

Exploration of US Army Equipment Support Construction of Laws and Regulations

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Keywords: US Army, Equipment support, Construction of laws and regulations

Abstract: With the extensive application of information technology in the military field, the United States is continuously adopting new technologies to meet the needs of the new military transformation, in the theory, system, regulation, organization and management of equipment support, the paper focuses on the legislation construction of equipment support of the US Army, using the methods of literature, historical analysis, induction and deduction, and other research methods, using sociology, history, law, equipment science and other related disciplines as a theoretical basis, this paper analyzes the system and content of the US military equipment support law from the two dimensions of the system level and the system support field, this paper sums up the characteristics of the legislation of n military equipment support, which is comprehensive, updated in time, specialized, independent and systematic, in order to provide reference for our military equipment support.

1. Introduction

Construction of laws and regulations system has the characteristics of being fundamental, global and stable, and the soundness and perfection of the equipment support regulations system not only provides institutional support to secure the modernization of equipment support construction, but also provides a boost to contribute to the legalization of equipment support construction [1]. In recent years, the US Army has continued to summarize its experience to optimize equipment support theory, and in order to accurately and efficiently complete the equipment support task, and to ensure that equipment support has a law to follow, and has rules to follow, the US Army timely develops a large number of equipment support regulations, and solidifies the equipment support requirements, maintenance capabilities, and scrap processes into a set of effective regulations system with clear level, which lays a good foundation for advancing the equipment support construction. [2]

2. US Army Equipment Support Regulation System

The US Army equipment support regulation system can be divided into three levels: the national legal level, the federal government regulation level and the Department of Defense and its

subordinate regulation level, and the regulation level developed by government departments, bureaus, and all the arms and service [3]. Each level of regulations has different effectiveness, with lower level regulations being less effective than higher level regulations.

The first level is the legislation passed by Congress regarding equipment support, such as the Article 2460, *Definition of Depot-level Maintenance*, the Article 2464, *Depot-level Core Maintenance Capabilities*, the Article 2466, *Limitations on Performing Depot-level Maintenance of Equipment*, the Article 2469, *Contracting to Perform Workloads Previously Performed by Department of Defense Depot-level Maintenance Institutions: Competitive Demand*, the Article 2474, *Industrial and Technical Demonstration Centre: Public-Private Partnerships*, and others of the Volume 10 of *United States Code* [4]. This level of the system is the primary legal basis and basic guidelines for the execution of equipment maintenance support in the US Army.

The second level is regulations promulgated by the President, the Federal Government, and the Department of Defense, which supplement and refine congressional laws and serve as action guideline for specific tasks. Where Federal Government ordinances apply to Federal Government departments and Department of Defense ordinances apply to Department of Defense departments. For example, the *Federal Procurement Regulation*, the *Supplemental Federal Procurement Regulation*, and executive orders promulgated by the Federal Government; and the *Military Equipment Maintenance*, *CM in Military Equipment Maintenance*, and the *Determination Method of Depot-level Maintenance Core Capability* promulgated by the Department of Defense. In terms of content, the equipment support regulations promulgated by the Department of Defense are somewhat more specific and diverse. They include Department of Defense Directives (DoDD), Department of Defense Instructions (DoDI), Manuals (DoDM), and Directive Memorandum (DTM) (see Table 1.) DoDD is in the nature of orders and is generally more concise, with fewer pages, and specifies policy issues [5]; DoDI is generally specific interpretations of certain directives and is more detailed and operational in content than directives; DoDM provides detailed regulations and elaboration for some specific issues, and some manuals are divided into multiple volumes, and each volume elaborates different issues, for example, DoDM 4140.01 series, a total of 12 volumes, with content of "US Department of Defense Supply Chain Equipment Procedures", and the third volume is "Equipment Procurement", etc. Usually these manuals are for specific issues in a certain area, and explain detailed workflow, technical requirements, etc.; DTM is a binding document that has not yet been developed, highlighting the timeliness, avoiding the time lag caused by the large amount of time spent on developing directives and other binding documents. In principle, it does not have binding effect, but in fact, its publication also actually binds the specification of subsequent work.

