial belts. Of the 5.1% (n=134) of TPs that prefer a commercial belt, 17.9% indicated that a commercial belt is all that is available to them. Nearly 25% of those TPs indicated that Army issued belts do not meet their needs. See Table 58.

Table 57. Load Management Survey – Which is Your Preferred Belt?

Which is your preferred belt?	N	%
I have no preference	1957	74.0
I prefer to wear no belt/sub-belt	352	13.3
FLC belt	188	7.1
Commercial Belt	134	5.1
Missing	14	0.5

Belts/Sub-belts Interest

One-third of the total population indicated that they *do* want secondary belts for load carriage equipment; two-thirds indicated that they *do not*. See Table 59.

Table 58. Load Management Survey – Do You Want Secondary Belts for Load Carriage Equipment

Do you want secondary belts for load carriage equipment?	N	%
Yes	904	34.2
No	1719	65.0
Missing	22	0.8

Ballistic Protection and Belts/Sub-belts

Over 80% of the total population indicate that they *do not* want ballistic protection incorporated into a secondary belt at the cost of increased weight/bulk. See Table 60.

Table 59. Load Management Survey – Do You Want Ballistic Protection Incorporated Into a Secondary Belt at the Cost of Increased Weight/Bulk

Do you want ballistic protection incorporated into a secondary belt at the cost of increased weight/bulk?	N	%
Yes	435	16.4
No	2187	82.7
Missing	21	0.9

Ballistic Protection in Belts/Sub-belts: By Gender

Figure 55 compares the responses from males and females to the question of incorporating ballistic protection into belts/sub-belts at the cost of increased weight/bulk. Nearly 75% of males *do not* want ballistic protection incorporated into belts/sub-belts compared to 27.2% of males that *do*. Females are nearly split evenly for those that *do not* want ballistic protection incorporated (54.3%) and those that *do* (45.7%).

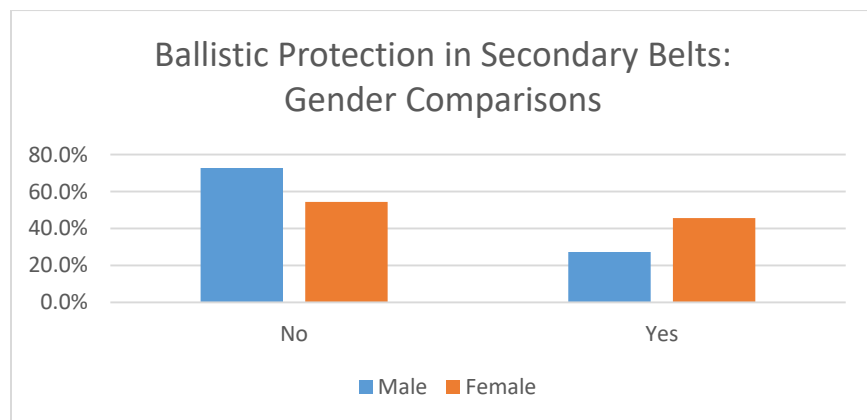


Figure 55. Load Management Survey – Ballistic Protection in Secondary Belts: Gender Comparisons

HYDRATION EQUIPMENT

Section Summary

This section covers hydration equipment used currently and during deployments, and hydration equipment preferences.

- The tube hydration system is the most frequently used piece of hydration equipment both during deployments and when not deployed (83–93% of TPs)
- The 1 quart canteen is used by 43–53% of TPs during deployments and when not deployed
- Disposable water bottles are used significantly more during deployments (by 55% of TPs) compared to when not deployed (25–30%)
- Nalgene type hydration equipment are consistently used during deployments and when not deployed by ~17% of TPs

- The tube hydration system is preferred by over 50% of TPs; all other hydration equipment is preferred by less than 10% each of TPs
- Disposable water bottles are preferred by 24% of females compared to 14% of males
- The attribute *volume of water* was the most frequently selected (by 50% of TPs) when asked which attributes were driving their preference for hydration equipment

Hydration Equipment Used (Deployments and Currently)

TPs were asked to select all hydration equipment they have used during deployments, as well as what hydration equipment they use currently. Of the 2,645 TPs, 882 indicated that they *have* been deployed and provided answers to hydration equipment used during deployments. Figure 56 displays three groups: hydration equipment used during deployments (for the 882 that have been deployed), hydration equipment used currently by those same 882 (for direct comparison), and the total population for hydration equipment used currently.

Tube hydration systems are the most frequently used piece of hydration equipment, by over 90% of TPs when deployed, and over 80% of TPs currently. The 1 quart canteen and disposable water bottles are used by more than 50% of TPs when deployed; the 1 quart canteen is also used by 50% of the total population currently, compared to only approximately 25% of TPs currently for disposable water bottles. The 1 quart canteen is used more frequently than the 2 quart canteen overall: over 50% compared to 35% during deployments, and 50% of the total population currently compared to 30% of the total population currently. Nalgene type hydration equipment is used consistently during deployments and currently, just below 20% for all three groups. See Figure 56.

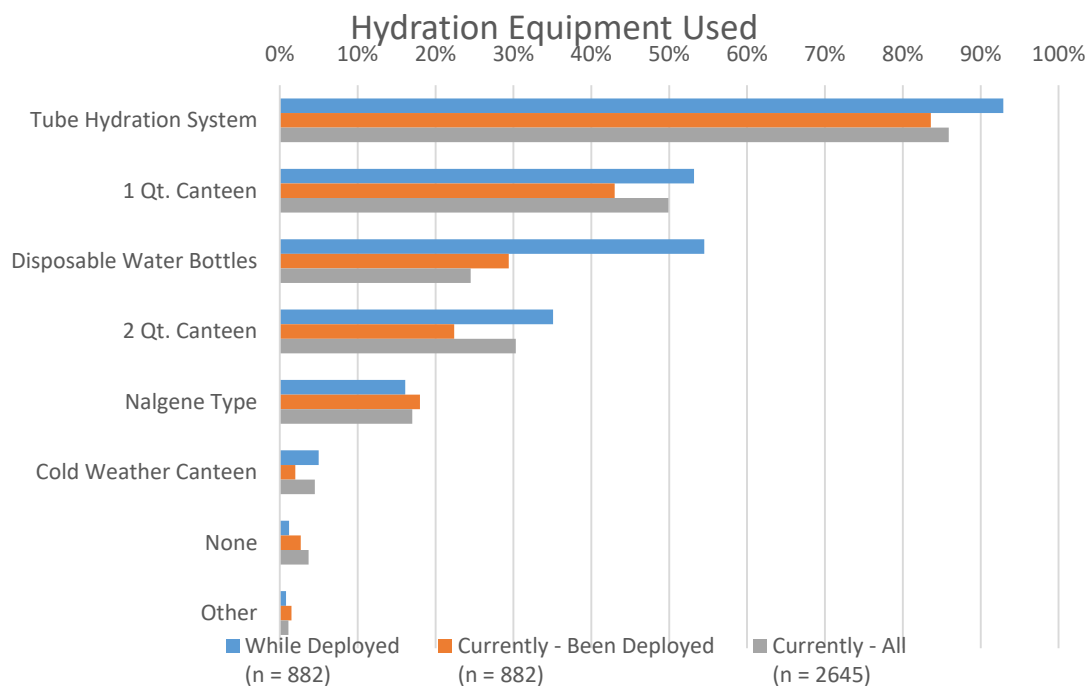


Figure 56. Load Management Survey – Hydration Equipment Used

Hydration Equipment Preferences by Segmented Demographics

Mounted vs Dismounted

Figure 57 displays hydration equipment preferences based on how TPs identified themselves for how they spend the majority of their time: mounted, dismounted, or equally split between mounted and dismounted. For all three groups, tube hydration systems are used by approximately 60% of users (slightly more frequently by the mounted group compared to the ‘equally’ group). All other hydration equipment was

indicated by approximately 10% or less for all three groups. Note that the dismounted group indicated using Nalgene type hydration equipment slightly more frequently than the mounted group.

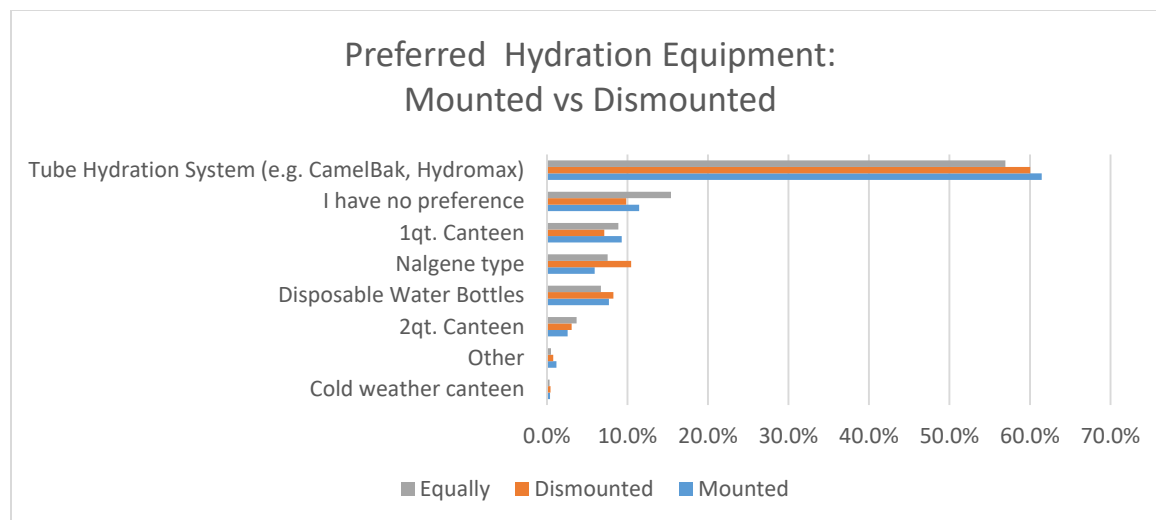


Figure 57. Load Management Survey – Preferred Hydration Equipment: Mounted vs. Dismounted

Height Comparisons

Figure 58 displays hydration equipment preferences based on TPs' height. The three height groups were determined by selecting the shortest 25% from this data set, the tallest 25%, and the middle 50%. These percentage cuts result in the following: 67 in or less (5 ft 7 in), 72 in or more (6 ft), and between 67 in and 72 in. The majority of all three groups prefer tube hydration systems, with the shortest group preferring them by approximately 5% more than the middle height group and tallest group. All remaining hydration equipment was preferred by approximately 10% or less of all three groups. Note that Nalgene type hydration equipment is preferred slightly more frequently by the tallest group than the shortest group. See Figure 58.

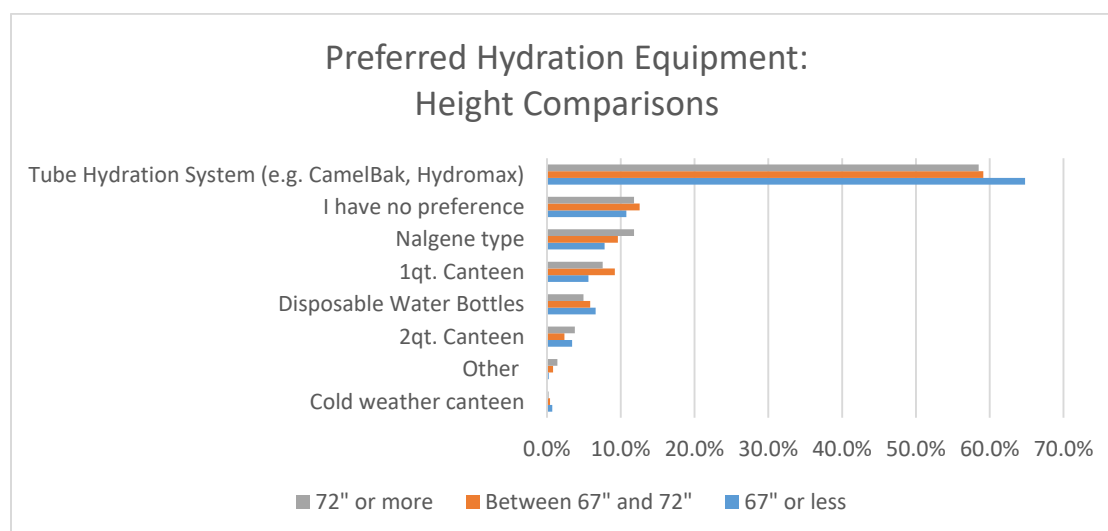


Figure 58. Load Management Survey – Preferred Hydration Equipment: Height Comparisons

Gender Comparisons

When comparing hydration equipment preferences by gender, tube hydration systems are the most frequently preferred by approximately 60% of both groups (by slightly more females than males). There

is a notable difference between males and females for disposable water bottles (17% females, 7% males), 1 quart canteens (8% males, 4% females), and Nalgene type hydration equipment (9% male, 2% female). See Figure 59.

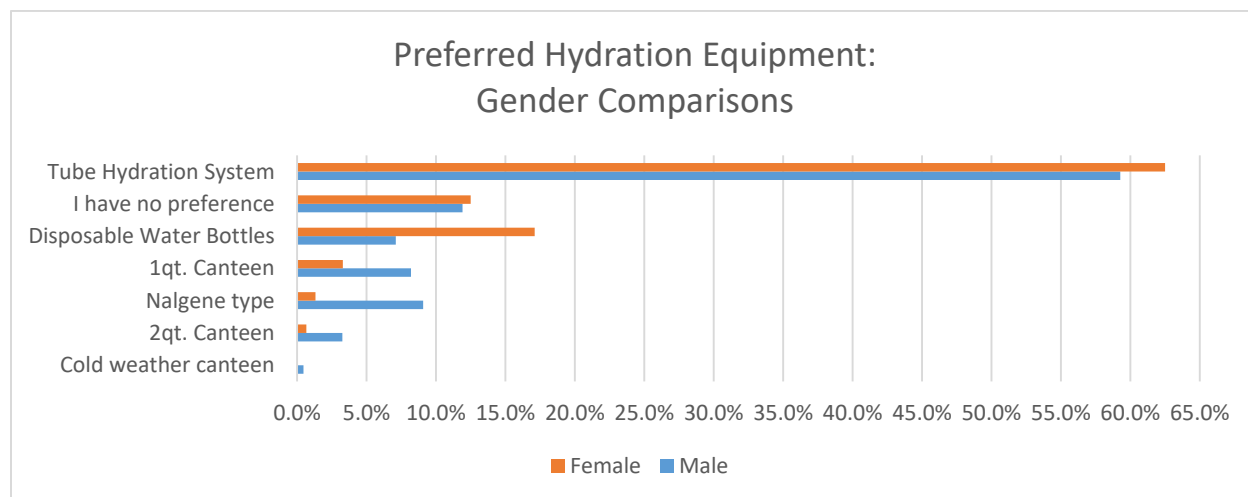


Figure 59. Load Management Survey – Preferred Hydration Equipment: Gender Comparisons

Medics vs Non-Medics

When comparing medics to non-medics, tube hydration systems are the most frequently preferred by approximately 60% of both groups (by slightly more medics than non-medics). Sixteen percent of medics prefer Nalgene type hydration equipment compared to 8% of non-medics. Disposable water bottles are preferred equally between the two groups (nearly 10%). See Figure 60.

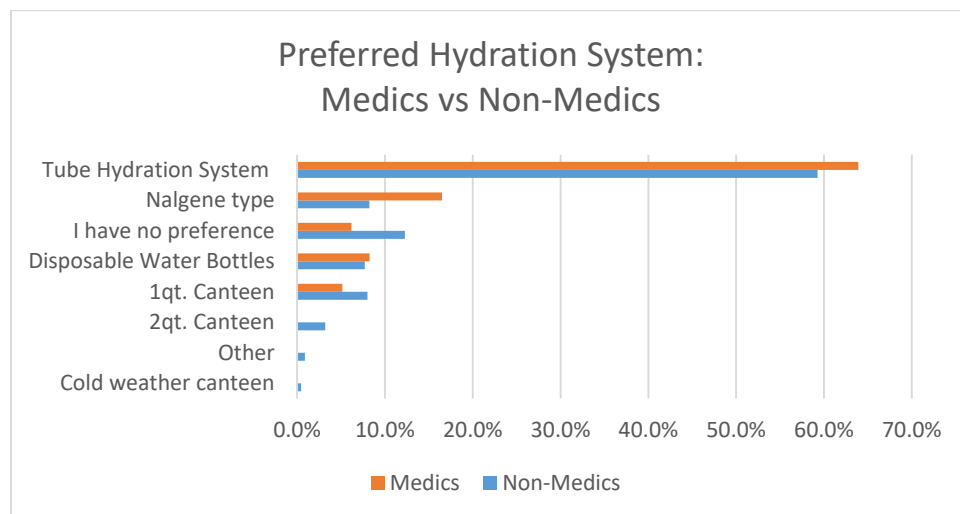


Figure 60. Load Management Survey – Preferred Hydration System: Medics vs. Non-Medics

Attributes of Hydration Equipment Preferences

TPs were asked to select all attributes that contributed to their preference for the hydration equipment they selected. Figure 61 displays an aggregate of all responses combined for attributes that contributed to hydration equipment preference.

