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Research on the construction of government emergency management system under the“ COVID-19”

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ABSTRACT. *Under the public health emergency, how to protect the public health and build a perfect emergency management system are the key issues. System engineering theory provides a new research perspective for governments at all levels to build emergency management system. Based on the "COVID-19" epidemic prevention and control, the current operation and existing problems of the government emergency management, and based on the basic theory and mechanism of system engineering, the top-level design of the government emergency management system is constructed. The feedback mechanism and the meta synthesis mechanism of the system are elaborated, and the logical relationship and function mechanism among the subsystems are studied. Finally, a proposal is put forward. Relevant guarantee measures for the construction of government emergency management system.*

KEYWORDS: *COVID-19; government; system engineering; emergency management*

1. Introduction

As of April 12, 2020, the "COVID-19" cases were diagnosed in more than 177 thousand cases worldwide. Many countries have launched a public health emergency response, and all sectors of society have been involved in the new prevention and control of the outbreak. At present, China "COVID-19" has caused certain control over the epidemic of pneumonia in China, but it has been accelerating worldwide. Italy, France, the United States, Japan and other countries have a large number of confirmed cases. On April 12, 2020, a total of 141 countries or regions except China have found confirmed cases. Therefore, every country has taken special measures to prevent and control the"COVID-19". However, the epidemic prevention and control also revealed that the existing emergency management system of most governments has some outstanding problems in response to such public health emergencies as the new crown epidemic. First of all,

ISSN 2616-5902 Vol. 2, Issue 4: 41-52, DOI: 10.25236/AJBM.2020.020405

the top-level design lacks systematic thinking, the existing emergency management work is relatively scattered, the response mechanism is not perfect, and a set of mature and systematic emergency management process is lacking. Secondly, there is a lack of permanent emergency response agencies in the organizational structure. Most of the government's epidemic prevention and control leading groups are temporarily set up, which is difficult to have mature emergency management capabilities, leading to inefficient work. Then, the linkage mechanism of the emergency management system is not perfect. The temporarily established epidemic prevention and control leading group and each special working group carry out their own work. There is a phenomenon of work modularization, which makes some government emergency management systems fail to achieve a good linkage mechanism. Finally, the awareness of participation of all staff is not strong, and the government emergency management system is lack of motivation for continuous improvement [1-3].

2. Model construction and analysis of government emergency management system

Based on the general principle, feedback principle and integrated principle of system engineering, we try to build a government emergency management system model.

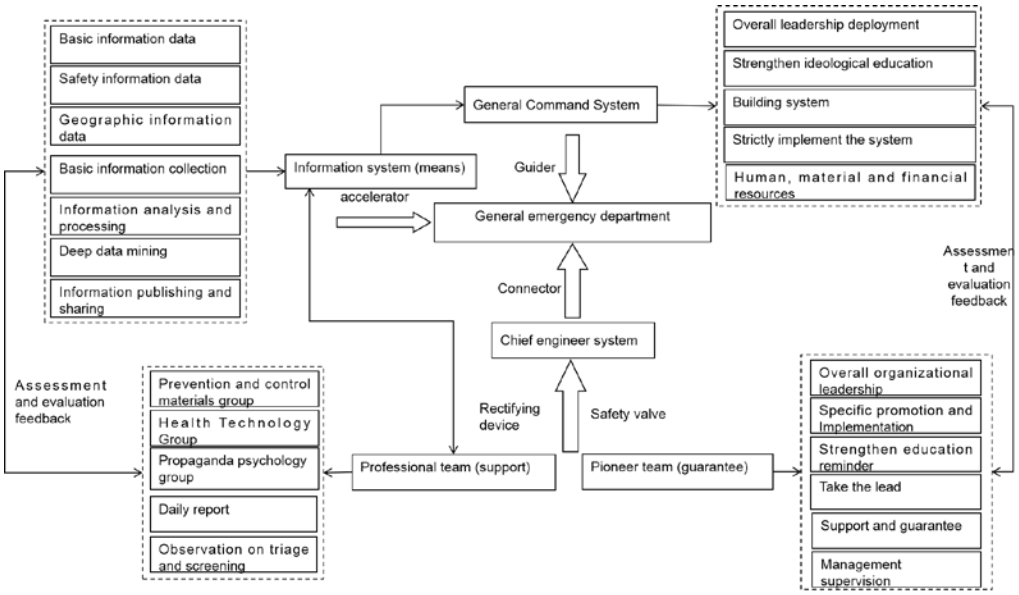

Figure. 1 Government emergency management system model based on System Engineering