The third level is the regulations level developed by government departments, bureaus, and all the arms and services, including departmental directives and manuals developed by various departments of the Department of Defense; regulations, ordinances, procedures, and technical manuals developed by all services in accordance with the spirit of the Department of Defense regulations; and relevant supporting ordinances, regulations, and rules and regulations developed by the relevant operational departments under all services. This part of the system is numerous and is a desk reference book for specific staff.

The Army, for example, includes some Army Regulations (AR), Army Manuals (DA Pam), Technical Manuals (TM), Field Manuals (FM), Army Technical Publications (ATP), and Army Doctrine Publications (ADP). Where, the AR is primarily used to standardize the work of US Army commands at all levels in order to follow through on higher-level requirements in accordance with uniform specifications (see Table 2).

Table 1: Major US Department of Defense equipment support regulations

Serial No.	No.	Regulation Name	Date of latest version
1	DoDD 4151.18	<i>Military Equipment Maintenance</i>	March 2004
2	DoD 4151.18-H	<i>Depot-level Core Maintenance Capacity and Utilization Measurement Manual</i>	March 2007
3	DoDI 4151.19	<i>Serial No. Project Management (SIM) in Equipment Life Cycle Management</i>	January 2014
4	DoDI 4151.20	<i>Determination Process of Depot-level Maintenance Core Capacity</i>	January 2007
5	DoDI 4151.22	<i>CBM+in Military Equipment Maintenance</i>	October 2012
6	DoDM 4151.22	<i>Reliability-centered Maintenance (RCM)</i>	June 2011
7	DoDM 4160.21 V1	<i>Disposal of National Defense Equipment: Scrap Guidelines and Procedures</i>	October 2015
8	DoDM 4160.21 V2	<i>Disposal of National Defense Equipment: Asset Scrapping and Recovery</i>	October 2015
9	DoDM 4140.01 V5	<i>Department of Defense Supply Chain management Equipment Procedures: Equipment Transportation</i>	February 2014
10	DoDM 4140.01 V6	<i>Department of Defense Supply Chain Equipment Management Procedures: Equipment Recovery, Retention and Scrapping</i>	February 2014
11	DoDM 4140.01 V7	<i>Department of Defense Supply Chain Equipment Procedures: Support Technology</i>	February 2014
12	DoDM 4140.01 V8	<i>Department of Defense Supply Chain Equipment Procedures: Equipment Data Management and Exchange</i>	February 2014
13	DoDM 4140.01 V11	<i>Department of Defense Supply Chain Equipment Procedures: Major support Project Management, and Controlled Inventory including Nuclear Weapons Related Equipment</i>	February 2014

Table 2: Major regulations related to US Army equipment support

Serial No.	No.	Regulation Name	Date of Latest Version
1	AR 750-1	<i>Army Equipment Maintenance Policy</i>	September 2013
2	AR 750-6	<i>Army Equipment Safety and Maintenance Notification System</i>	October 2006
3	AR 700-18	<i>US Army Equipment Supply</i>	September 2009
4	AR 700-127	<i>Integrated Logistics Support</i>	October 2016
5	AR 700-135	<i>Field Soldiers Support</i>	February 2009
6	AR 700-139	<i>Army Warranty Plan</i>	February 2015
7	AR 715-9	<i>Wartime Contractor support Planning and Management</i>	June 2011

The DA Pam type of regulations are mainly used to explain and clarify relevant policies, and serve as guidelines, and they are not mandatory provisions, and mainly propose various methods, to provide alternative and useful methods for implementing tasks, feasible implementation plans, and to illustrate the effectiveness of various strategies, etc. (Table 3).