Volume of water was the most frequently selected attribute contributing to hydration equipment preference, selected by just over 50% of the total population. The second most frequently selected

attribute was hands-free access by nearly 40% of TPs, followed by *integration with fighting load* by approximately 35% of TPs. The following four attributes were selected by a range of 25–35% of TPs: overall size, cleanliness/maintenance, compatibility with rucksack, and good for hot environments. See Figure 61.

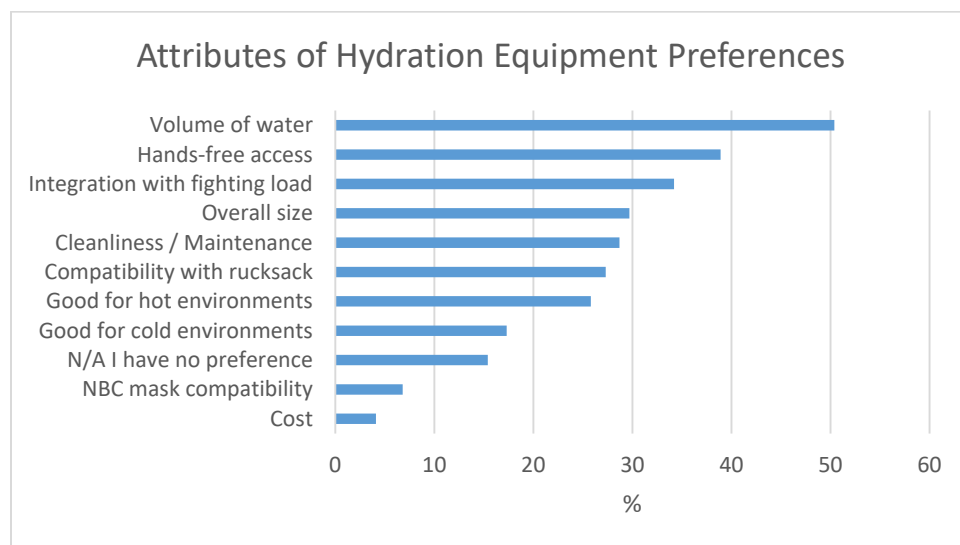


Figure 61. Load Management Survey – Attributes of Hydration Equipment Preferences

Hydration Equipment Preferences: By Attribute

Figure 62 displays each attribute and the percentage that each piece of hydration equipment was preferred for that attribute. There is a moderate amount of variation within each attribute, indicating that depending on the particular piece of hydration equipment, different attributes contribute towards preference. The attribute *overall size* is the most consistently preferred attribute, ranging from nearly 30% (tube hydration system) to 50% (cold weather canteen). The attribute *cleanliness/maintenance* is overall the most highly preferred attribute, accounting for approximately 40% of preferences for the cold weather canteen, the 1 quart canteen and the 2 quart canteen, and over 60% of preferences for disposable water bottles and Nalgene type hydration equipment. Overall, the attribute *volume of water* is the third most frequently selected attribute, accounting for 70% of preferences for tube hydration, 50% of preferences for the cold weather canteen, over 40% of preferences for the 2 quart canteen, and over 30% of preferences for Nalgene type hydration equipment. The cold weather canteen is the most preferred piece of hydration equipment for the attribute *good for hot environments* at 60%, with all other hydration equipment being preferred for this attribute by approximately 30% or less. The 1 quart canteen, tube hydration system and Nalgene type hydration equipment were the three most preferred for the attribute *integration with fighting load* at approximately 50%, 40% and 30% respectively. See Figure 62.

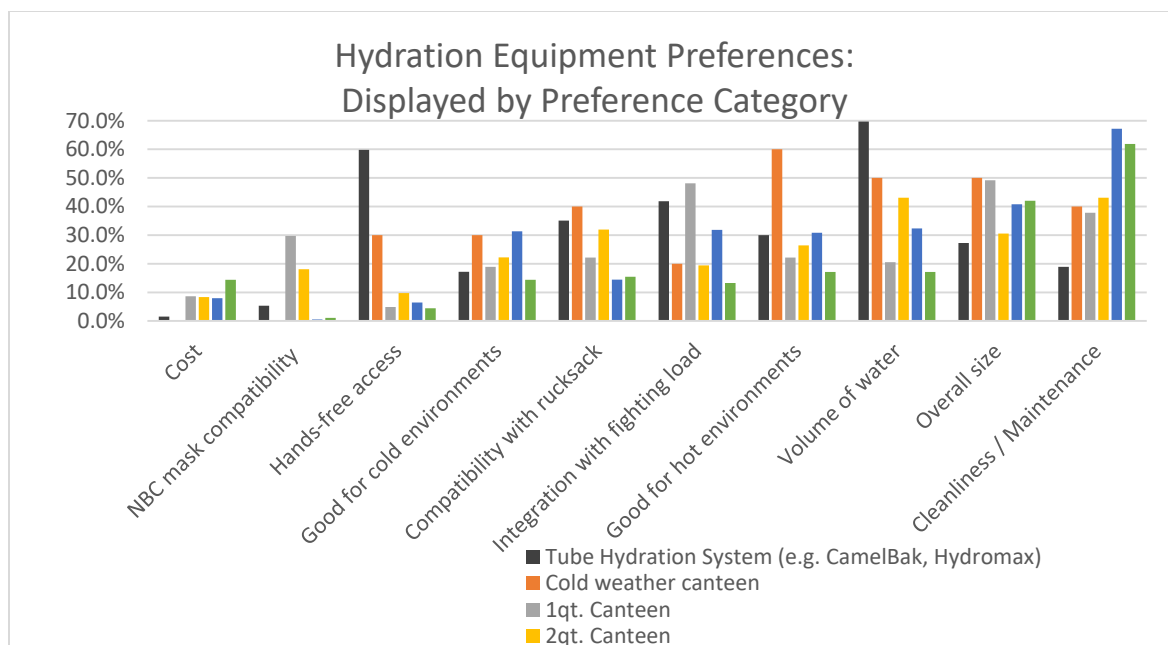


Figure 62. Load Management Survey – Hydration Equipment Preferences: Displayed by Preference Category

Hydration Equipment Preferences: By Hydration Equipment

Figure 63 displays each piece of hydration equipment and how frequently it was preferred for each attribute. For tube hydration systems, the attributes *volume of water* and *hands-free access* accounted for 70% and 60% of preferences respectively. *Integration with fighting load* accounted for over 40% of preferences, followed by *compatibility with rucksacks* (35%), *good for hot environments* (30%), and *overall size* (27%). For the cold weather canteen, the attribute *good for hot environments* accounted for 60% of preferences, followed by *volume of water* and *overall size* (50% each), *cleanliness/maintenance* and *compatibility with rucksacks* (40% each), and *hands-free access* and *good for cold environments* (30% each). Compared to all other hydration equipment, the 1 quart canteen was the most preferred for the attribute *integration with fighting load* (nearly 50%) and the attribute *NBC mask compatibility* (30%). Of the TPs that preferred the 1 quart canteen, nearly 50% preferred it for *overall size* and nearly 40% preferred it for *cleanliness/maintenance*. Nalgene type hydration equipment was the most preferred for *cleanliness/maintenance* compared to all other hydration equipment at nearly 70%, followed by disposable water bottles at approximately 60%. Both Nalgene type and disposable water bottles were preferred *the least* for the attribute *compatibility with rucksack* when compared to other hydration equipment (approximately 15% each). For the attribute *cost*, disposable water bottles were the most preferred (15%), followed by Nalgene type, 1 quart canteen and 2 quart canteen (all approximately 8%). See Figure 63.

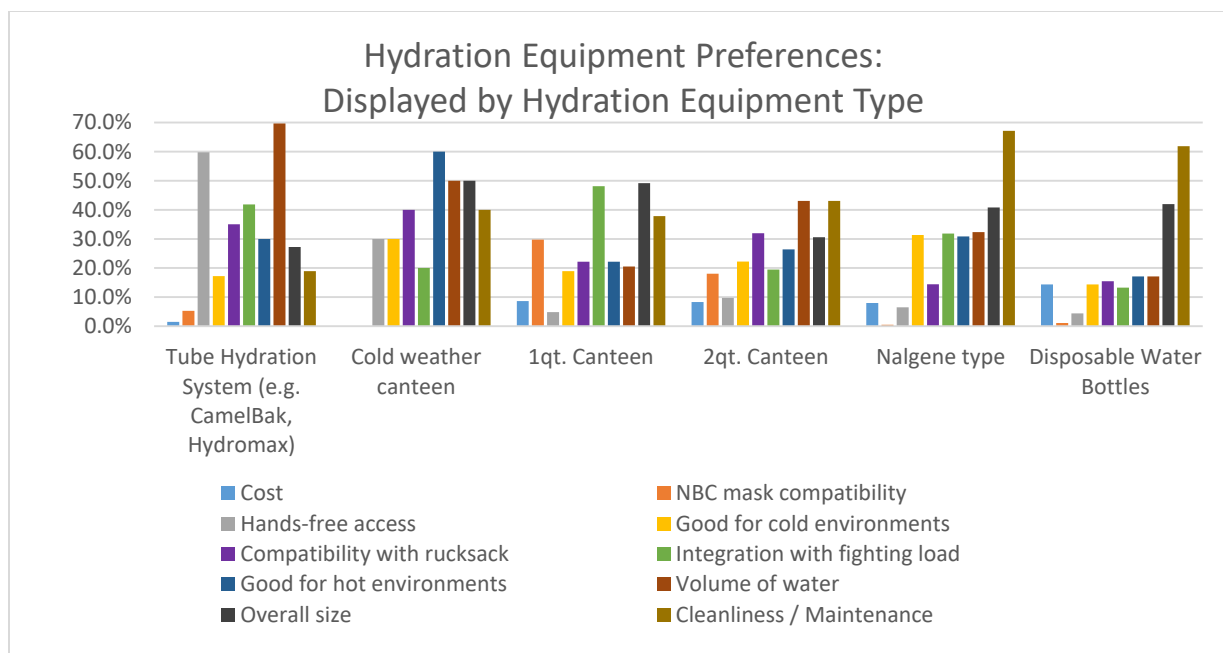


Figure 63. Load Management Survey – Hydration Equipment Preferences: Displayed by Hydration Equipment Type

POUCHES

Section Summary

This section covers pouches that are used currently.

- M4 magazine pouches are the most frequently used pouch (by 86.5% of TPs)
- Canteen pouches and hand grenade pouches are used by 69.6% and 63.8% of TPs respectively
- The original IFAK and IFAK II are used by 49.1% and 42.2% of TPs respectively

Pouches Used Currently

The three most frequently used pouches currently by the total population are M4 magazine pouches (86.5%), canteen pouches (69.6%), and hand grenade pouches (63.8%). The original IFAK and IFAK II are currently used by 49.1% and 42.2% of the total population, respectively. The E-tool pouch and flash bang grenade pouches are currently used by 30.5% and 24.7% of the total population, respectively. NODs pouches, administrative pouches, smoke grenade pouches, dump pouches, radio/comms pouches and medical pouches are currently used by a range of 10–20% of the total population. All other pouches are used by less than 10% of the total population. See Figure 64.

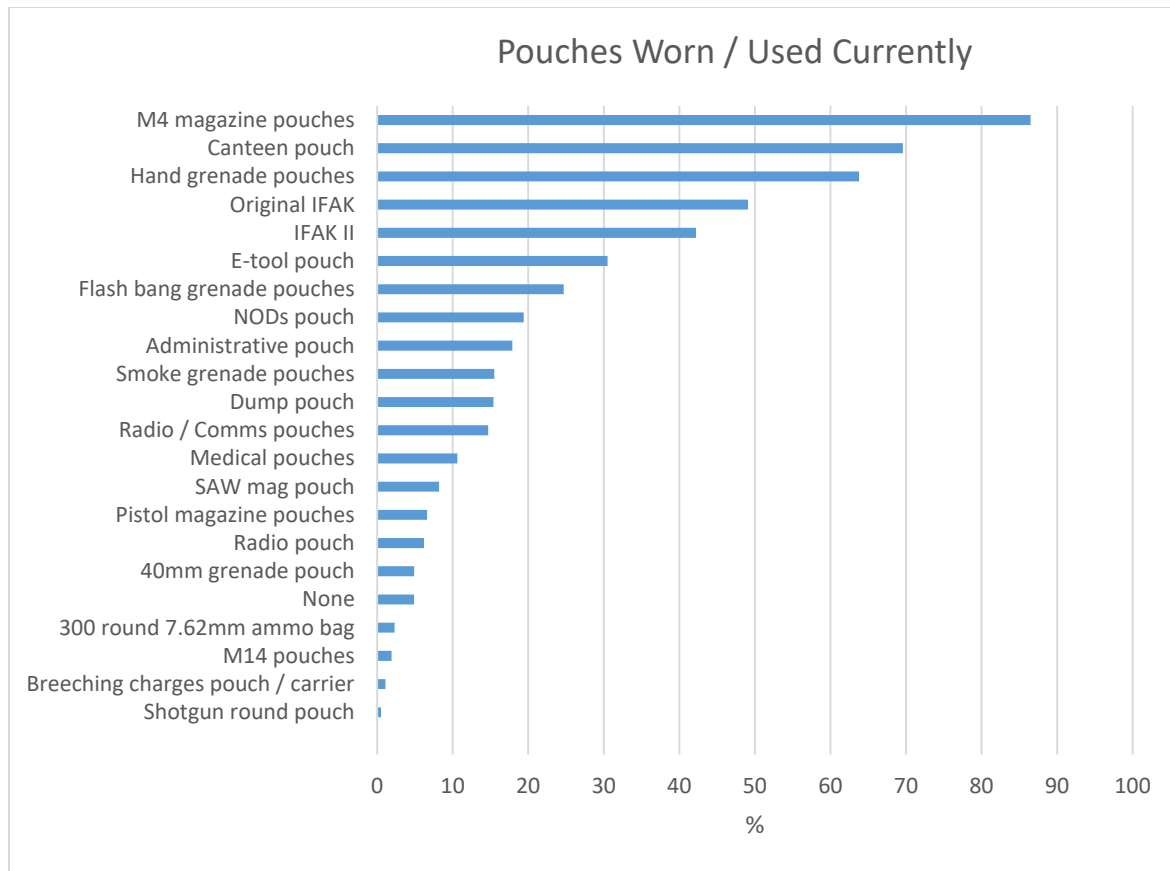


Figure 64. Load Management Survey – Pouches Worn/Used Currently

DATA SEGMENTATION

Section Summary

This section provides easy access to all of the previously covered data segmented by specific demographics. All data in this section have already been covered by relevance to specific equipment. Here, all similar demographic segmentation is provided together.

- All mounted/dismounted comparisons data
- All height comparisons data
- All gender comparisons data
- All medics/non-medics comparison data

MOUNTED/DISMOUNTED COMPARISONS

This section provides all analyses comparing the following groups: Mounted, Dismounted, and those who equally split their time between being mounted and dismounted.

Table 60. Load Management Survey – Time Spent Mounted or Dismounted

	N	%
Mounted	563	21.3
Dismounted	1278	48.3
Equally	686	25.9
Blank	118	4.5

Body Armor Preferences (Mounted vs Dismounted)

The chart below displays body armor preferences based on how TPs identified themselves for how they spend the majority of their time: mounted, dismounted, or equally split between mounted and dismounted. For all three groups, the SPCS was the most preferred body armor system by 33–40% of TPs. IOTV Gen III was preferred by nearly 20% of TPs that split their time equally between mounted and dismounted, and by TPs that spend the majority of their time mounted, but by just over 10% of TPs that spend the majority of their time dismounted.