ISSN 2616-5902 Vol. 2, Issue 4: 41-52, DOI: 10.25236/AJBM.2020.020405

2.1 General department mechanism in government emergency management system

Government emergency management refers to the whole process from receiving to overall system analysis, to task division, task system division, and task system integration, to the final realization of task objectives, including the establishment of rules and regulations, specification requirements, supervision system and implementation of regulations, inspection, care, custody and coordination of various input forces Various activities restricting, combing and coordinating the smooth progress of tasks.

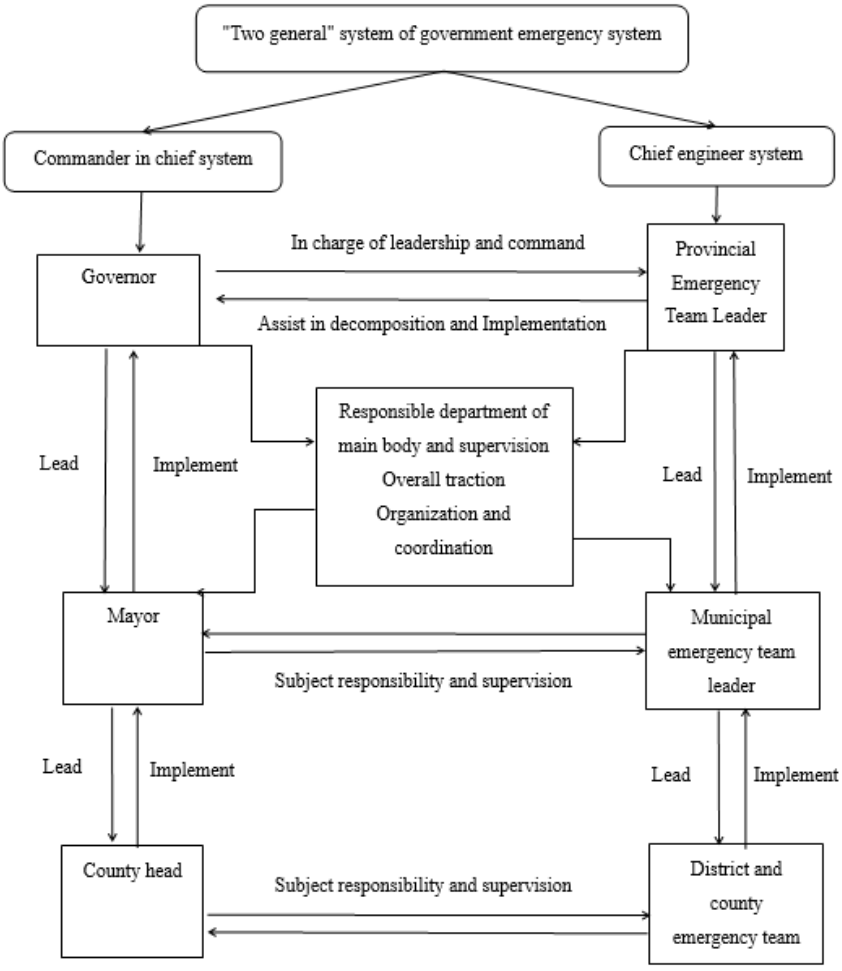

Figure.2 "Two general" system of government emergency system

ISSN 2616-5902 Vol. 2, Issue 4: 41-52, DOI: 10.25236/AJBM.2020.020405

(1) System decomposition

On the basis of emphasizing the relevance, systematization and comprehensiveness of the system engineering, the system hierarchical structure decomposition analyzes and processes the basic information, data security, data security, data security of the accelerator of the information system (means) of the General Department of epidemic emergency response, collects the basic information of geographic information, deeply excavates the data, releases the information, shares the general command system, makes overall arrangement, builds the system, and strictly implements the system Strengthen ideological education, human, material and financial resources guide professional team (support), prevention and control materials group, propaganda psychology group, daily report, zero report, health technology group, Party member team (guarantee), safety valve of rectifying device, overall organization and leadership, strengthen education, remind connector to take the lead in demonstration, lead to specific implementation, support, assessment, feedback, assessment, feedback, triage, screening, retention, general management and supervision The overall work of division system engineering and the level of various sub-systems are divided into the best, and the division of labor among sub-systems is divided into the best. The general principle is that each sub-system should be roughly divided according to the technical and organizational conditions of different functions, disciplines or engineering disciplines, the design and implementation of the undertaking units, and the degree of frequent coordination of the overall departments.

(2) System synthesis

System synthesis is the unity of opposites of system decomposition. It means that the overall system team designs a set of methods and steps while system decomposition. With the progress of subsystem research, its single performance is gradually accepted, and then the correlation of multiple subsystems is gradually accepted, so that the components and performance of the whole task are gradually converged and integrated in a simple and efficient way The work to achieve the established objectives of the task.

(3) System coordination