TM is a specific operational use guideline for the operation and maintenance of Army equipment, etc. Each piece of equipment is equipped with a corresponding technical manual; In addition, there are corresponding technical manuals for the use and maintenance of various military facilities. For repair and maintenance, the TM××-10/20 series is the Army's maintenance standard which contains

the Preventive Maintenance Check and Maintenance Schedule (PMCS), which is the basic basis for determining and performing preventive maintenance, and in addition, others include the following technical manuals (see Table 4).

Table 3: Major manuals related to US Army equipment support

Serial No.	No.	Regulation Name	Date of Latest Version
1	DA Pam 750-1	<i>Commander Maintenance Manual</i>	December 2013
2	DA Pam 750-3	<i>Operation Guideline for Field Maintenance of Soldiers</i>	September 2013
3	DA Pam 700-2-1	<i>Use of Basic Level Supply System (Manual Treatment Procedure)</i>	December 1997
4	DA Pam 750-8	<i>Army Maintenance Management System User Manual</i>	August 2005

Table 4: US Army equipment support related component technical manual

Serial No.	No.	Regulation Name	Date of Latest Version
1	TM 9-2320-280-24P-1	<i>Truck (15 models) Operator, Base Level, Direct Support Level and Full Shift Support Level Maintenance Manual (with Spare Parts and Special Tools List)</i>	March 2001
2	TM5-692-2	<i>Maintenance of Mechanical and Electronic Equipment in C4ISR System</i>	December 2005
3	TM5-698-2	<i>Reliability-centered Maintenance for C4ISR Equipment</i>	October 2006
4	TM 10-8465-236-24&P	<i>Modular Single Soldier Light Armament Field Level and Support Level Maintenance Manual</i>	March 2014

Field manuals (FMs) primarily describe how the Army and its institutions at all levels direct operations and train in peacetime, and are the design of tactics and procedures for how the Army performs the tasks described in the Army Doctrine Publications (ADP), of which there are 50 adjusted field manuals. Most logistics-related field manuals have provisions for equipment support-related contents, including those that define the responsibilities for maintenance and support of troop equipment, maintenance-related specifications, supply and transportation of equipment, maintenance and support of equipment during operations, and wartime operational guidance for the unit or post. For example, FM 4-30.3 *Maintenance Operations* gives the basic principles of equipment maintenance under field conditions, organizational structure of maintenance and support, wartime maintenance and support activities, maintenance management and other related contents, which is the overall specification of wartime maintenance and support, and some of the field manuals related to equipment support (see Table 5).

Table 5: US Army equipment support related component field manuals

Serial No.	No.	Regulation Name	Date of Latest Version
1	FM 4-01	<i>Army Transportation Operations</i>	April 2014
2	FM 4-30	<i>Ordnance Operation</i>	April 2014
3	FM 4-40	<i>Military Supplies Operations</i>	October 2013
4	FM 4-95	<i>Logistics Operations</i>	April 2014

Army Technical Publications (ATP, 15 in total) list techniques as opposed to principles. ATP is more detailed and specific in scope than ADP or FMs providing "ways or means" to accomplish a task, but they are not prescriptive. Some ATP is function- or operation-specific, such as ATP 3-90.37

Counter-temporary Explosive Devices. ADP defines how force is to be employed, describing the essential elements of force required to conduct military operations to achieve national objectives and the principles by which force is to be employed, such as ADP 4-0, *support*, issued in July 2012.

3. Key Elements of US Army Equipment Support Regulations

The US Army equipment support regulations and systems cover all areas of equipment support, including equipment procurement activities, peacetime equipment support, wartime equipment support, and local civil power recruitment.