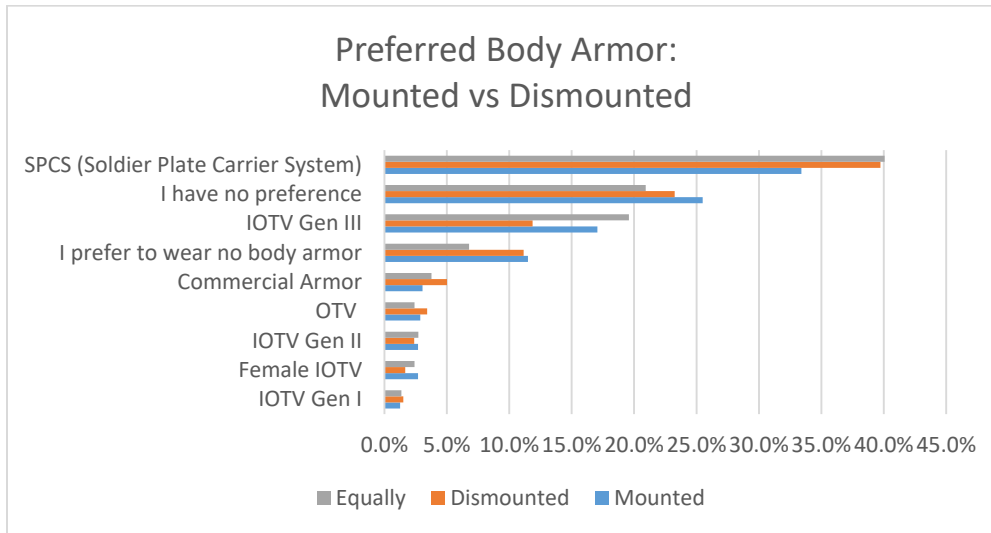


Figure 65. Load Management Survey – Preferred Body Armor: Mounted vs. Dismounted

Rucksack Preferences (Mounted vs Dismounted)

Figures 66–69 display rucksack preferences for four mission durations based on how TPs identified themselves for how they spend the majority of their time: mounted, dismounted, or equally split between mounted and dismounted.

For 1 to 12 hour missions, the majority of all three groups prefer the MOLLE Assault Pack (38–41%). The largest difference between these three groups is for the MOLLE Medium, preferred by 16% of the dismounted group compared to 21% of the mounted group.

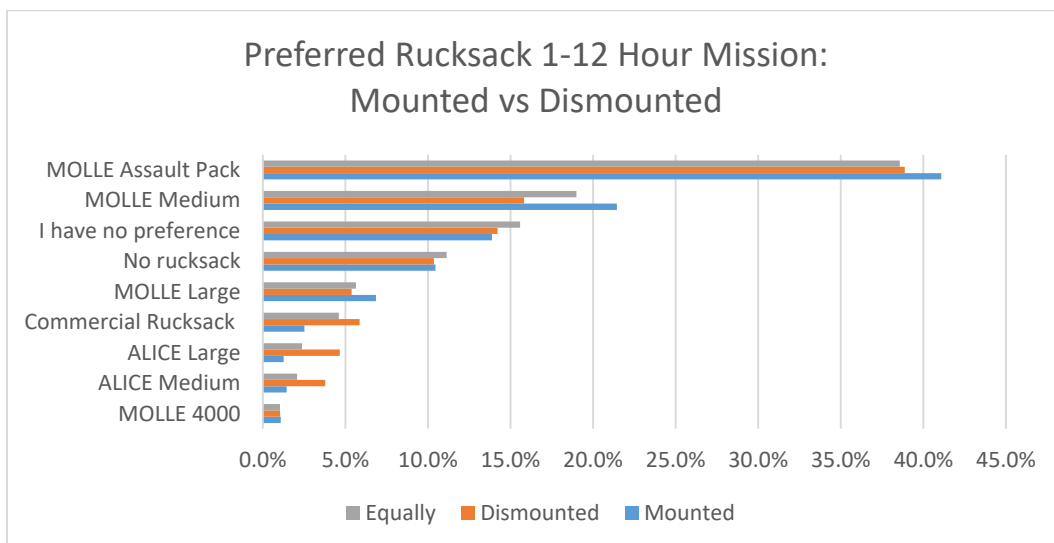


Figure 66. Load Management Survey – Preferred Rucksack 1-12 hour Mission: Mounted vs. Dismounted

For 12 to 24 hour missions, the MOLLE Assault Pack and MOLLE Medium were the two most preferred rucksacks, although there are small differences between the three groups. More TPs in the ‘equally mounted/dismounted’ group prefer the MOLLE Medium (28.5%) than the MOLLE Assault Pack (23.9%). In contrast, the MOLLE Assault pack was preferred by more TPs in the mounted and dismounted groups (27.9% and 25.6% respectively) than MOLLE Medium (25.6% and 23.9% respectively). For all three groups, the MOLLE Large was the third most preferred ruck for a 12 to 24 hour mission, preferred by 18.8% of the mounted group, 14.3% of the dismounted group, and 12% of the ‘equally mounted/dismounted’ group. The ALICE Large was preferred by 7.2% of the dismounted group compared to only 1.3% of the mounted group. See Figure 67.

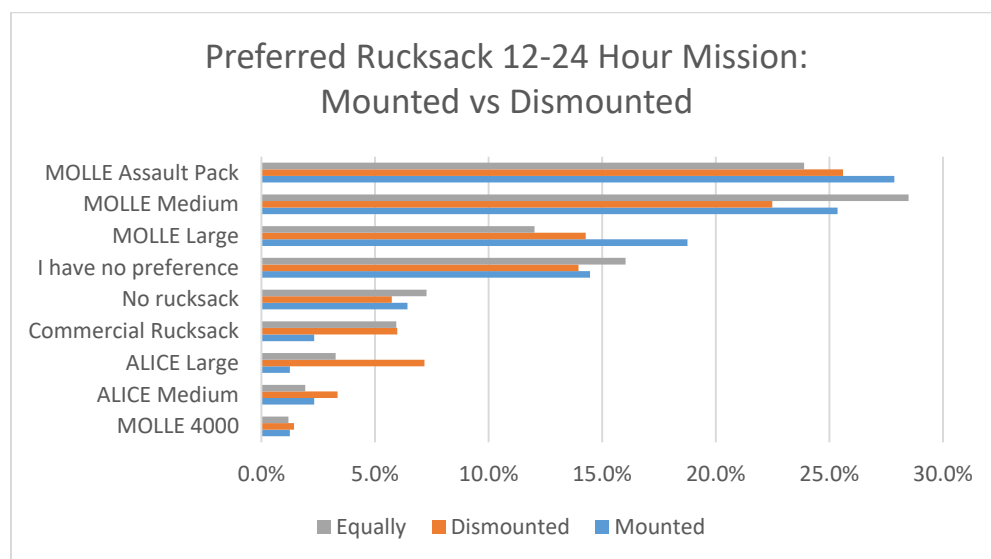


Figure 67. Load Management Survey – Preferred Rucksack 12-24 hour Mission: Mounted vs. Dismounted

For 24 to 72 hour missions, the MOLLE Large was the most preferred ruck by all three groups, ranging from 31% (‘equally mounted/dismounted’) to 41% (mounted). The MOLLE Medium was the second most preferred ruck by all three groups ranging from 17% (dismounted) to 23% (‘equally mounted/dismounted’). Approximately 10% of all three groups prefer the MOLLE Assault pack for a 24 to 72 hour missions. Assault Pack and MOLLE Medium were the two most preferred rucksacks, although there are small differences between the three groups. More TPs in the ‘equally mounted/dismounted’ group prefer the MOLLE Medium (28.5%) than the MOLLE Assault Pack (23.9%). In contrast, the MOLLE Assault pack was preferred by more TPs in the mounted and dismounted groups (27.9% and 25.6% respectively) than MOLLE Medium (25.6% and 23.9% respectively). For all three groups, the MOLLE large was the third most preferred ruck for a 12 to 24 hour mission, preferred by 18.8% of the mounted group, 14.3% of the dismounted group, and 12% of the ‘equally mounted/dismounted’ group. The ALICE Large is preferred by nearly 10% of the dismounted group compared to only 3% and 4.2% of the mounted and ‘equally mounted/dismounted’ groups respectively. See Figure 68.

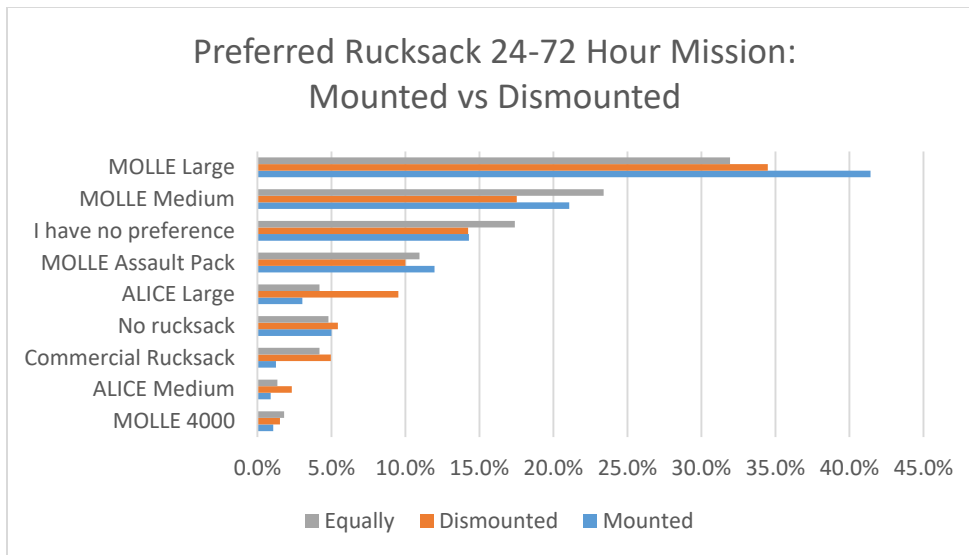


Figure 68. Load Management Survey – Preferred Rucksack 24-72 hour Mission: Mounted vs. Dismounted

For 72+ hour missions, the MOLLE Large was the most preferred ruck by all three groups ranging from 48% (‘equally mounted/dismounted’) to 56.4% (mounted). Approximately 15% of all three groups express ‘no preference’ for 72+ hour missions. The second most preferred ruck for the dismounted group is the ALICE Large (10.9%) compared to ‘equally mounted/dismounted’ and mounted groups whose second most preferred ruck is the MOLLE Medium (approximately 10% each). See Figure 69.

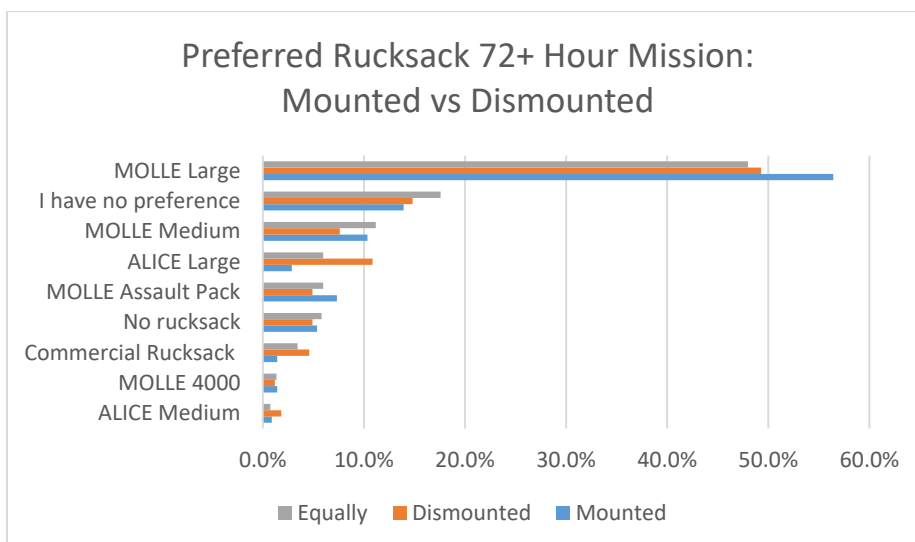


Figure 69. Load Management Survey – Preferred Rucksack 72+ hour Mission: Mounted vs. Dismounted

New Rucksack Size (Mounted vs Dismounted)

Over 40% of all three sub-groups indicated that a new Army issued rucksack capacity should be between the MOLLE Large and the MOLLE Medium. For all of these sub-groups, the second most frequently selected response was that the currently available range of capacity meets users’ operational needs (over 20% for all). See Figure 70.

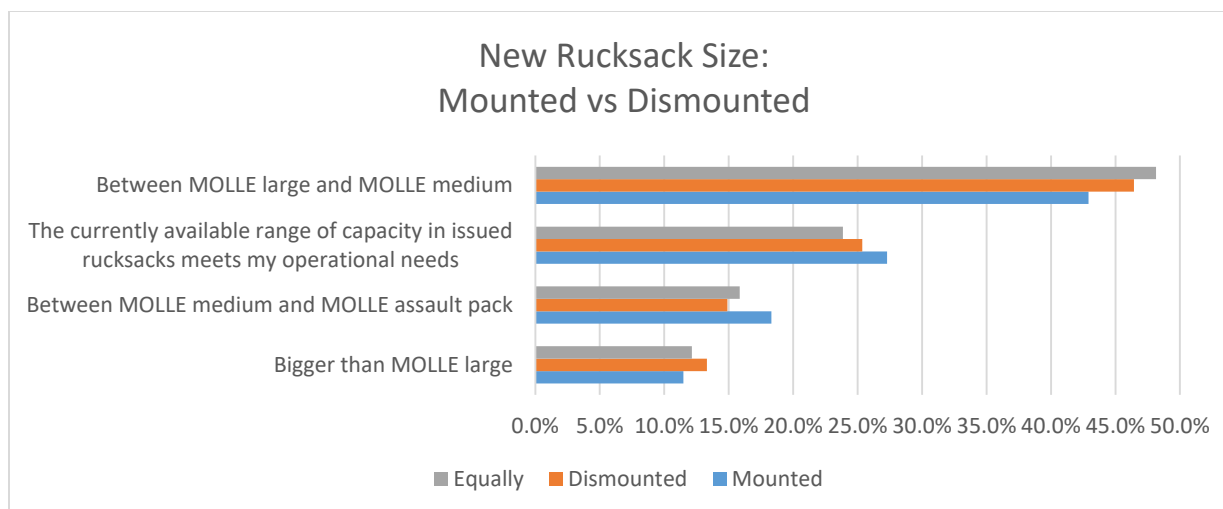


Figure 70. Load Management Survey – New Rucksack Size: Mounted vs. Dismounted

Load Carriage Vest Preferences (Mounted vs Dismounted)

Figure 71 displays load carriage vest preferences based on how TPs identified themselves for how they spend the majority of their time: mounted, dismounted, or equally split between mounted and dismounted. Approximately 25% of all three groups expressed that they have no preference for load carriage vests, and comparable percentage indicated they prefer to wear no load carriage vest. However, there are small differences between the three groups for preferring to wear no load carriage vest; 27.6% of the ‘equally’ group compared to 23.3% of the dismounted group. For the mounted group, the FLC is the most frequently selected answer for load carriage vest preference by nearly 30% of TPs in that group, compared to only 21% of the ‘equally’ group and dismounted group. The TAP was preferred by approximately 15% of all three groups. Commercial load carriage vests are most frequently preferred by the dismounted group (10%), compared to the ‘equally’ group by 7.7%, and 4.1% by the mounted group, indicating that the more time a Soldier spends, the more likely they are to prefer a commercial load carriage vest.

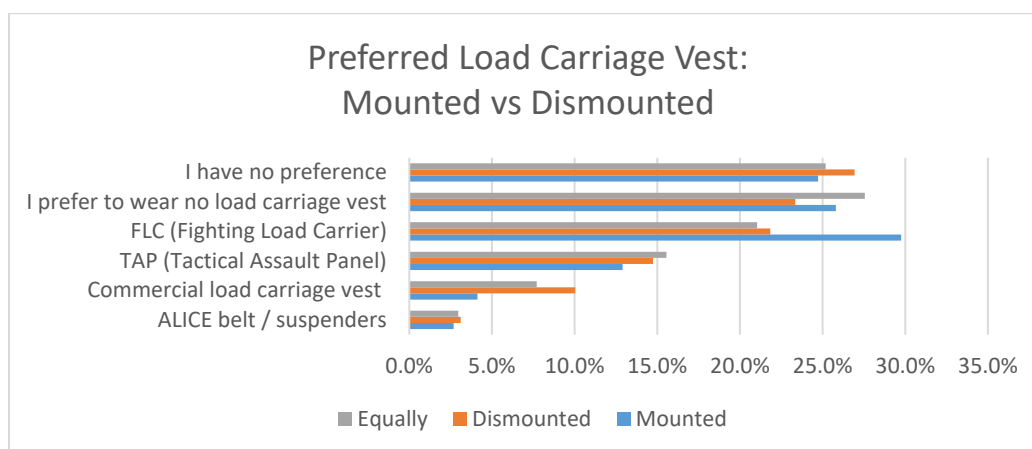


Figure 71. Load Management Survey – Preferred Load Carriage Vest: Mounted vs. Dismounted

Preferred Hydration Equipment (Mounted vs Dismounted)

Figure 72 displays hydration equipment preferences based on how TPs identified themselves for how they spend the majority of their time: mounted, dismounted, or equally split between mounted and dismounted. For all three groups, tube hydration systems are used by approximately 60% of users (slightly more frequently by the mounted group compared to the ‘equally’ group). All other hydration equipment was

indicated by approximately 10% or less for all three groups. Note that the dismounted group indicated using Nalgene type hydration equipment slightly more frequently than the mounted group.