In the process of system engineering implementation, the continuous improvement, modification and supplement of system decomposition and system synthesis is called system coordination. Cross level coordination should be reduced as much as possible between different levels, and the amount of coordination at the upper level should be reduced as much as possible. The work that can be delegated to the lower level for coordination should be delegated to the lower level for coordination. If it involves important technical indicators and needs frequent coordination, even if it involves a small number of institutions, it should also be directly coordinated by the overall department as a subsystem.

2.2 Feedback mechanism in government emergency management system

There are three closed-loop feedback systems in the government emergency management system. The first closed-loop feedback system is composed of the

ISSN 2616-5902 Vol. 2, Issue 4: 41-52, DOI: 10.25236/AJBM.2020.020405

general emergency department, chief engineer system, professional team, information system and general emergency department. The purpose is to integrate the expert's experience and knowledge with the information system, so as to assist and correct the decision. The second closed-loop feedback system is composed of the emergency headquarters, the general command system, the vanguard team, the chief engineer system and the emergency headquarters[4]. The purpose is to determine whether the system has reached the expected goal after formulation and promulgation in the process of decision-making and implementation. The analysis results need to be fed back and compared with the expected goal. If they are consistent, the system will be modified. The third large closed-loop feedback system is composed of the general emergency department, the general command system, the pioneer team, the professional team, the information system and the general emergency command department, which forms the multi-channel feedback management. Its basic principle is to make adjustment decisions based on the comparison between the known information of system input and the feedback information of system output. Therefore, the essence of using the feedback principle in the government emergency management system based on the system engineering theory is to establish a system that can correct the deviation in time and improve the effect of emergency management [5].

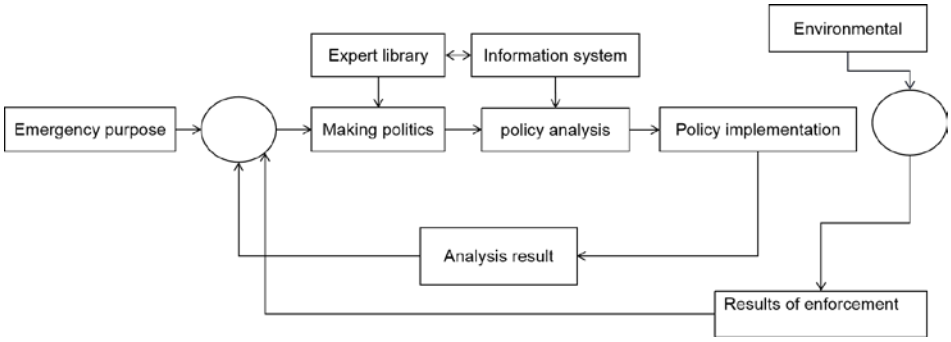

Figure.3 Feedback mechanism in government emergency management system

2.3 Integrated mechanism in government emergency management system

This method is an effective way to deal with complex systems and complex giant systems (including social systems) at present. Successful cases have proved its scientificity and effectiveness. The theoretical basis of the integrated method is thinking science, the method basis is system science and mathematics science, the technical basis is modern information technology and network technology, and the philosophical basis is practice theory and epistemology. The problems of complex systems and complex giant systems (including social systems) are usually unstructured problems. Nowadays, computers can only deal with structured problems. It can be seen from the above synthesis integration process that in the successive approximation process, the synthesis integration method actually uses