For systems procurement, it is composed of two main components: weapons and equipment procurement regulations and weapons and equipment scientific research and production regulations. The US Army's procurement operations are conducted in accordance with the Department of Defense procurement system regulations, complying with the *Federal Procurement Regulation* (last revised in 2012), DoDD 5000.01, *Defense Procurement Systems* (last revised in 2018), and DoDI 5000.02, *Defense Procurement Systems Operations* (last revised in 2018). To regulate competitive negotiations, there is the *Competition in Contracting Act* (issued by Congress on January 25, 1984), the *Truth in Negotiations Act* (issued by Congress on August 10, 2012), and Department of Defense Instruction DoDI 5505.152, *Department of Defense Contractor Publicity Plan* (last revised on December 22, 2016). All the US services have also developed detailed contracting regulations to govern procurement behaviors [6]. These include the Army's AR 215-4, *Contracting for Non-appropriated Funds*, and ATP 4-92, *Joint Ground Operations Contracting Support*, issued to govern specific contracting; the Navy's OPNAVINST 4200.7 CH-1, *Office of the Chief of Naval Operations Service Contract Requirements Management*, issued to govern the functions of service contract management departments; and the Air Force's AF PD64-1, *Contracting System*, and AFI64-105, *Contingency Contracting Support*, issued to regulate contracting and procurement management. Where, Air Force Policy Directive AFPD 64-1, *Contracting System* (last revised on November 6, 2018), establishes the responsibilities, tasks, and policies for Air Force contracting [7].

For wartime equipment support, it primarily regulates overall equipment support and wartime equipment support for all services. For example, Department of Defense Instruction DoDI 3020.41, *Wartime Contract Support*, was last revised on August 31, 2018, which regulates the scope of application of operational contract support operations, requirements for contracting officers to enter into Department of Defense operation support contracts, and procedures for wartime contractor support [8]. Department of Defense Instruction DoDI 3020.50, *Use of Private Support Contractors in Contingency Operations, Humanitarian or Peacekeeping or Other Military Operations or Exercises*, was last revised on August 31, 2018, which specifies how Department of Defense and the State Council coordinate the selection, training, equipment, and conduct of private support contractor personnel, and how private support contractors are to be used in war and non-war military operations. Army Regulation AR 715-9, *Operation Contract Support Planning and Management*, last revised on March 24, 2017, provides for consideration of leadership responsibilities, pre-deployment, deployment, receipt, forward delivery, and redeployment procedures, as well as regulates contractor personnel supervision, Army personnel supervision, government-provided support, delivery control, personnel accountability, and other intra-theater contractor and contract management. Secretary of the Navy Operations Instruction OPNAVINST 3020.12, *Planning for Operation Contract Support*, was last issued on November 14, 2018, which provides the background, policy, responsibilities, requirements, scope of application, and records management for operation contract support in joint operations and maritime operations. Air Force Policy Directive AFPD 10-36, *Contract Air Support for Enemy Air and Close Air Support Training*, was last revised on June 5, 2017, which provides for relevant leadership responsibilities, as well as

Federal Aviation Administration, US Air Force airworthiness regulations, and civil flight activity policies [9].

For peacetime equipment support, including the peacetime equipment maintenance, decision-making processes, and public-private partnerships. For example, Department of Defense Manual DoDH 4151.18, *Depot Maintenance Capability and Utilization Measurement Manual*, was last revised on August 31, 2018, which regulates leadership responsibilities, standard parameters, performance measures, and utilization parameters around the US Army maintenance civil-military integration task division. Air Force Equipment Command Instruction AFMCI 21-149, *Contract Depot-level Maintenance Project*, was issued on March 4, 2009, which specifies the complexity of contract depot-level maintenance projects, planning of contract depot-level maintenance projects, direct funding of contract depot-level maintenance projects, contracting methods, preparation for contract depot-level maintenance, and the contract maintenance process. Department of Defense Instruction DoDI 4151.20, *Determination Process of Depot-level Maintenance Core Capacity*, was last revised on August 31, 2018, which defines the responsibilities of the Under Secretary of Department of Defense for procurement and support, the Assistant Secretary of Department of Defense for logistics and equipment combat readiness integrity, and other leaders, and the core capability decision-making process and methods. Army Regulation AR 700-137, *Logistics Civil Power Enhancement Plan*, was last revised on March 23, 2017, which provides for leadership responsibilities, plan management, planning development, ordinance and training, and execution and implementation around the use and regulation of logistics civil power. Department of Defense Instruction DoDI 4151.21, *Public-private Partnerships for Product Support*, last revised on August 31, 2018, is the US Department of Defense policy regulation on public-private partnerships for product support, which is centered on the conduct of civil-military integration for US Army equipment maintenance and provides for leadership responsibilities, types of public-private partnerships, analysis, and cooperation procedures.