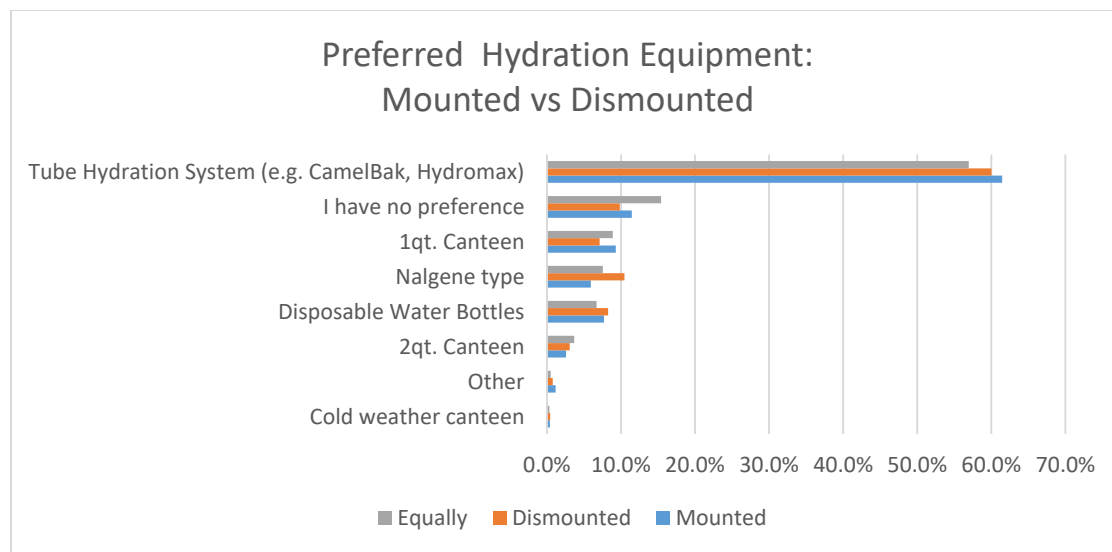


Figure 72. Load Management Survey – Preferred Hydration Equipment: Mounted vs. Dismounted

HEIGHT COMPARISONS

This section provides all analyses comparing the following groups: height of 67 in or less, heights between 67 in and 72 in, and height of 72 in or more. The three height groups were determined by selecting the shortest 25% from this data set, the tallest 25%, and the middle 50%. These percentage cuts result in the following: 67 in or less (5 ft 7 in), 72 in or more (6 ft), and between 67 in and 72 in.

Table 61. Load Management Survey – Reported Heights

	N	%
67 in or less	462	26.4
Between 67 in and 72 in	803	46.0
72 in or more	482	27.6

Preferred Body Armor (Height Comparisons)

Figure 73 displays body armor preferences based on TPs' height. When comparing these three height groups for body armor preferences, 33–43% of all three groups prefer the SPCS. Note that the tallest group (72 in or more) prefer the SPCS by approximately 5% more than the middle height group (68 in to 71 in), and approximately 10% more than the shortest group (67 in or less). This indicates that although the SPCS is the most preferred body armor system, taller Soldiers tend to prefer the SPCS more than shorter Soldiers. The middle height group and shortest group selected the response “I have no preference” by approximately 26% each, compared to 18% of the tallest group, indicating that taller Soldiers tend to have a stronger preference for body armor compared to average height or shorter Soldiers. IOTV Gen III was the second most preferred body armor by all three groups, ranging from 13–14% of TPs. Commercial body armor was preferred by less than 5% of all three groups, as well as OTV, IOTV Gen II and IOTV Gen I. Notably, none of the TPs in the tallest group prefer the Female IOTV and only 1% of the middle height group prefer the Female IOTV, compared to 6% of the shortest group. This is largely explained by the fact that females tend to be in the shortest group. See Figure 73.

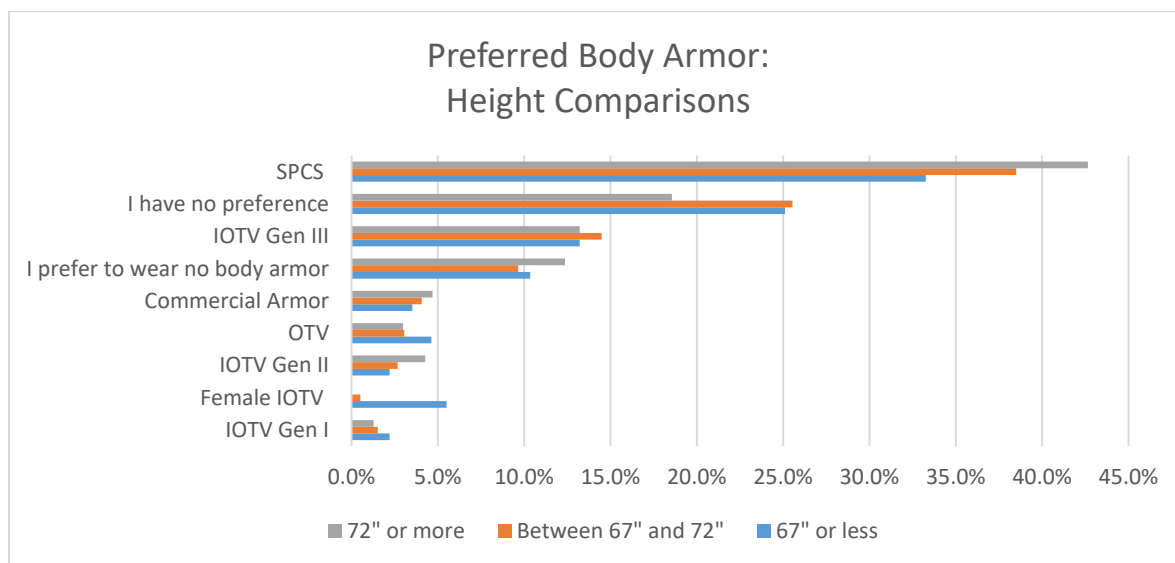


Figure 73. Load Management Survey – Preferred Body Armor: Height Comparisons

New Rucksack Size (Height Comparisons)

Over 40% of all sub-groups indicated that a new Army issued rucksack capacity should be between the MOLLE Large and the MOLLE Medium. For all of these sub-groups, the second most frequently selected response was that the currently available range of capacity meets users' operational needs (over 20% for all). Note that for height comparisons, nearly 25% of the 67 in or less group expressed a new capacity preference between the MOLLE Medium and the MOLLE Assault Pack, compared to nearly 15% for those in the tallest group (72 in or more) and the medium height group (between 67 in and 72 in). See Figure 74.

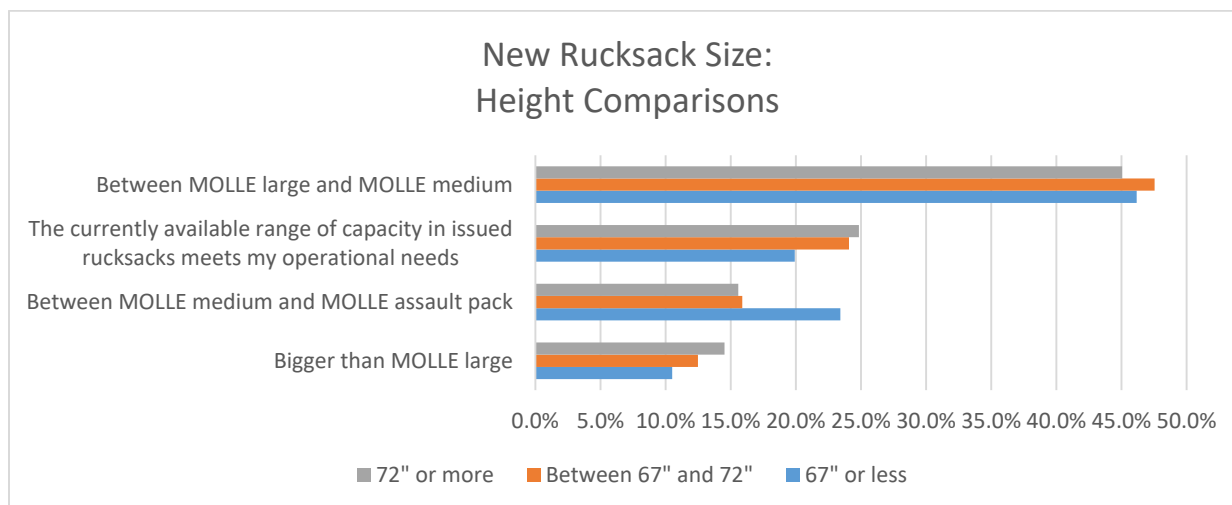


Figure 74. Load Management Survey – New Rucksack Size: Height Comparisons

Preferred Load Carriage Vest: Height Comparisons

Figure 75 displays load carriage preferences based on TPs' height. Over 30% of the shortest group expressed no preference, compared to over 26% of the medium height group and 23% of the tallest group. The FLC is the most preferred load carriage vest by the shortest group (28%), by 25% of the medium height group, and by 20% of the tallest group. The tallest group most frequently indicated that they prefer to wear no load carriage vest (25%), compared to 24% of the medium height group and 21% of the shortest group. The TAP is preferred most frequently by the tallest group (14.5%), followed by the medium height group (13.1%), and by 10% of the shortest group. Nearly 12% of the tallest group prefer

commercial load carriage vests, compared to 7.5% of the medium height group and 6.8% of the shortest group. Approximately 5% or less of all three groups prefer the ALICE belt/suspenders. See Figure 75.

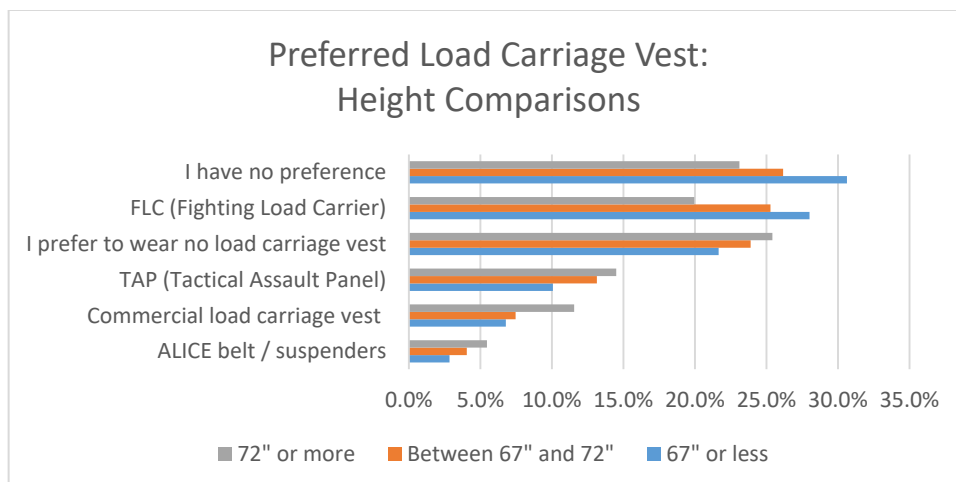


Figure 75. Load Management Survey – Preferred Load Carriage Vest: Height Comparisons

Preferred Hydration Equipment (Height Comparisons)

Figure 76 displays hydration equipment preferences based on TPs' height. The majority of all three groups prefer tube hydration systems, with the shortest group preferring them by approximately 5% more than the middle height group and tallest group. All remaining hydration equipment was preferred by approximately 10% or less of all three groups. Note that Nalgene type hydration equipment is preferred slightly more frequently by the tallest group than the shortest group. See Figure 76.

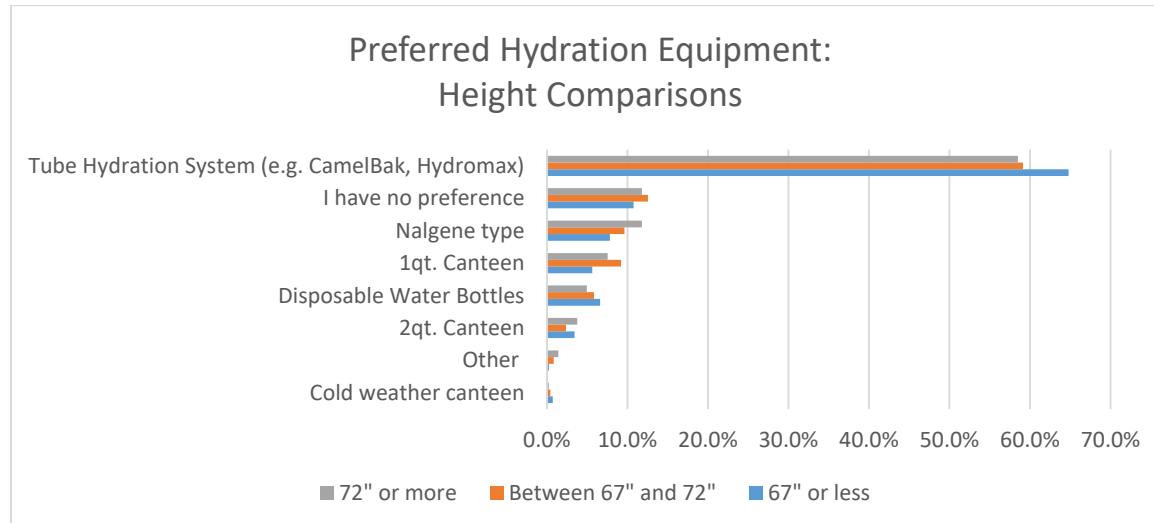


Figure 76. Load Management Survey – Preferred Hydration Equipment: Height Comparisons

GENDER COMPARISONS

This section provides all analyses comparing males and females. See Table 62.

Table 62. Load Management Survey – Reported Genders

	N	%
Male	2453	93.2
Female	180	6.8

MOS (Gender Comparisons)

When splitting the data of the total population by gender, there are drastically more males with the MOS Infantryman than females. Females outnumber males by 5% or more for the following MOS's: Health Care Specialist, Motor Transport Operator, Unit Supply Specialist, Human Resource Specialist and Signal Support Systems Specialist. In contrast, there are nearly 5% more males with the MOS M1 Armor Crewman compared to females. Figure 77 only displays MOS's that were reported by at least 5% of either males or females.

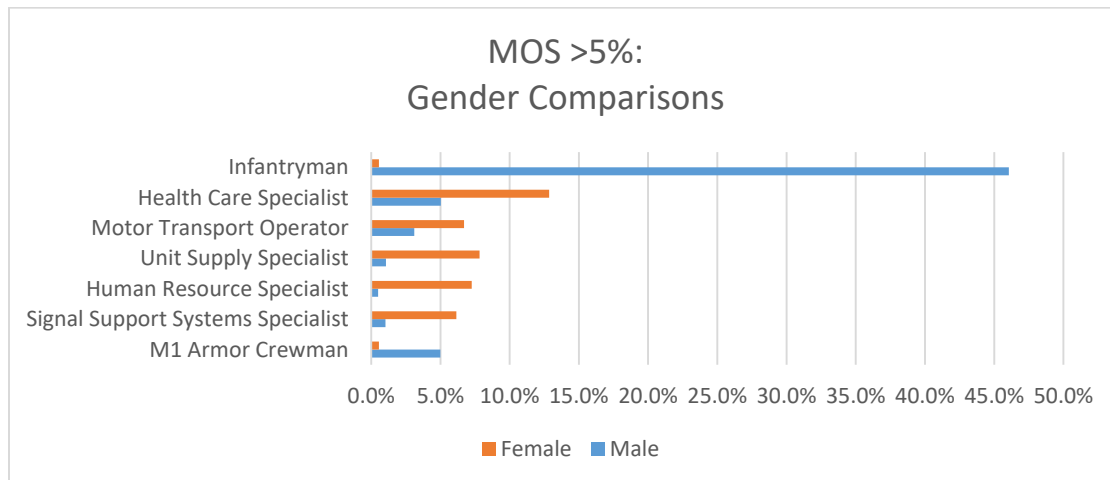


Figure 77. Load Management Survey – MOS >5%: Gender Comparisons

Mounted/Dismounted (Gender Comparisons)

When splitting the data of the total population by gender, males and females spend their time comparably between mounted and dismounted, with 4% more females reporting mounted and 6% fewer females reporting dismounted when compared to males. See Figure 78.