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structured sequences to approach unstructured problems.

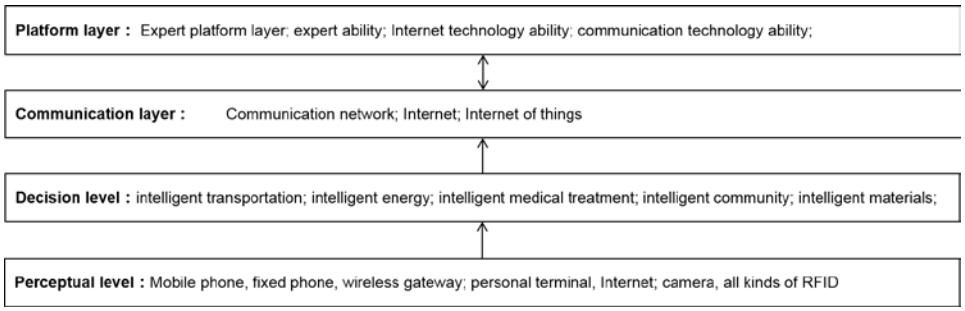

Figure.4 Integrated mechanism of government emergency management system

The government emergency management information system should be built as a large platform for citizens' identification, location service and data exchange. The key task is to get through the data and information integration of hospitals, citizens and community service personnel. It should cover three stages: the period of isolation of citizens' epidemic situation, the period of centralized rework (return to work) and the period after resumption of work. The whole process service, the whole process monitoring and the whole process service should be carried out to provide intelligence With the intelligent emergency prevention and control system as the core, the network of emergency command and scientific decision-making system covering the whole province and even the whole country will be established to realize "command networking, emergency informatization, implementation process and decision-making wisdom".

The data source of the perception layer in the government emergency management information system consists of two parts: one is the data filled in by the citizens, such as "daily health punch" and "rework information filling", including the data of departure place, train number, accompanying personnel, transfer on the way and other return information; the other is the data collected from mobile phones, wireless gateways, personal computers, cameras and various RFID. The communication layer is mainly composed of urban communication network, Internet and Internet of things. The platform layer includes expert set, it ability and IC ability. The expert ability and the latter two are combined to form the support ability. Finally, it reaches the decision application layer, including the emergency command system of various urban applications and the emergency general department. Of course, this capability can be expanded, which can build all aspects of future oriented smart city construction, such as fire protection, transportation, safety, energy, etc., rather than just the establishment of the system for emergency prevention and control.

3. Measures

The construction of the government emergency management system will be a

ISSN 2616-5902 Vol. 2, Issue 4: 41-52, DOI: 10.25236/AJBM.2020.020405

gradual process. It is urgent to change the mobile phones, fixed phones, wireless gateways, personal terminals, internel, cameras, all kinds of RFID communication networks, the Internet, the Internet of things platform expert platform layer; Experts' ability; Internet technology ability; communication technology ability; emergency response Department of decision-making level; intelligent transportation; intelligent energy; intelligent medical treatment; intelligent community; intelligent materials; concepts should be transformed from the current general response mode to the daily emergency prevention management mode, and the emergency management should be included in the normal management.

3.1 Accelerate the construction of government emergency management system

The construction of emergency management system is a systematic project involving many elements and problems, such as national top-level design, construction objectives, development priorities, grass-roots governance, emergency team, command and dispatching, technical configuration, scientific support, performance management, etc., which directly affects the overall safety and sustainable development of a country. In the planning and formulation of emergency management system construction, we should make great efforts to optimize the emergency management system on the basis of scientific assessment of major safety risks faced, especially in combination with the outstanding problems encountered in the epidemic, and pay attention to the following work.