For the area of national defense mobilization, both at the Department of Defense level and at the Service level involve the recruitment and use of civil personnel, contractor personnel, and mercenaries for contingencies, emergencies, and wartime conditions, and issue corresponding safeguards regulations to regulate local civil power recruitment. For example, to regulate peacetime readiness, Department of Defense Directive DoDD 1400.31 *Department of Defense Civil Power Contingency and Emergency Planning and Execution* (revised on December 1, 2003), provides that Department of Defense civil personnel shall be prepared to respond quickly and efficiently to effectively meet all contingency and emergency task requirements; Provides for proper planning of contingency and emergency manpower requirements to maintain proper combat readiness equipment; And provides for Department of Defense civil personnel to be available for deployment to contingency and emergency areas to provide the necessary coverage for military operations. To regulate emergency availability, Department of Defense Instruction DoDI 3020.50 *Use of Private Support Contractors in Contingency Operations, Humanitarian or Peacekeeping, or Other Military Operations or Exercises* (last revised on August 31, 2018) states that in contingency operations, humanitarian, or peacekeeping, Department of Defense and the State Council shall coordinate the selection, training, equipment, and conduct of private support contractor personnel, including the establishment of appropriate procedures, and a requirement that operation commanders develop specific private support contractor guideline and procedures for the operational environment within their area of responsibility [10]. To regulate wartime response, Army Regulation AR 700-137, *Logistics Civil Power Enhancement Plan*, provides for planning for the use of civil power during wartime, training of personnel, and also how civil personnel are applied and deployed during wartime. Its purpose is to provide advance planning for the use of civil contractors during operation so that selected service support can be executed in wartime, thereby increasing the strength of Army

troops. Secretary of the Navy Instruction SECNAVINST 12990.1B *Determination of Civil or Contractor Personnel in Active Service* (last revised on August 22, 2018) provides a description of the conditions, scope of application, application process, entitlements, and related policies for the US Navy's determination of civil or contractor personnel in active service.

4. Characteristics of US Army Equipment Support Regulations

4.1. Highlight the Operability of the Provisions of the Regulations and Systems, with Comprehensive Content, and Specific Provisions

The US Army's equipment support regulations are more detailed and specific and more operable than our Army's regulations from the content point of view. From the command and control of equipment support to the execution and operation of equipment support, from the Army's self-support to the civil-military integration support, and from the construction and use of support forces to the training of support personnel, the US Army support regulations have given specific and detailed provisions, with strong operability. For example, AR750-1 *Army Equipment Maintenance Policy*, as the top-level management regulation of the Army on maintenance and support, is 223 pages long and covers many contents such as maintenance organization structure, maintenance operations, depot-level maintenance, various equipment maintenance policies, life cycle maintenance and support, etc. Its level of detail is by no means the "policy" regulations of our Army. It should be said that these policy provisions have been very detailed and clear, and the division of responsibilities is clear, easy to administrative supervision and management. In addition, the Army regulatory system has a series of regulations to explain specific operational processes and technical issues, such as DA Pam750-1 *Commander Maintenance Manual*, DA Pam750-3 *Soldier Field Level Maintenance Operations Guideline*, ATP 4-33 *Maintenance Operations*, DA Pam750-8 *Army Maintenance Management System User Manual*, and other supporting specific regulations, and TM manuals for each type of equipment to guide specific maintenance operations.