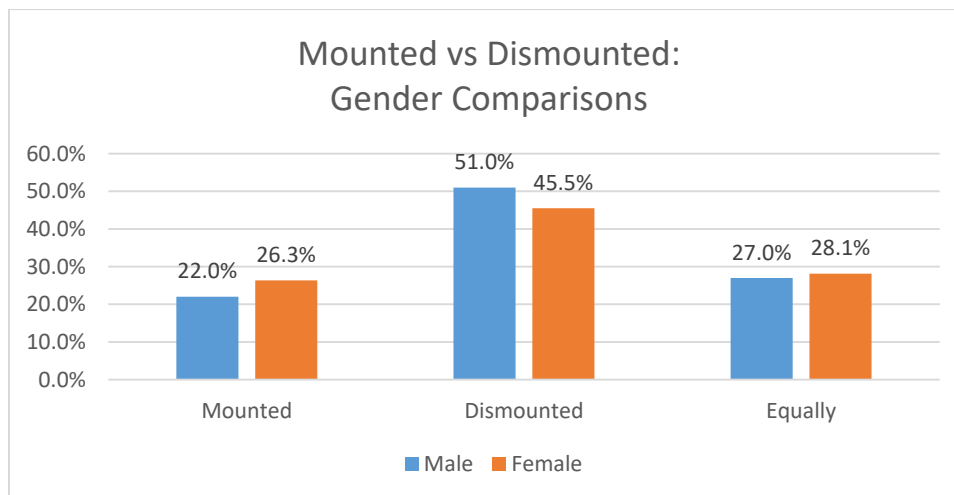


Figure 78. Load Management Survey – Mounted vs. Dismounted: Gender Comparisons

Personal Money Spent on Load Carriage Equipment (Gender Comparisons)

When splitting the data of the total population by gender and comparing personal money spent on load carriage equipment, nearly twice as many females spend zero dollars compared to males (53.9% compared to 31.7% respectively). For the range of \$1–\$99, males and females are nearly identical (20%).

For all remaining ranges of increasing value, males outspend females by a range of 2.4% more (\$751–\$1000) to 7.2% more (\$251–\$500). See Figure 79.

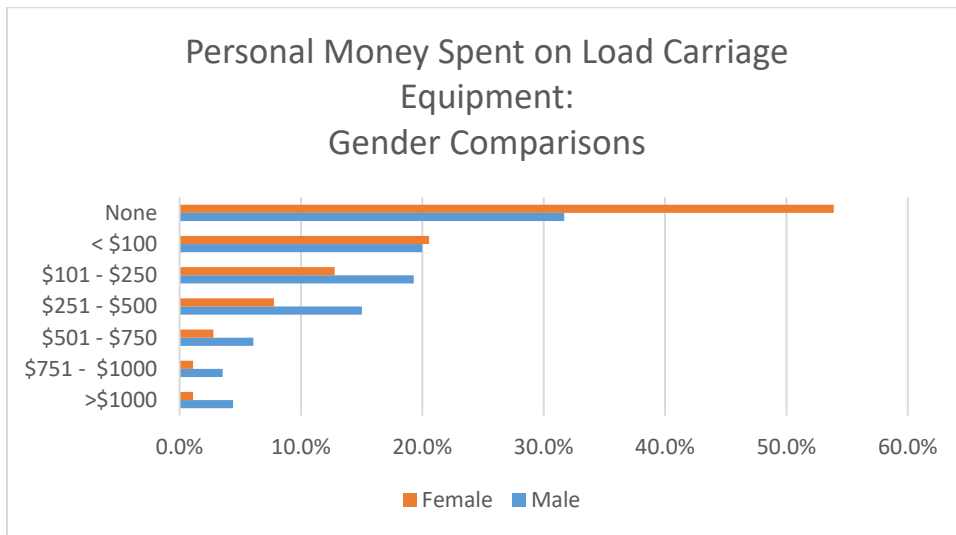


Figure 79. Load Management Survey – Personal Money Spent on Load Carriage Equipment: Gender Comparisons

Preferred Body Armor (Gender Comparisons)

When comparing body armor preferences by gender, the SPCS is preferred by 40% of males compared to 7% of females. The Female IOTV is preferred by 31% of females and by less than 1% of males. The next most frequently selected response is “I have no preference”, selected by 30% of females and 23% of males. Note that the focus group data revealed that the majority of females either do not know that the Female IOTV exists or have never had access to it. It is possible that if more females had access to the Female IOTV, that it would be the preferred body armor by more females. IOTV Gen III was preferred by 16% of males compared to 8% of females. See Figure 80.

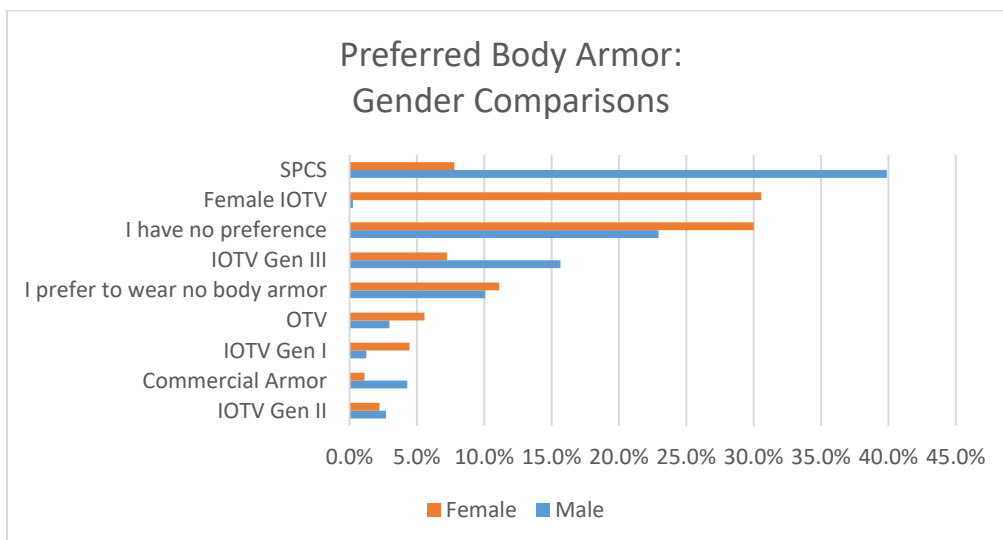


Figure 80. Load Management Survey – Preferred Body Armor: Gender Comparisons

Area of Coverage vs Mobility (Gender Comparisons)

TPs were presented with two scenarios and asked if they preferred more area of coverage for increased protection or less area of coverage for increased mobility. In one scenario, IED threats are low and direct fire threats are high (shown directly below). For both genders in this scenario, more area of coverage for increased protection is selected more frequently than less area of coverage for increased mobility, but by more females (nearly 80%) compared to males (nearly 60%). See Figure 81.

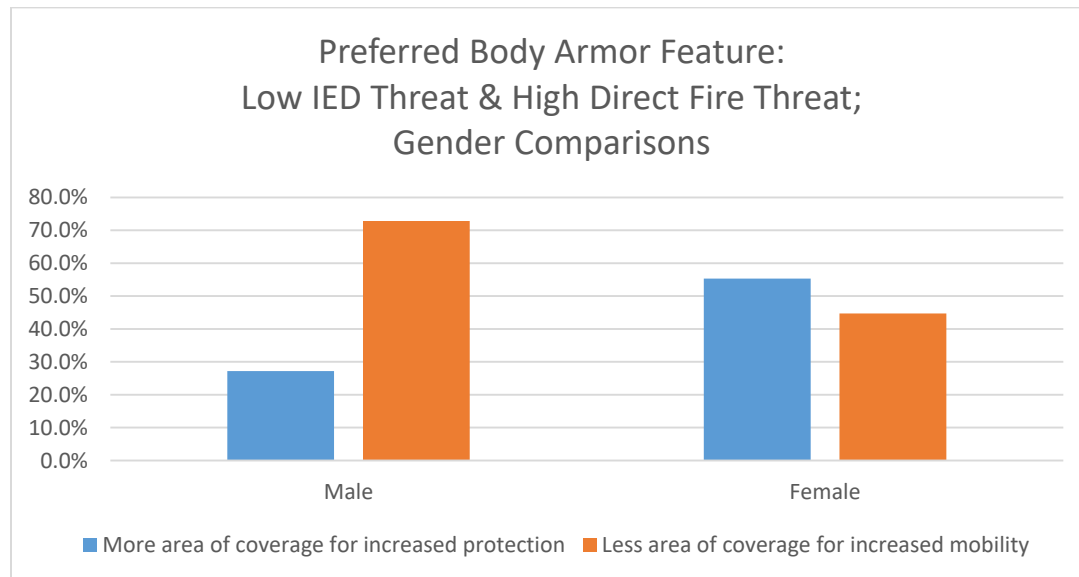


Figure 81. Load Management Survey – Preferred Body Armor Feature: Low IED Threat & High Direct Fire Threat; Gender Comparisons

In another scenario, IED threats are high and direct fire threats exist. For both genders in this scenario, more area of coverage for increased protection is selected more frequently than less area of coverage for increased mobility, but by more females (nearly 80%) compared to males (nearly 60%). See Figure 82.

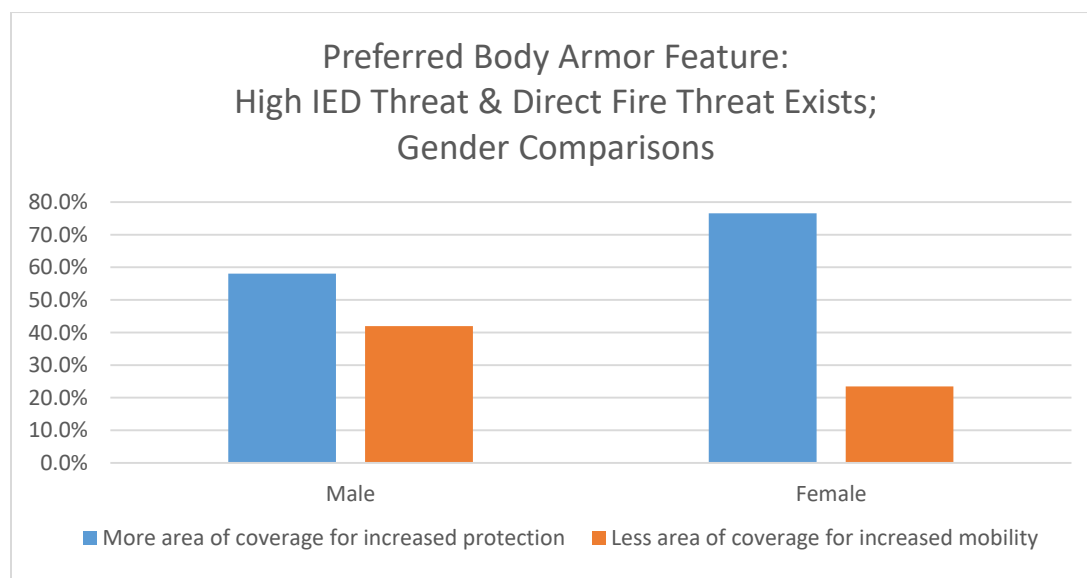


Figure 82. Load Management Survey – Preferred Body Armor Feature: High IED Threat & Direct Fire Threat Exists; Gender Comparisons

Preferred Load Carriage Vest (Gender Comparisons)

Figure 83 displays load carriage vest preferences based on gender. Nearly 35% of females have no preference, compared to approximately 25% of males. Nearly 35% of females prefer the FLC, compared to nearly 25% of males. Nearly 25% of both males and females prefer to wear no load carriage vest. Fifteen percent of males prefer the TAP compared to 8% of females. Eight percent of males prefer commercial load carriage vests compared to 1% of females. Three percent of males prefer the ALICE belt/suspenders compared to 0.6% of females. See Figure 83.

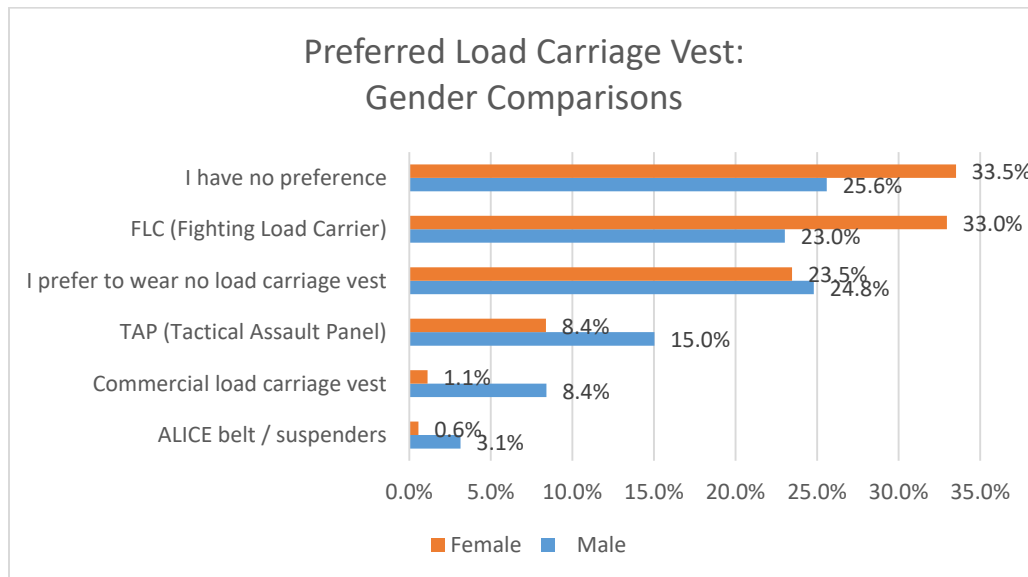


Figure 83. Load Management Survey – Preferred Load Carriage Vest: Gender Comparisons

Ballistic Protection in Belts/Sub-belts (Gender Comparisons)

Figure 84 compares the responses from males and females to the question of incorporating ballistic protection into belts/sub-belts at the cost of increased weight/bulk. Over 70% of males *do not* want ballistic protection incorporated into belts/sub-belts compared to 27.2% of males that *do*. Females are nearly split evenly for those that *do not* want ballistic protection incorporated (54.3%) and those that *do* (45.7%).

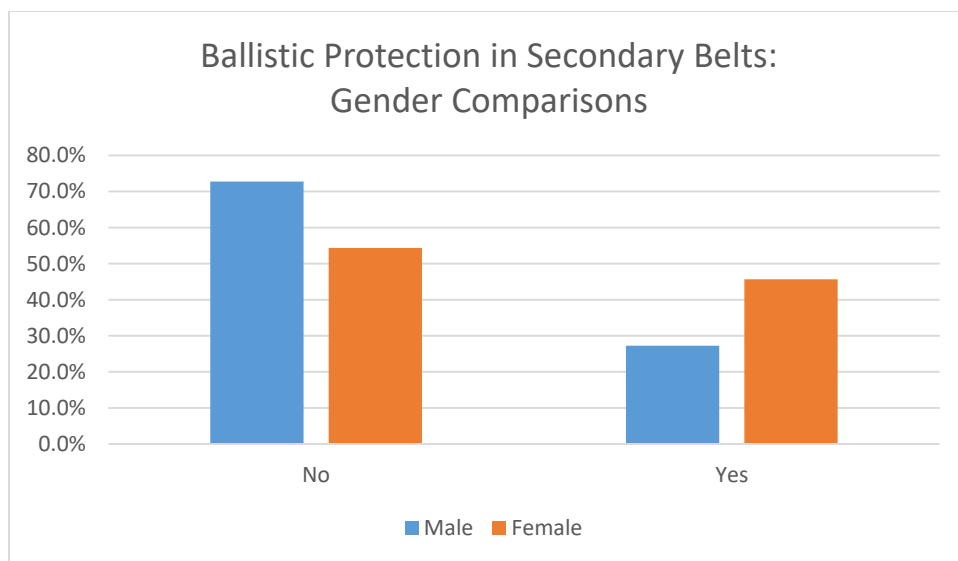


Figure 84. Load Management Survey – Ballistic Protection in Secondary Belts: Gender Comparisons

Preferred Hydration Equipment (Gender Comparisons)

When comparing hydration equipment preferences by gender, tube hydration systems are the most frequently preferred by approximately 60% of both groups (by slightly more females than males). There is a notable difference between males and females for disposable water bottles (17% females, 7% males), 1 quart canteens (8% males, 4% females), and Nalgene type hydration equipment (9% male, 2% female). See Figure 85.