It is necessary to strengthen the risk management of emergencies in an all-round way and consolidate the basic capacity of the grass-roots as the focus of the construction of emergency management system. Adhere to social co governance, improve citizen safety education system, promote safety publicity into enterprises, rural areas, communities, schools and families, strengthen public welfare publicity, popularize safety knowledge, cultivate safety culture, carry out regular emergency evacuation drills, support and guide community residents to carry out risk investigation and governance, actively promote grid management of safety risks, and build up disaster prevention and mitigation The people's defense line for disaster relief. [6-8]

(2) Attention should be paid to promoting the establishment of an emergency management pattern that combines government leadership with social participation and involves the mobilization and coordination of the whole people. Guide the public to enhance the awareness of risk prevention, urge enterprises and institutions to actively perform the main responsibility of safety management, and comprehensively enhance the risk prevention ability of the whole society. [9]We will integrate public safety and education, such as health and health, into the national education system, improve the social and psychological intervention system for public safety, and improve the public safety awareness and emergency response skills of the whole people. Pay close attention to the initial response capacity building of basic units at the grass-roots level, pay attention to the basic capacity building of grass-roots and individual protection, monitoring and early warning, information reporting, coordination and cooperation, continue to promote the

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grass-roots training of "the first responder", strengthen the publicity and education of emergency science of the whole society, and enhance the disaster resistance of the whole society.

3.2 Strengthen the training of government emergency team

(1) Further improve the system of emergency talents. According to the characteristics of the severe emergency situation, we should appropriately increase the number of personnel positions focusing on strengthening emergency management, emergency risk assessment, monitoring and early warning, emergency rescue and rescue, disaster assessment and post disaster intervention. At the same time, further expand the scale of volunteer team, develop the social emergency informant team, and generally set up emergency informant posts in urban and rural areas of the country.

(2) Strengthen the professional capacity building of emergency talents. Include emergency knowledge and skills education and training into the national education system: basic emergency knowledge and skills education into pre-school education and compulsory education; establish and improve the interaction mechanism between higher education, vocational education and social needs, strengthen the professional setting for emergency response, expand the scale of emergency talents training, and improve the quality of emergency talents; rely on social organizations and employers, Train all citizens in basic emergency knowledge and skills on a regular basis. Establish and improve the qualification system of emergency talents. Training system for different levels, different identities and different categories of emergency talents.

(3) Establish a comprehensive management mechanism for emergency talents. Strengthen the macro management and business guidance function of the human resources department of the government to the emergency talents, strengthen the integration function of the emergency management department to the emergency talents, strengthen the unified planning, overall coordination and dispatching responsibility of the emergency talents; set up the comprehensive emergency rescue team in the government above the county level; establish the linkage and cooperation mechanism of all kinds of emergency rescue teams.

(4) Strengthen the construction of incentive and guarantee mechanism for emergency talents. We will improve and optimize the income compensation mechanism for social emergency talents, improve the special post allowance system for front-line insurance related talents, and establish and improve the safety insurance system for front-line insurance related talents.

3.3 Strengthen the construction of government management information system

(1) To build a perception network project, by means of IOT perception, aviation perception and video perception, to promote each unit to build a perception network in the field of production safety, natural disaster, urban safety and emergency

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response site, and complete data access.

(2) To build a communication network project, comprehensively apply the provincial E-government extranet, provincial E-government intranet and Internet, and build Establish command information network, satellite communication network, wireless communication network, spatiotemporal unified service system and integrated communication service system to form the emergency communication network covering the relevant departments of emergency management business of the whole province horizontally and connecting the provinces, cities and counties vertically.

(3) Build the construction process of basic environment, build or transform the existing infrastructure, including the emergency command and dispatching at all levels of the provinces, cities and counties.

(4) Building big data support system project, relying on the information infrastructure of emergency management department or the infrastructure of local government cloud, building provincial and municipal data governance platforms (federal government and state), carrying out the integration and governance of emergency management business data, and building business application system project.