4.2. Adhere to the Timeliness of the Construction of Regulations and Systems, and Timely Update and Continuously Improve

The US Army insists on the timeliness of the construction of regulations and systems, timely updates, and continuously improves. For example, in maintenance and support, the US Army maintenance and support regulations, according to the international situation and changes in the war situation constantly updated and gradually improved. The separate maintenance and support field manuals include FM 4-30.3, *Maintenance Operations and Procedures*, whose version of July 28, 2004, was replaced by ATTP 4-33, *Maintenance Operations*, which was developed on March 18, 2011, and subsequently changed to ATP 4-33, *Maintenance Operations*, on April 14, 2014, along with the reform of the ordinance system. In recent years of ordinance reform, both ATTP and FMI (temporary FM) types of publications, which were activated after 2000, have been replaced by ATP and FM, and many of the original FM has also been replaced by ATP. In order to facilitate regulation updates, the US Army has also designed a regulation update and modification report form DA Form 2028 for this purpose, which can be reported directly to the corresponding regulation development department through the network, thus enabling regulations to be continuously modified and improved at a faster pace.

4.3. Emphasis on the Pertinence of the Construction of Regulations and Systems, Issue Special Laws Specially to Facilitate Implementation

For equipment maintenance and support, with the gradual advancement of equipment maintenance and support, the US Army usually formulates special laws and regulations for problems have to be settled urgently and important special activities in the maintenance process. Taking civil-military integration support as an example, the US civil-military integration maintenance and support regulation system has made specific provisions or developed special regulations on major issues such as wartime contractor support, public-private partnerships, core maintenance capabilities, and performance-based support (as shown in Figure 1). In terms of level, the regulations for a certain issue are often reflected as a certain chapter or entry in the high-level regulations, and gradually refined in the lower-level regulations, i.e., the high-level sets the policy and the lower-level sets the plan. In terms of content, the level of detail is gradually refined and enriched as the level decreases, especially the directional requirements put forward by the Federal Government and the Department of Defense, which are clarified and refined at the arms and services level according to their specific characteristics. In terms of the variability of regulations, the frequency of changes at the high-level is less than that of regulations at the lower-level. The US Army regulations have changed rapidly in recent years, but the US Department of Defense regulations have been updated basically at a consistent rate.