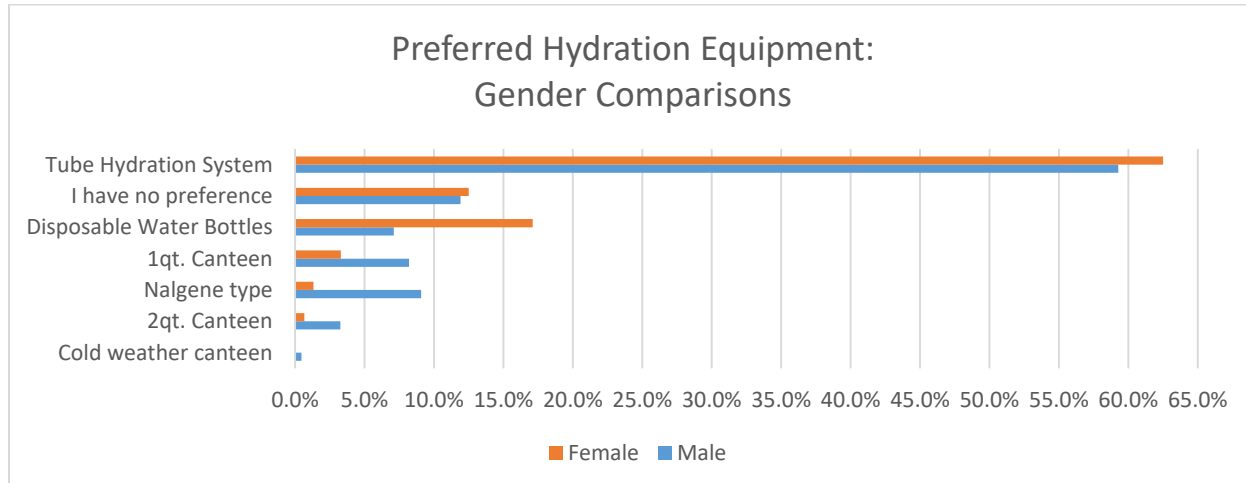


Figure 85. Load Management Survey – Preferred Hydration Equipment: Gender Comparisons

MEDICS vs NON-MEDICS

This section provides all analyses comparing medics and non-medics. See Table 63.

Table 63. Load Management Survey – Reported Medics

	N	%
Medics	103	3.9
Non-Medics	2542	96.1

Preferred Body Armor (Medics vs Non-Medics)

When comparing medics to non-medics, both groups nearly equally prefer the SPCS by approximately 37%. Medics and non-medics nearly equally express no preference (25% and 23% respectively). IOTV Gen III is the second most preferred body armor system by 15% of non-medics and 12% of medics. IOTV Gen II was preferred by twice as many medics (6%) than non-medics (3%). See Figure 86.

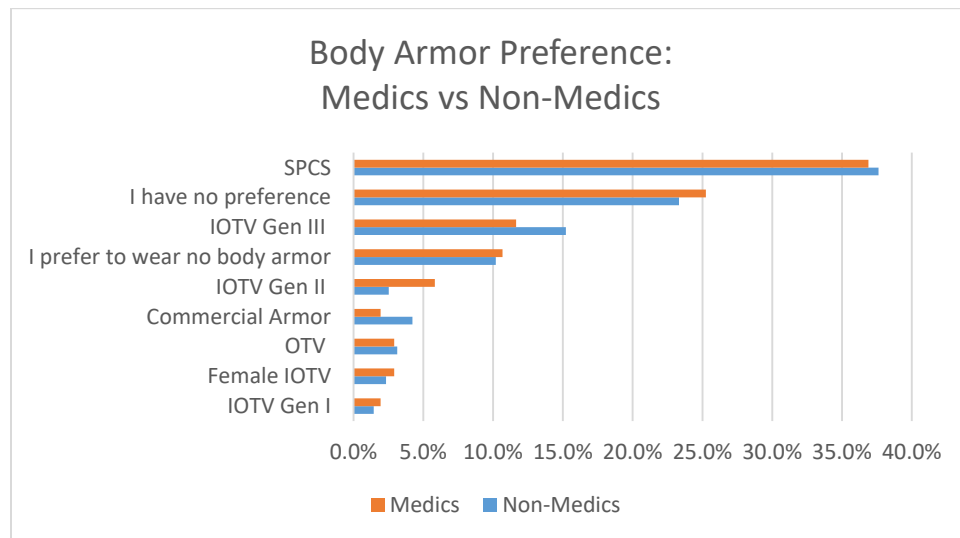


Figure 86. Load Management Survey – Body Armor Preference: Medics vs. Non-Medics

New Rucksack Size (Medics vs Non-Medics)

Figure 87 displays new rucksack capacity preferences for medics compared to non-medics. Medics and non-medics have the same preferences for new rucksack capacities, which are the same as the total population. Over 40% of both groups indicated that a new Army issued rucksack capacity should be between the MOLLE Large and the MOLLE Medium. For both groups, the second most frequently selected response was that the currently available range of capacity meets users' operational needs (over 20% for all).

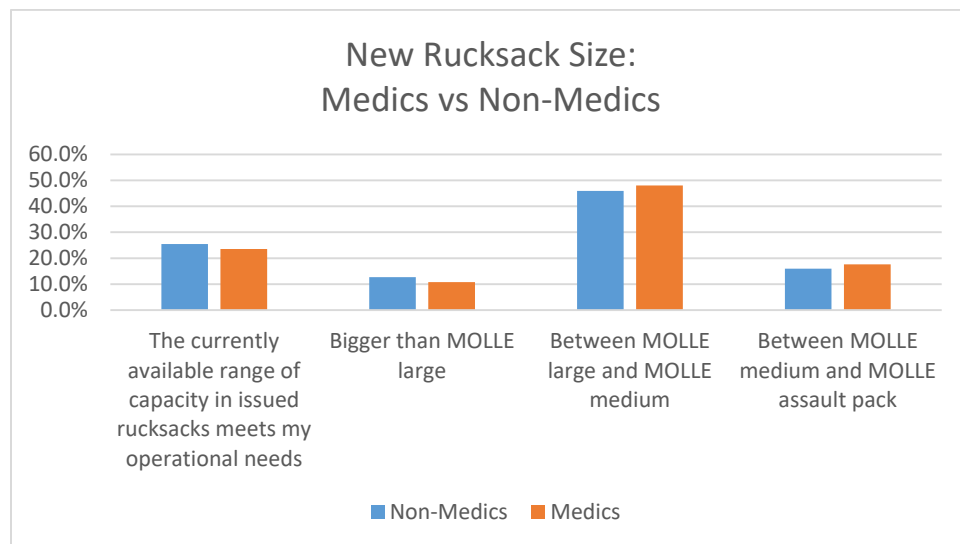


Figure 87. Load Management Survey – New Rucksack Size: Medics vs. Non-Medics

Preferred Load Carriage Vest (Medics vs Non-Medics)

Figure 88 displays load carriage vest preferences comparing medics to non-medics. Over 30% of medics prefer the FLC compared less than 25% of non-medics. Approximately the same percentage of medics and non-medics express no preference (25%) or that they prefer to wear no load carriage vest (25%). Nearly 15% of medics prefer the TAP compared to just over 10% of non-medics. A comparable percentage of medics and non-medics prefer commercial load carriage vests (7%). No medics prefer the ALICE belt/suspenders compared to 3% of non-medics. See chart below.

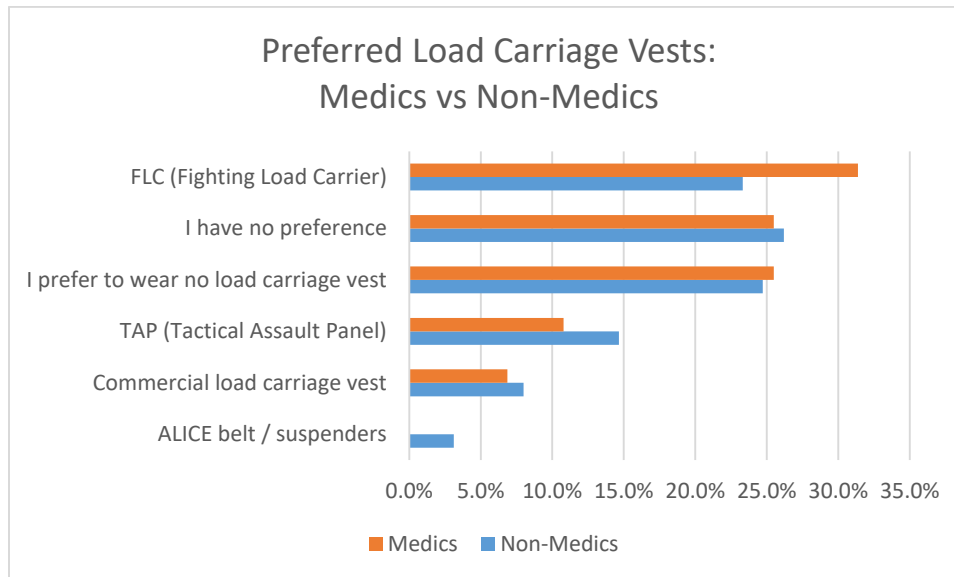


Figure 88. Load Management Survey – Preferred Load Carriage Vests: Medics vs. Non-Medics

Preferred Hydration System (Medics vs Non-Medics)

When comparing medics to non-medics, tube hydration systems are the most frequently preferred by approximately 60% of both groups (by slightly more medics than non-medics). Sixteen percent of medics prefer Nalgene type hydration equipment compared to 8% of non-medics. Disposable water bottles are preferred equally between the two groups (nearly 10%). See Figure 89.

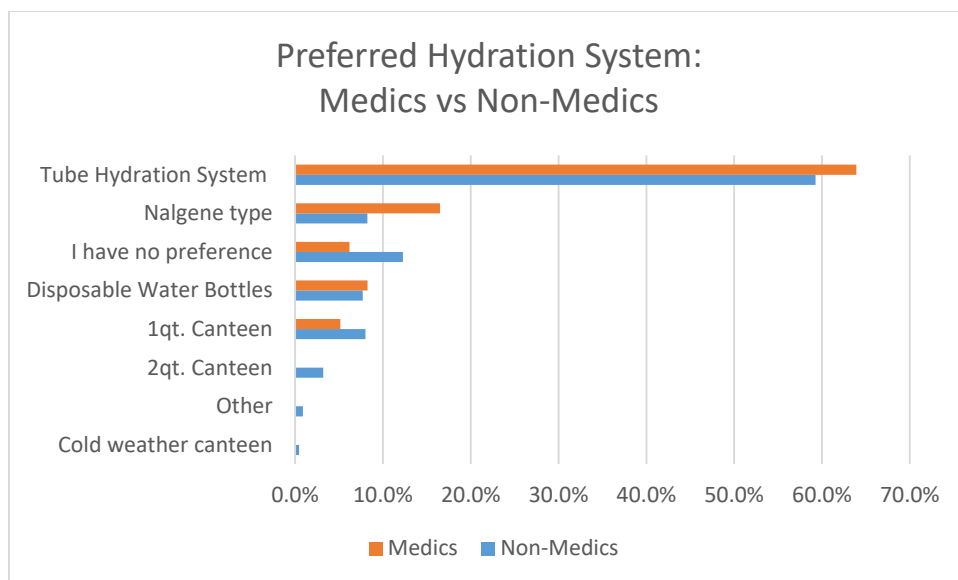


Figure 89. Load Management Survey – Preferred Hydration System: Medics vs. Non-Medics

This document reports research undertaken at the U.S. Army Natick Soldier Research, Development and Engineering Center, Natick, MA, and has been assigned No. NATICK/TR- 19/010 in a series of reports approved for publication.

APPENDIX A – EXPERT CHOICE SURVEY

Expert Choice Survey



INSTRUCTIONS:

You have been selected based on your experience level to participate in this expert choice survey. This tool is designed to capture data that will inform engineers when designing next generation load management equipment. Trade-offs of performance characteristics cannot be avoided. By completing this survey, you are directly informing decision makers on how best to make these trade-offs from the Warfighter perspective.

SECTION 1: RUCK SACK

In this section, you will be rank ordering the importance of several attributes in order of *most important* to *least important* with regard to the following piece of load bearing equipment: RUCK SACK.

There are 16 attributes below. After considering each attribute, assign each attribute a number value from 1 to 16, where 1 is most important and 16 is least important relative to the other attributes. **You must assign a number value to each attribute and you cannot assign the same number value to multiple attributes.**

Feel free to use this space to help make sure you've assigned each number once and only once:

Most Important	Least Important
1 2 3 4 5 6 7 8 9 10 11	12 13 14 15 16

	Write in 1-16 below
Empty Weight of Ruck	
Durability	
Water Repellency	
Water Proof	
Ventilation / Airflow between back and ruck	
Adjustability of Shoulder Straps, Waist Belt & Frame to fit Soldier torso size	
Overall ease of use	
Capacity of Ruck Sack	
Noise Management	
Quick Donning	
Quick Doffing	
Ability to Distribute Load between Shoulders and Hips	
Compatibility with Body Armor	
Compatibility with Helmet	
Compatibility with Tube Hydration	
Compatibility with Airborne Operations	

Expert Choice Survey

SECTION 2: RUCK SACK

In this section, you will be rating the importance of several attributes with regard to the following piece of load bearing equipment: RUCK SACK

	Not at all Important	1	2	3	4	5	6	7	Extremely Important
Empty Weight of Ruck	0	1	2	3	4	5	6	7	8
Durability	0	1	2	3	4	5	6	7	8
Water Repellency	0	1	2	3	4	5	6	7	8
Water Proof	0	1	2	3	4	5	6	7	8
Ventilation / Airflow between back and ruck	0	1	2	3	4	5	6	7	8
Adjustability of Shoulder Straps, Waist Belt & Frame to fit Soldier torso size	0	1	2	3	4	5	6	7	8
Ease of use	0	1	2	3	4	5	6	7	8
Capacity of Ruck Sack	0	1	2	3	4	5	6	7	8
Noise Management	0	1	2	3	4	5	6	7	8
Quick Donning	0	1	2	3	4	5	6	7	8
Quick Doffing	0	1	2	3	4	5	6	7	8
Ability to Distribute Load between Shoulders and Hips	0	1	2	3	4	5	6	7	8
Compatibility with Body Armor	0	1	2	3	4	5	6	7	8
Compatibility with Helmet	0	1	2	3	4	5	6	7	8
Compatibility with Tube Hydration	0	1	2	3	4	5	6	7	8
Compatibility with Airborne Operations	0	1	2	3	4	5	6	7	8

Expert Choice Survey

SECTION 3: RUCK SACK

In this section, you will be asked to make trade-offs between two attributes with regard to the following piece of load bearing equipment: RUCK SACK.

Each scale has two attributes that directly affect one another. For example, in order to increase the durability of a ruck sack, the weight is increased as a result. Make your selections below to indicate what you believe to be the ideal trade-off between each pairing of attributes.

Weight & Durability

Low Weight / Low Durability					High Weight / High Durability
①	②	③	④	⑤	⑥

Weight & Water Repellency

Low Weight / Low Water Repellency					High Weight / High Water Repellency
①	②	③	④	⑤	⑥

Weight & Storage Capacity

Low Weight / Low Storage Capacity					High Weight / High Storage Capacity
①	②	③	④	⑤	⑥

Design & Adjustability

Simple Design / Low Adjustability					Complex Design / High Adjustability
①	②	③	④	⑤	⑥

Expert Choice Survey

SECTION 1: BODY ARMOR

In this section, you will be rank ordering the importance of several attributes in order of *most important* to *least important* with regard to the following piece of load bearing equipment: BODY ARMOR.

There are 20 attributes below. After considering each attribute, assign each attribute a number value from 1 to 20, where 1 is most important and 20 is least important relative to the other attributes. **You must assign a number value to each attribute and you cannot assign the same number value to multiple attributes.**

Feel free to use this space to help make sure you've assigned each number once and only once:

Most Important																				Least Important
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

	Write in 1-20 below
Weight of Body Armor with hard plates	
Durability	
Variety of Sizes to choose from	
Large Area of Ballistic Protection	
Ventilation / Airflow between body and armor	
Adjustability to fit body armor to individual torso size	
Overall ease of use	
Area to directly mount fighting load pouches, ammo, etc.	
Noise Management	
Quick Donning	
Quick Routine Doffing	
Quick Emergency Doffing	
Ability to Transfer Load off Shoulders to Hips	
Compatibility with Ruck Sack Shoulder Straps / Frame / Waist Belt	
Mobility / Ease of Movement	
Compatibility with Tube Hydration	
Compatibility with Shouldering Weapon	
Compatibility with Fighting Load Carrier (FLC) or Tactical Assault Panel (TAP)	
Upper Body Extremity Protection	
Lower Body Extremity Protection	

Expert Choice Survey

SECTION 2: BODY ARMOR

In this section, you will be rating the importance of several attributes with regard to the following piece of load bearing equipment: BODY ARMOR.