3.4 Improve the follow-up support mechanism for epidemic prevention and control

From the perspective of historical experience, the spread of infectious diseases is cyclical. Different stages of epidemic development and different levels of epidemic prevention and control have different costs and formation risks for economic and social development. At the same time of strengthening epidemic prevention and control, we should improve the emergency medical assistance mechanism, and carry out the economic and social cost and risk assessment work as soon as possible. Professional organizations should be organized to use the data of national authoritative departments to quantitatively analyze the economic and social costs and risks caused by the epidemic, so as to provide necessary support for the prevention and control of the epidemic and the follow-up work. According to the cost and risk assessment results, combined with the resource endowments and affordability of different regions, industries and groups, a "policy box" should be formed for accurate and stable support and assistance. In addition, we should combine the epidemic cost and risk assessment with the national and local development planning and project arrangement, pay attention to the study and judgment of non economic major risks, improve the prevention and control mechanism of key infectious risks, and strengthen the modernization of emergency management system and governance capacity.

ISSN 2616-5902 Vol. 2, Issue 4: 41-52, DOI: 10.25236/AJBM.2020.020405

3.5 Improve the comprehensive guarantee mechanism for epidemic prevention and control

We should improve a unified material security system, closely integrate the situation of epidemic prevention and control, coordinate production, demand, flow and distribution, and focus on improving the matching ability of medical material supply and demand. At the same time, it is necessary to establish and improve the emergency medical capacity, material and production capacity reserve system in response to public health emergencies.

(1) We will make every effort to ensure the production and supply of key medical prevention and control materials, encourage enterprises with conditions to start construction as soon as possible and orderly, expand production capacity, and ensure the supply of medical materials with quality and quantity guaranteed.

(2) To clarify the level of demand for medical materials, to clarify the standards for scientific use of medical prevention and control materials in different places and different groups of people, and to focus on ensuring the needs of medical materials for front-line medical workers.

(3) Speed up the logistics of medical materials, organize logistics enterprises and social organizations to use their own channels to speed up the distribution of medical rescue materials and basic people's livelihood needs.

(4) Do a good job in the "last kilometer" distribution of medical materials, strictly close the loopholes in the interception, transfer and overstock of medical materials, reduce the intermediate allocation of medical materials, and establish a direct supply and demand docking mechanism between medical institutions and material suppliers (including various foundations, enterprises, etc.).

(5) We will effectively build a long-term mechanism for emergency medical treatment, material reserve and production capacity reserve in response to public health emergencies, establish emergency medical treatment teams in medical institutions at all levels, establish emergency medical treatment institutions in cities, especially in large and medium-sized cities, establish and improve emergency material reserve and production capacity reserve institutions, and establish a cross regional cooperative emergency treatment system.

3.6 Improve the information dissemination mechanism of epidemic prevention and control

Large scale outbreak will inevitably cause social panic. Fast and reliable information is the "disinfectant" to inhibit the spread of the epidemic, and also the "strong agent" to gather social consensus. The epidemic revealed that there are still some defects in the information transmission, feedback and disclosure mechanism of emergency public health events in China, so it is urgent to strengthen the information transmission mechanism of epidemic prevention and control. We should improve the disclosure mechanism of major epidemic information, increase the

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administrative and criminal penalties for concealing and misreporting epidemic information, increase the penalties and supervision for professionals deliberately monopolizing the use of data and information resources, improve the guidance mechanism of public opinion, take science and law as the standard, timely release correct information through open and legal channels, and broaden the government and the public We should strengthen the international communication mechanism of epidemic information, continue to do a good job in communication and coordination with the World Health Organization and relevant countries and regions, and promote the sharing of epidemic information and coordination of prevention and control strategies.

4. Conclusion

Based on the "COVID-19" epidemic management reality, this paper constructs a system management model of government emergency management based on the system engineering theory, and makes a detailed analysis of the various elements of the model, and puts forward the government's new improvement mechanism and safeguard measures in the context of the "COVID-19" epidemic situation. In order to provide some reference for the government to build the emergency management system under the public crisis.

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