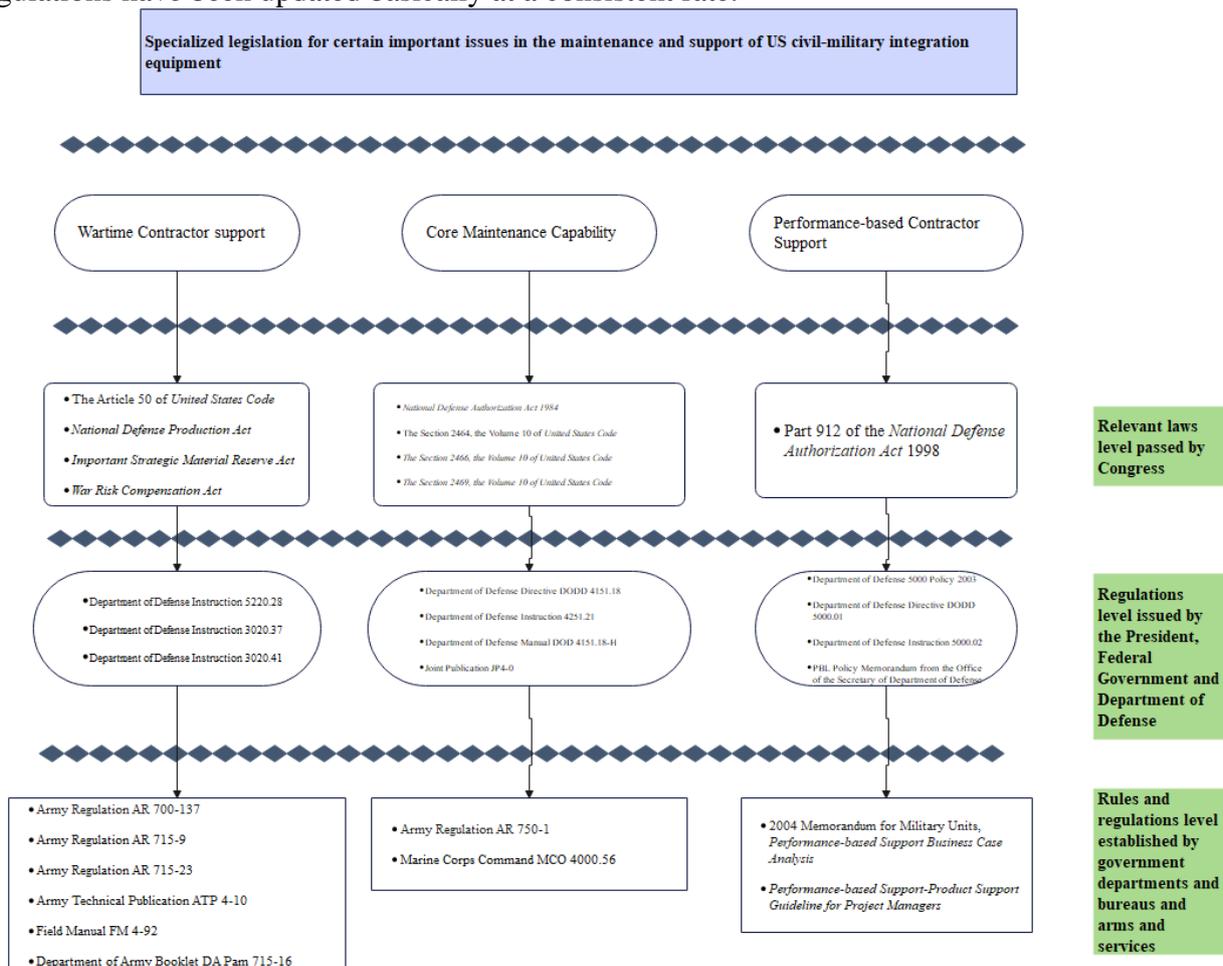


Figure 1: Specialized legislation on certain important issues of US civil-military integration maintenance and support

4.4. Focus on the Hierarchy of the Construction of Regulations and Systems, Vertical into A Structure, and Horizontal into A System

The US Army focuses on the hierarchy of the construction of regulations and systems, vertical into a structure, and horizontal into a system. For example, the US maintenance and support system can be divided into three levels: the first level is the relevant laws level passed by Congress; The second level is regulations level issued by the President, Federal Government and Department of Defense; The third level is rules and regulations established by government departments and bureaus and arms and services. Each service establishes its own regulations, ordinances, procedures, and technical manuals for equipment maintenance and support management in accordance with the spirit of Department of Defense regulations. Each level of law or regulation has a different effect, and the next level is subordinate to the previous level. Regulations are not the more the better, the more detailed the better, but to be effective and work well. The US Army has found in recent years that its system of regulations has become increasingly large and lengthy, bringing many problems to the use of troops. In recent years, the US Army has made drastic reforms to its regulation system, greatly reducing the overall number of regulations and re-planning the structure of the regulations to make the system more concise and the regulations moderate in length. Many regulations have been integrated according to the similarity of their contents, reducing the number and duplication; In response to the original field regulations "one all-inclusive" and lengthy situation, they have been changed to the ADP, ADRP, ATP, and FM joined with each other, with different contents for different needs of personnel, making it more convenient for personnel at different levels to check the relevant contents and facilitate targeted use.

5. Conclusions

It can be seen that the US equipment support regulations and standards system is hierarchical and comprehensive, while the latest equipment support construction content feedback is very timely, with quick updated rate and a more flexible form, reflecting the latest technology of equipment support in a timely manner. Jade can be polished by stones from other hills. In recent years, our Army equipment maintenance, equipment procurement and other aspects have been introduced some regulations and policies, although to a certain extent they improve and make up for the lack of construction of the regulation system, there is a lack of macro-level equipment support regulations. Speeding up that study of the characteristics of US Army equipment support regulations is beneficial to our Army support regulations construction, which contributes to ensure that the equipment support is stable and healthy on the track of rule of law.

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