	Not at all Important	1	Slightly Important	2	3	Moderately Important	4	5	6	Very Important	7	8	Extremely Important
Weight of Body Armor with hard plates	0	1	2	3	4	5	6	7	8				
Durability	0	1	2	3	4	5	6	7	8				
Variety of Sizes to choose from	0	1	2	3	4	5	6	7	8				
Large Area of Ballistic Protection	0	1	2	3	4	5	6	7	8				
Ventilation / Airflow between body and armor	0	1	2	3	4	5	6	7	8				
Adjustability to fit body armor to individual torso size	0	1	2	3	4	5	6	7	8				
Overall ease of use	0	1	2	3	4	5	6	7	8				
Area to directly mount fighting load pouches, ammo, etc.	0	1	2	3	4	5	6	7	8				
Noise Management	0	1	2	3	4	5	6	7	8				
Quick Donning	0	1	2	3	4	5	6	7	8				
Quick Routine Doffing	0	1	2	3	4	5	6	7	8				
Quick Emergency Doffing	0	1	2	3	4	5	6	7	8				
Ability to Transfer Load off Shoulders to Hips	0	1	2	3	4	5	6	7	8				
Compatibility with Ruck Sack Shoulder Straps / Frame / Waistbelt	0	1	2	3	4	5	6	7	8				
Mobility / Ease of Movement	0	1	2	3	4	5	6	7	8				
Compatibility with Tube Hydration	0	1	2	3	4	5	6	7	8				
Compatibility with Shouldering Weapon	0	1	2	3	4	5	6	7	8				
Compatibility with Fighting Load Carrier (FLC) or Tactical Assault Panel (TAP)	0	1	2	3	4	5	6	7	8				
Upper Body Extremity Protection	0	1	2	3	4	5	6	7	8				
Lower Body Extremity Protection	0	1	2	3	4	5	6	7	8				

Expert Choice Survey

SECTION 3: BODY ARMOR

In this section, you will be asked to make trade-offs between two attributes with regard to the following piece of load bearing equipment: BODY ARMOR.

Each scale has two attributes that directly affect one another. For example, in order to increase the mobility of body armor, the area of ballistic protection is decreased as a result. Make your selections below to indicate what you believe to be the ideal trade-off between each pairing of attributes.

Area of Ballistic Protection & Mobility

Small Area of Ballistic Protection / High Mobility					Large Area of Ballistic Protection / Low Mobility
①	②	③	④	⑤	⑥

Design & Adjustability

Simple Design / Low Adjustability					Complex Design / High Adjustability
①	②	③	④	⑤	⑥

On a mission where IED threats are low and direct fire threats are high, what level of torso protection would you choose?

- ① Maximum area of coverage with upper and lower extremity protection
- ② Full area of coverage (for example, IOTV with SAPI [Small Arms Protective Insert])
- ③ Plate Carrier
- ④ Spall Vest (no plates)
- ⑤ None

On a mission where IED threats are high and direct fire threats exist, what level of torso protection would you choose?

- ① Maximum area of coverage with upper and lower extremity protection
- ② Full area of coverage (for example, IOTV with SAPI [Small Arms Protective Insert])
- ③ Plate Carrier
- ④ Spall Vest (no plates)
- ⑤ None

Expert Choice Survey

DEMOGRAPHICS

Unit: _____

Have you been to jump school? ☐ Yes ☐ No

Are you on jump status? ☐ Yes ☐ No

What is your gender? ☐ Male ☐ Female Height: _____ Weight: _____

What is your rank?

Enlisted ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Warrant Officer ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Officer ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

What is your age? _____ Please fill in using 2 digits.

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Years in service? _____ Please fill in using 2 digits. (e.g. "05" years) Less than 1 year ☐

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Number of deployments? _____ Please fill in using 2 digits. (e.g. "02")

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Total months deployed? _____ Please fill in using 2 digits. (e.g. "09" months)

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Have you been deployed as part of:

- ☐ Never been deployed
- ☐ OIF_____ (write-in number of times)
- ☐ OEF_____ (write-in number of times)
- ☐ Other _____
(write-in all other deployments and number of times deployed)

Is the majority of your time spent mounted or dismounted?

☐ Mounted ☐ Dismounted ☐ Equally

Expert Choice Survey

What is your Primary MOS?

- | | |
|-----------------------------------|---------------------------|
| ☐ 11A | ☐ 68K |
| ☐ 11B | ☐ 68S |
| ☐ 11C | ☐ 68W |
| ☐ 12A | ☐ 68X |
| ☐ 12B | ☐ 73A |
| ☐ 12N | ☐ 74D |
| ☐ 13A | ☐ 88A |
| ☐ 13B | ☐ 88A |
| ☐ 13F | ☐ 88M |
| ☐ 15A | ☐ 89D |
| ☐ 15B | ☐ 89E |
| ☐ 15Q | ☐ 91B |
| ☐ 15T | ☐ 91C |
| ☐ 15U | ☐ 91D |
| ☐ 19D | ☐ 91E |
| ☐ 19K | ☐ 91F |
| ☐ 21B | ☐ 91L |
| ☐ 25U | ☐ 91X |
| ☐ 29E | ☐ 92A |
| ☐ 37F | ☐ 92Y |
| ☐ 42A | ☐ 94E |
| ☐ 61H | ☐ 94F |
| ☐ 67J | ☐ 94M |
| ☐ Other _____ | |

What is your Branch?

- | | |
|--|---|
| ☐ Infantry | ☐ Special Forces |
| ☐ Armor/Cavalry | ☐ Signal |
| ☐ Engineer | ☐ Finance |
| ☐ Field Artillery | ☐ Medical |
| ☐ Chemical | ☐ Quartermaster |
| ☐ Aviation | ☐ PSYOPS |
| ☐ Ordnance | ☐ Civil Affairs |
| ☐ Transportation | ☐ Adjutant General |
| ☐ Judge Advocate General | ☐ Military Intelligence |
| ☐ Acquisition Corps | ☐ Air Defense Artillery |
| ☐ Military Police | ☐ Chaplain Corps |
| ☐ Logistics | ☐ Other: _____ |

Expert Choice Survey

What is your current duty position?

- | | |
|--|--|
| ☐ Squad Member | ☐ Forward Observer |
| ☐ Mortar Section Leader / platoon member | ☐ Sniper |
| ☐ Squad Designated Marksman | ☐ Radio Telephone Operator |
| ☐ Mechanic | ☐ Medic |
| ☐ Team Leader | ☐ Squad Leader |
| ☐ Section Leader | ☐ Platoon Sergeant |
| ☐ First Sergeant | ☐ Platoon Leader |
| ☐ Company Executive Officer | ☐ Company / Detachment Commander |
| ☐ Fire Direction Officer | ☐ Fire Support Officer |
| ☐ Fire Support NCO | ☐ TOW Gunner |
| ☐ Javelin Gunner | ☐ BN Master Gunner |
| ☐ Executive Officer | ☐ Crew Chief |
| ☐ Other: _____ | |

APPENDIX B – LOAD MANAGEMENT SURVEY



LOAD MANAGEMENT SURVEY



The purpose of this survey is to build a comprehensive understanding of Soldiers' load management strategies, as well identify and characterize problem areas. Please read the questions carefully and fill-in all of the bubbles completely. Your support in this research will enable the Army to best address your load management needs. Thank-you for your participation! Please fill in bubbles completely.

DEMOGRAPHICS

Unit: _____

What is your gender?

☐ Male

☐ Female

Height: _____ Weight: _____

What is your rank?

Enlisted (1) (2) (3) (4) (5) (6) (7) (8) (9)

Warrant Officer (1) (2) (3) (4) (5)

Officer (1) (2) (3) (4) (5) (6) (7) (8) (9)

What is your age? _____ Please fill in using 2 digits.

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

Years in service? _____ Please fill in using 2 digits. (e.g. "05" years)

Less than 1 year

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

☐

Number of deployments? _____ Please fill in using 2 digits. (e.g. "02")

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

Total months deployed? _____ Please fill in using 2 digits. (e.g. "09" months)

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

(0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

Have you been deployed as part of:

☐ Never been deployed

☐ OIF _____ (write-in number of times)

☐ OEF _____ (write-in number of times)

☐ Other _____
(write-in all other deployments and number of times deployed)

Is the majority of your time spent mounted or dismounted?

☐ Mounted

☐ Dismounted

☐ Equally

LOAD MANAGEMENT SURVEY

What is your Primary MOS?

- | | |
|-----------------------------------|---------------------------|
| ☐ 11A | ☐ 68K |
| ☐ 11B | ☐ 68S |
| ☐ 11C | ☐ 68W |
| ☐ 12A | ☐ 68X |
| ☐ 12B | ☐ 73A |
| ☐ 12N | ☐ 74D |
| ☐ 13A | ☐ 88A |
| ☐ 13B | ☐ 88A |
| ☐ 13F | ☐ 88M |
| ☐ 15A | ☐ 89D |
| ☐ 15B | ☐ 89E |
| ☐ 15Q | ☐ 91B |
| ☐ 15T | ☐ 91C |
| ☐ 15U | ☐ 91D |
| ☐ 19D | ☐ 91E |
| ☐ 19K | ☐ 91F |
| ☐ 21B | ☐ 91L |
| ☐ 25U | ☐ 91X |
| ☐ 29E | ☐ 92A |
| ☐ 37F | ☐ 92Y |
| ☐ 42A | ☐ 94E |
| ☐ 61H | ☐ 94F |
| ☐ 67J | ☐ 94M |
| ☐ Other _____ | |

What is your Branch?

- | | |
|--|---|
| ☐ Infantry | ☐ Special Forces |
| ☐ Armor/Cavalry | ☐ Signal |
| ☐ Engineer | ☐ Finance |
| ☐ Field Artillery | ☐ Medical |
| ☐ Chemical | ☐ Quartermaster |
| ☐ Aviation | ☐ PSYOPS |
| ☐ Ordnance | ☐ Civil Affairs |
| ☐ Transportation | ☐ Adjutant General |
| ☐ Judge Advocate General | ☐ Military Intelligence |
| ☐ Acquisition Corps | ☐ Air Defense Artillery |
| ☐ Military Police | ☐ Chaplain Corps |
| ☐ Logistics | ☐ Other: _____ |

LOAD MANAGEMENT SURVEY

What is your current duty position?

- | | |
|--|--|
| ☐ Squad Member | ☐ Forward Observer |
| ☐ Mortar Section Leader / platoon member | ☐ Sniper |
| ☐ Squad Designated Marksman | ☐ Radio Telephone Operator |
| ☐ Mechanic | ☐ Medic |
| ☐ Team Leader | ☐ Squad Leader |
| ☐ Section Leader | ☐ Platoon Sergeant |
| ☐ First Sergeant | ☐ Platoon Leader |
| ☐ Company Executive Officer | ☐ Company / Detachment Commander |
| ☐ Fire Direction Officer | ☐ Fire Support Officer |
| ☐ Fire Support NCO | ☐ TOW Gunner |
| ☐ Javelin Gunner | ☐ BN Master Gunner |
| ☐ Executive Officer | ☐ Crew Chief |
| ☐ Other: _____ | |

How much personal money have you spent on load carriage equipment during your military service?

- ☐ None
- ☐ < \$100
- ☐ \$101 - \$250
- ☐ \$251 - \$500
- ☐ \$501 - \$750
- ☐ \$751 - \$1000
- ☐ >\$1000

LOAD MANAGEMENT SURVEY

EQUIPMENT

WEAPONS

Please select all weapons you have carried *during deployments*:

- ☐ Never been deployed
- ☐ M-4A1 Rifle or M-16A2
- ☐ M-320 Grenade Launcher
- ☐ M-203 Grenade Launcher
- ☐ M-240
- ☐ M14
- ☐ SAW
- ☐ AT-4
- ☐ Shotgun
- ☐ M-2CG / Carl Gustav
- ☐ FGM-148 Javelin
- ☐ 9mm Pistol
- ☐ Other _____ (write-in all others)

Please select all weapons you *carry currently*:

- ☐ M-4A1 Rifle or M-16A2
- ☐ M-320 Grenade Launcher
- ☐ M-203 Grenade Launcher
- ☐ M-240
- ☐ M14
- ☐ SAW
- ☐ AT-4
- ☐ Shotgun
- ☐ M-2CG / Carl Gustav
- ☐ FGM-148 Javelin
- ☐ 9mm Pistol
- ☐ Other _____ (write-in all others)

What is your preferred weapon sling type for your individual weapon (eg M-4, M-320)?

- ☐ N/A
- ☐ Not sure
- ☐ 1-point
- ☐ 2-point
- ☐ 3-point
- ☐ Other _____ (please describe)

LOAD MANAGEMENT SURVEY

Do you carry a pistol? ☐ Yes ☐ No

If YES, please answer the questions below. If NO, please skip to the next page 'BODY ARMOR SYSTEMS'.

On your last deployment, did you ever carry a pistol in combat? ☐ Yes ☐ No

If YES, what holster did you carry?

- ☐ Black Hawk Serpa [IMAGE REFERENCE A]
- ☐ G-Code [IMAGE REFERENCE B]
- ☐ Safariland [IMAGE REFERENCE C]
- ☐ Ambidextrous Fabric Holster
- ☐ Other _____ (write-in all others)

On your last deployment, did you ever draw your pistol in combat? ☐ Yes ☐ No ☐ Did not carry a pistol

Do you lanyard your pistol? ☐ Yes ☐ No ☐ N/A

➔ If YES, please describe where: _____

How important is it to you for your pistol holster to accommodate mounted sites, lasers, silencers, etc?

N/A	Not at all important	Slightly important	Very important	Critically important
☐	☐	☐	☐	☐

Which is more important to you in a holster, faster draw capability or more protection from the elements?

N/A	More protection from the elements		Equally important	Faster Draw	
	Much more important	More important		More important	Much more important
☐	☐	☐	☐	☐	☐

Where do you prefer to locate your holster?

- ☐ Hip / Waist / Belt
- ☐ Drop Leg / Thigh
- ☐ Chest
- ☐ Other _____ (write-in all others)

LOAD MANAGEMENT SURVEY

BODY ARMOR SYSTEMS

Please select all body armor systems you have worn *during deployments*:

- ☐ Never been deployed
- ☐ None
- ☐ OTV (Outer Tactical Vest center opening)
- ☐ IOTV Gen I (2007: over the head side opening with draw cord quick release) [IMAGE REFERENCE F]
- ☐ IOTV Gen II (2009: improved side plate carrier, adjustable side plate pocket) [IMAGE REFERENCE G]
- ☐ IOTV Gen III (2012: single point quick release with 4 QR buckles in shoulders and front) [IMAGE REFERENCE H]
- ☐ Female IOTV (2013: female variant of IOTV Gen III) [IMAGE REFERENCE I]
- ☐ SPCS (Soldier Plate Carrier System) [IMAGE REFERENCE J]
- ☐ Neck Protection / Collar Yoke
- ☐ DAPS (Dorsal Axillary Protection System)
- ☐ Groin Protector
- ☐ PUG (Protective Under Garment, blast underwear)
- ☐ POG (Protective Outer Garment, over the pant blast pelvic protection)
- ☐ Commercial Armor _____ (write-in all others)

Please select all body armor systems you *wear currently*:

- ☐ None
- ☐ OTV (Outer Tactical Vest center opening)
- ☐ IOTV Gen I (2007: over the head side opening with draw cord quick release)
- ☐ IOTV Gen II (2009: improved side plate carrier, adjustable side plate pocket)
- ☐ IOTV Gen III (2012: single point quick release with 4 QR buckles in shoulders and front)
- ☐ Female IOTV (2013: female variant of IOTV Gen III)
- ☐ SPCS (Soldier Plate Carrier System)
- ☐ Neck Protection / Collar Yoke
- ☐ DAPS (Dorsal Axillary Protection System)
- ☐ Groin Protector
- ☐ PUG (Protective Under Garment, blast underwear)
- ☐ POG (Protective Outer Garment, over the pant blast pelvic protection)
- ☐ Commercial Armor _____ (write-in all others)

Which is your preferred body armor system (please select only one):

- ☐ I have no preference
- ☐ I prefer to wear no body armor
- ☐ OTV (Outer Tactical Vest center opening)
- ☐ IOTV Gen I (2007: over the head side opening with draw cord quick release)
- ☐ IOTV Gen II (2009: improved side plate carrier, adjustable side plate pocket)
- ☐ IOTV Gen III (2012: single point quick release with 4 QR buckles in shoulders and front)
- ☐ Female IOTV (2013: female variant of IOTV Gen III)
- ☐ SPCS (Soldier Plate Carrier System)
- ☐ Commercial Armor _____ (write-in all others)

LOAD MANAGEMENT SURVEY

Please mark all that apply for *why* your selection in the previous question is your preferred body armor system:

- ☐ N/A I have no preference
- ☐ Area of coverage / protection
- ☐ Mobility / Agility
- ☐ Range of motion
- ☐ Weight
- ☐ Compatibility with other load carriage items
- ☐ Comfort
- ☐ Ability to effectively distribute load
- ☐ Cost
- ☐ Other _____ (write-in all others)

On a mission where IED threats are low and direct fire threats are high, which feature of body armor is more important to you?

- ☐ More area of coverage for increased protection
- ☐ Less area of coverage for increased mobility

On a mission where IED threats are high and direct fire threats exist, which feature of body armor is more important to you?

- ☐ More area of coverage for increased protection
- ☐ Less area of coverage for increased mobility

Have you ever used your quick release mechanism to doff your body armor for convenience (not for an emergency)?

- ☐ Yes
- ☐ No
 - ➔ If YES, does use of your quick release mechanism for convenient doffing give you more confidence to use your quick release in an emergency?
 - ☐ Yes
 - ☐ No
 - ☐ Not sure

Have you ever *emergency doffed* your body armor using a quick release (not including practice/training)?

- ☐ Yes
- ☐ No

Which is more important to you in a quick release mechanism, speed of release or speed of reassembly?

Speed of release			Speed of reassembly	
Much more important	More important	Equally important	More important	Much more important
☐	☐	☐	☐	☐

LOAD MANAGEMENT SURVEY

Have you ever experienced discomfort in the shoulder area of your body armor as the result of a quick release buckle?

- ☐ Yes
- ☐ No
- ☐ N/A never used a quick release mechanism with a buckle in the shoulder area

RUCKSACKS

Please select all rucksacks you have used *during deployments*:

- ☐ Never been deployed
- ☐ None
- ☐ MOLLE Large [IMAGE REFERENCE K]
- ☐ MOLLE Medium [IMAGE REFERENCE L]
- ☐ MOLLE Assault Pack [IMAGE REFERENCE M]
- ☐ MOLLE 4000 [IMAGE REFERENCE N]
- ☐ ALICE Medium [IMAGE REFERENCE O]
- ☐ ALICE Large
- ☐ Commercial Rucksacks _____ (write-in all others)

Please select all rucks you *use currently*:

- ☐ None
- ☐ MOLLE Large
- ☐ MOLLE Medium
- ☐ MOLLE Assault Pack
- ☐ MOLLE 4000
- ☐ ALICE Medium
- ☐ ALICE Large
- ☐ Commercial Rucksacks _____ (write-in all others)

How is your balance affected when carrying the MOLLE large rucksack?

- ☐ N/A
- ☐ I need to lean forward significantly
- ☐ I need to lean forward slightly
- ☐ I can stand straight up

How is your balance affected when carrying the MOLLE medium rucksack?

- ☐ N/A
- ☐ I need to lean forward significantly
- ☐ I need to lean forward slightly
- ☐ I can stand straight up

LOAD MANAGEMENT SURVEY

How is your balance affected when carrying the MOLLE assault pack?

- ☐ N/A
- ☐ I need to lean forward significantly
- ☐ I need to lean forward slightly
- ☐ I can stand straight up

Which is your preferred rucksack for a 1-12 hour mission? (please select only one):

- ☐ I have no preference
- ☐ No rucksack
- ☐ MOLLE Large
- ☐ MOLLE Medium
- ☐ MOLLE Assault Pack
- ☐ MOLLE 4000
- ☐ ALICE Medium
- ☐ ALICE Large
- ☐ Commercial Rucksack _____(write-in)
 - ➔ Why do you prefer this commercial rucksack over Army issued rucksacks?
 - ☐ A commercial item is all that is available to me
 - ☐ Army issued rucksacks do not meet my operational needs
 - ☐ Army issued rucksacks *do* meet my operational needs, this commercial item provides better performance/functionality

Which is your preferred rucksack for a 12-24 hour mission? (please select only one):

- ☐ I have no preference
- ☐ No rucksack
- ☐ MOLLE Large
- ☐ MOLLE Medium
- ☐ MOLLE Assault Pack
- ☐ MOLLE 4000
- ☐ ALICE Medium
- ☐ ALICE Large
- ☐ Commercial Rucksack _____(write-in)
 - ➔ Why do you prefer this commercial rucksack over Army issued rucksacks?
 - ☐ A commercial item is all that is available to me
 - ☐ Army issued rucksacks do not meet my operational needs
 - ☐ Army issued rucksacks *do* meet my operational needs, this commercial item provides better performance/functionality

LOAD MANAGEMENT SURVEY

Which is your preferred rucksack for a 24-72 hour mission? (please select only one):

- ☐ I have no preference
 - ☐ No Rucksack
 - ☐ MOLLE Large
 - ☐ MOLLE Medium
 - ☐ MOLLE Assault Pack
 - ☐ MOLLE 4000
 - ☐ ALICE Medium
 - ☐ ALICE Large
 - ☐ Commercial Rucksack _____(write-in)
- ➔ Why do you prefer this commercial rucksack over Army issued rucksacks?
- ☐ A commercial item is all that is available to me
 - ☐ Army issued rucksacks do not meet my operational needs
 - ☐ Army issued rucksacks *do* meet my operational needs, this commercial item provides better performance/functionality

Which is your preferred rucksack for a 72+ hour mission? (please select only one):

- ☐ I have no preference
 - ☐ No Rucksack
 - ☐ MOLLE Large
 - ☐ MOLLE Medium
 - ☐ MOLLE Assault Pack
 - ☐ MOLLE 4000
 - ☐ ALICE Medium
 - ☐ ALICE Large
 - ☐ Commercial Rucksack _____(write-in)
- ➔ Why do you prefer this commercial rucksack over Army issued rucksacks?
- ☐ A commercial item is all that is available to me
 - ☐ Army issued rucksacks do not meet my operational needs
 - ☐ Army issued rucksacks *do* meet my operational needs, this commercial item provides better performance/functionality

When considering what items you will pack for a 72 hour mission, how confident are you in resupply?

N/A	Not at all confident	Slightly confident	Moderately confident	Very confident
☐	☐	☐	☐	☐

Do the currently issued rucksacks provide the flexibility to meet operational requirements?

- ☐ Yes
 - ☐ No
- ➔ If NO, please explain why:

LOAD MANAGEMENT SURVEY

Multiple access points to rucksacks require vulnerable closures (like zippers). Would you rather have more access to your rucksack main compartment or more secure compartments?

Multiple access points to main compartment (higher risk, easier access)	Fewer but more secure access points to main compartment (lower risk, less access)
☐	☐

If the Army were to issue a new rucksack to meet a capacity need that is not currently being met, what size should it be?

The currently available range of capacity in issued rucksacks meets my operational needs	Bigger than MOLLE large	Between MOLLE large and MOLLE medium	Between MOLLE medium and MOLLE assault pack
☐	☐	☐	☐

LOAD CARRIAGE VESTS

Please select all load carriage vests you have worn *during deployments*:

- ☐ Never been deployed
- ☐ None / Mount pouches directly to body armor
- ☐ FLC (Fighting Load Carrier) [IMAGE REFERENCE Q]
- ☐ TAP (Tactical Assault Panel) [IMAGE REFERENCE R]
- ☐ ALICE belt / suspenders [IMAGE REFERENCE S]
- ☐ Commercial chest rigs: _____ (write-in all others)

Please select all load carriage vests you *wear currently*:

- ☐ None / Mount pouches directly to body armor
- ☐ FLC (Fighting Load Carrier)
- ☐ TAP (Tactical Assault Panel)
- ☐ ALICE belt / suspenders
- ☐ Commercial chest rigs: _____ (write-in all others)

LOAD MANAGEMENT SURVEY

Which is your preferred load carriage vest (please select only one):

- ☐ I have no preference
- ☐ I prefer to wear no load carriage vest
- ☐ FLC (Fighting Load Carrier)
- ☐ TAP (Tactical Assault Panel)
- ☐ ALICE belt / suspenders
- ☐ Commercial load carriage vest: _____ (write-in)
 - ➔ Why do you prefer this commercial load carriage vest over Army issued load carriage vests?
 - ☐ A commercial item is all that is available to me
 - ☐ Army issued load carriage vests do not meet my operational needs
 - ☐ Army issued load carriage vests *do* meet my operational needs, this commercial item provides better performance/functionality

Please mark all that apply for *why* your selection in the previous question is your preferred load carriage vest:

- ☐ N/A I have no preference
- ☐ Area to support/carry equipment
- ☐ Mobility / Agility
- ☐ Range of motion
- ☐ Weight (empty)
- ☐ Compatibility with other load carriage items (armor/packs)
- ☐ Comfort
- ☐ Ability to effectively distribute load
- ☐ Cost
- ☐ Other _____ (write-in all others)

Does the FLC support your operational needs when wearing body armor?

- ☐ Yes
- ☐ No
 - ➔ If NO, please explain why: _____
- ☐ I don't know

Does the FLC support your operational needs when NOT wearing body armor?

- ☐ Yes
- ☐ No
 - ➔ If NO, please explain why: _____
- ☐ I don't know

LOAD MANAGEMENT SURVEY

BELTS / SUB-BELTS

Please select all belts / sub-belts you have worn *during deployments*:

- ☐ Never been deployed
- ☐ None
- ☐ FLC belt
- ☐ Commercial Sub-belts _____ (write-in all others)

Please select all belts / sub-belts you *wear currently*:

- ☐ None
- ☐ FLC belt
- ☐ Commercial Sub-belts _____ (write-in all others)

Which is your preferred belt / sub-belt (please select only one):

- ☐ I have no preference
- ☐ I prefer to wear no belt / sub-belt
- ☐ FLC belt
- ☐ Commercial belts / sub-belts _____ (write-in)
 - ➔ Why do you prefer this commercial belt / sub-belt over Army issued belts / sub-belts?
 - ☐ A commercial item is all that is available to me
 - ☐ Army issued belts / sub-belts do not meet my operational needs
 - ☐ Army issued belts / sub-belts *do* meet my operational needs, this commercial item provides better performance/functionality

Please mark all that apply for *why* your selection in the previous question is your preferred belt / sub-belt:

- ☐ N/A I have no preference
- ☐ Area for carrying gear/kit
- ☐ Mobility
- ☐ Weight
- ☐ Compatibility with other load carriage items
- ☐ Comfort
- ☐ Ability to effectively distribute load
- ☐ Cost
- ☐ Other _____ (write-in all others)

Do you want secondary belts for load management incorporated into your load management equipment?

- ☐ Yes
- ☐ No

Do you want ballistic protection incorporated into a secondary belt at the cost of increased weight/bulk?

- ☐ Yes
- ☐ No

LOAD MANAGEMENT SURVEY

HYDRATION

Please select all hydration equipment you have worn *during deployments*:

- ☐ Never been deployed
- ☐ None
- ☐ Tube Hydration System (e.g. CamelBak, Hydromax) [IMAGE REFERENCE T]
- ☐ Cold weather canteen [IMAGE REFERENCE U]
- ☐ 1qt. Canteen [IMAGE REFERENCE V]
- ☐ 2qt. Canteen [IMAGE REFERENCE W]
- ☐ Nalgene type
- ☐ Disposable Water Bottles
- ☐ Other: _____ (write-in all others)

Please select all hydration equipment you *wear currently*:

- ☐ None
- ☐ Tube Hydration System (e.g. CamelBak, Hydromax)
- ☐ Cold weather canteen
- ☐ 1qt. Canteen
- ☐ 2qt. Canteen
- ☐ Nalgene type
- ☐ Disposable Water Bottles
- ☐ Other: _____ (write-in all others)

Which is your preferred hydration equipment (please select only one):

- ☐ I have no preference
- ☐ Tube Hydration System (e.g. CamelBak, Hydromax)
- ☐ Cold weather canteen
- ☐ 1qt. Canteen
- ☐ 2qt. Canteen
- ☐ Nalgene type
- ☐ Disposable Water Bottles
- ☐ Other: _____ (write-in)

LOAD MANAGEMENT SURVEY

Please mark all that apply for *why* your selection in the previous question is your preferred hydration equipment:

- ☐ N/A I have no preference
- ☐ Overall size
- ☐ Volume of water
- ☐ Hands-free access
- ☐ Cleanliness / Maintenance
- ☐ Integration with fighting load
- ☐ Compatibility with rucksack
- ☐ Good for hot environments
- ☐ Good for cold environments
- ☐ NBC mask compatibility (Nuclear Biological Chemical)
- ☐ Cost
- ☐ Other _____ (write-in all others)

POUCHES

Please select all pouches you *wear currently*:

- ☐ None
- ☐ Dump pouch
- ☐ Original IFAK (Individual First Aid Kit)
- ☐ IFAK II (Improved First Aid Kit)
- ☐ Medical pouches
- ☐ M4 magazine pouches
- ☐ Hand grenade pouches
- ☐ Smoke grenade pouches
- ☐ Flash bang grenade pouches
- ☐ Radio / Comms pouches
- ☐ SAW mag pouch
- ☐ E-tool pouch
- ☐ Breaching charges pouch/carrier
- ☐ Pistol magazine pouches
- ☐ M14 pouches
- ☐ 40mm grenade pouch
- ☐ Canteen pouch
- ☐ Radio pouch
- ☐ NODs pouch
- ☐ 300 round 7.62mm ammo bag
- ☐ Administrative pouch
- ☐ Shotgun round pouch
- ☐ Other pouches: _____ (write-in all others)

LOAD MANAGEMENT SURVEY

Please list / describe any items that need pouches that do not currently have pouches available:

COMPATIBILITY / INTERFACE

In this section, you will be presented with a series of equipment pairings. Consider the interactions specifically between the two pieces of gear and answer each question based on your experience.

Are these two items compatible / interface effectively with each other?	YES, with no problem	YES, but requires a modification / significant effort	NO, they are not compatible	N/A
1 Rucksack waist-belt & lower soft armor	☐	☐	☐	☐
2 Rucksack waist-belt & fighting load	☐	☐	☐	☐
3 Rucksack waist-belt & secondary belts / sub-belts	☐	☐	☐	☐
4 Rucksack frame & rear ballistic plate	☐	☐	☐	☐
5 Rucksack & tube hydration	☐	☐	☐	☐
6 Rucksack shoulder straps & fighting load	☐	☐	☐	☐
7 Rucksack shoulder straps & body armor	☐	☐	☐	☐
8 Rucksack shoulder straps & acquiring a target	☐	☐	☐	☐
9 Acquiring a target & body armor	☐	☐	☐	☐
10 Acquiring a target & fighting load	☐	☐	☐	☐
11 Acquiring a target & tube hydration	☐	☐	☐	☐
12 Body armor quick release & rucksack shoulder straps	☐	☐	☐	☐
13 Body armor quick release & fighting load / chest rig	☐	☐	☐	☐
14 Quick release shoulder buckle & rucksack shoulder straps	☐	☐	☐	☐

LOAD MANAGEMENT SURVEY

For any of the above items that you indicated either 'YES but requires a modification' or 'NO they are not compatible', please explain the modification / why they are not compatible:

	Please explain 'YES but requires a modification' or 'NO they are not compatible'
1 Rucksack waist-belt & lower soft armor	
2 Rucksack waist-belt & fighting load	
3 Rucksack waist-belt & secondary belts / sub-belts	
4 Rucksack frame & rear ballistic plate	
5 Rucksack & tube hydration	
6 Rucksack shoulder straps & fighting load	
7 Rucksack shoulder straps & body armor	
8 Rucksack shoulder straps & acquiring a target	
9 Acquiring a target & body armor	
10 Acquiring a target & fighting load	
11 Acquiring a target & tube hydration	
12 Body armor quick release & rucksack shoulder straps	
13 Body armor quick release & fighting load / chest rig	
14 Quick release shoulder buckle & rucksack shoulder straps	

OPEN ENDED

Please list / describe any load bearing equipment that you would like to see redesigned or added to federal supply system and what improvements are most important to you:

Please list / describe any specialty equipment that you carry that was not mentioned in this survey that you need to conduct your mission:

APPENDIX B – LOAD MANAGEMENT SURVEY