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Establishing Resilient Supply Chains – Guidance

ICS 03.100.40

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**FOREWORD**

*(Formal clauses to be added later on)*

The standard has been prepared for the guidance of all organizations to assist them in establishing the resilient supply.

The supply chain is network of companies and people engaged in providing raw material or services for process/ production and also help in delivering the product for final consumption. The supply chain management is important and crucial process in any business as managing the supply chain effectively can lower cost and help in efficient production process. The companies employ supply chain management process to cut cost and remain competitive.

The pandemic and war has taught us that one can not have faith in the established supply chain channels. What if an established supply chain gets disrupted without any alternate supply chain? What if the cost of material in supply chain increases? What if the complex logistic involve in supply chain is dominated by a group or conglomerate to freeze its customer. All these issues point to the need of having alternate supply chain that can be readily adjusted to. That is why there is need to have resilient and sustainable supply chain so that any disruption in established supply chain can be quickly adapted to.

This response may not be effective without an adapting to new supply chain routes making them resilient. Resilient and sustainable supply chain management refers to the ability of a company's supply chain to quickly adapt to new routes and effectively respond to any disruptions or challenges that may arise with due concern for environmental cause.

By establishing resilient supply chain management strategies, not only contribute to a greener world but also companies can better cope with changes and uncertainties, and minimize the impact of supply chain disruptions on their operations, profitability, and reputation. As

companies collaborate in building such resilient and sustainable supply chains, we pave the way for a brighter, more sustainable future for generations to come

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

# **INDIAN STANDARD**

## ESTABLISHING RESILIENT SUPPLY CHAINS – GUIDANCE

- 0.0 **Foreword**
- 1.0 **Scope**
- 2.0 **References**
- 3.0 **Terminology**
- 4.0 **Risk identification and management**
- 5.0 **Establishing Resilient Supply Chains**
  - 5.1 Identify critical sectors and goods
    - 5.1.1 Monitor supply
      - 5.1.1.1 Potential changes in volume/ price
      - 5.1.1.2 Potential disruptions/ delays/ shortages in supply chain
      - 5.1.1.3 Other disruptions in supply chain
      - 5.1.1.4 Capture any abnormal signal
  - 5.2 Establish Early Warning System (EWS)
    - 5.2.1 Data collection
    - 5.2.2 Data analysis
    - 5.2.3 Legal backing for EWS
  - 5.3 Establish crisis response mechanism
    - 5.3.1 Short term response
    - 5.3.2 Long term response
- 6.0 **Communication**
  - 6.1 Communication link with stakeholders and other parties
  - 6.2 Data sharing
    - 6.2.1 Trade and customs data
  - 6.3 Information sharing
    - 6.3.1 Information on regulatory decisions
    - 6.3.2 Information on advance procurement schedules
- 7.0 **Planning the Supply mechanism**
  - 7.1 Alternate transport mechanisms
  - 7.2 Role of workers
    - 7.2.1 Labour rights
    - 7.2.2 Capacity building
  - 7.3 Stress testing of supply chain
- 8.0 **Preventive actions**

## INDIAN STANDARD

### ESTABLISHING RESILIENT SUPPLY CHAINS – GUIDANCE

#### 1.0 Scope

This document provides guidance to organizations on establishment of resilient supply chains.

This document is applicable to all types and sizes of organizations (e.g. commercial enterprises, government or other public agencies and non-profit organizations). This document can be used throughout the life of the organization and can be applied to any activity, internal or external, at all levels.

This document does not cover management aspect of resilient supply chains.

#### 2.0 References

IS 16421- Glossary of terms in supply chain management

ISO 20400- Sustainable procurement- Guidance

ISO 22095- Chain of custody- General Terminology and Models

ISO 28002:2011- Security management systems for the supply chain - Development of resilience in the supply chain — Requirements with guidance for use

ISO 28003:2007- Security management systems for the supply chain — Requirements for bodies providing audit and certification of supply chain security management systems

ISO 28004-1:2014- Security management systems for the supply chain — Guidelines for the implementation of ISO 28000 — Part 1: General principles

ISO 28004-3:2014- Security management systems for the supply chain — Guidelines for the implementation of ISO 28000 — Part 3: Additional specific guidance for adopting ISO 28000 for use by medium and small businesses (other than marine ports)

ISO 28004-4:2014- Security management systems for the supply chain — Guidelines for the implementation of ISO 28000 — Part 4: Additional specific guidance on implementing ISO 28000 if compliance with ISO 28001 is a management objective

#### 3.0 Terminology

Organization (Also include governmental organizations)

Shock

Disruption

Stakeholders

#### 4.0 Risk identification and management

While planning and establishing resilient supply chains, the organization shall identify the risk and manage the risk to ensure:

- to achieve the desired output of all processes

- to prevent and reduce undesired effects

The organization shall plan:

- actions to address these risks
- how to
  - o integrate and implement the actions into its processes
  - o evaluate effectiveness of these actions

## 5.0 **Establishing Resilient Supply Chains**

Organization shall strive and control to minimize supply chain disruptions and strengthen supply chains over the long run. Supply chains thus established shall be able to withstand and rapidly recover from the shocks and irregularities in the critical supply chain systems. Organizations shall foster a coordinated and pre-emptive response to such shocks and irregularities.

Organization may follow the flow diagram given in fig 1 for establishing resilient supply chains.

### 5.1 **Identify critical sectors and goods**

Organization shall identify critical sectors and/ or goods, that are important for the organization and non-availability of which can hamper smooth operation of functioning of the organization or can impact the daily lives of the public. Possible disruptions to the entire supply chain due to small insignificant factors may be considered by efficient use of limited resources available at their end.

Organization may consider qualitative factors for identification of such critical sectors and/or goods. Impact on the economy, foreign dependence, short term necessity, local production capability, possibility of import substitution, higher global price, fluctuation in price, supply and demand, market trends etc. may be considered for this purpose.

#### 5.1.1 **Monitor supply**

Organization shall establish means to identify and monitor the supply of identified critical sectors and/ or goods and capture any abnormal signal. A list of internal and external factors that may cause the fluctuation and instability in the supply may be listed and monitored regularly.

The organization shall be responsible to design their own monitoring system and also may collaborate with other organizations for this purpose. Such identification and monitoring in the supply chain shall be done on continuous basis.

##### 5.1.1.1 **Potential changes in volume/ price**

Organization shall establish means to identify and monitor the potential changes of identified critical sectors and /or goods or supply chain components that are essential to the production of critical goods. Such monitoring shall include, but

not limited to, the volume and / or price of identified critical sectors and/or goods, including services.

Such identification and monitoring in potential changes in the volume / price of identified critical sectors and /or goods or supply chain components shall be done on continuous basis.

#### 5.1.1.2 Potential disruptions/ delays/ shortages in supply chain

Organization shall establish means to identify and monitor potential disruptions / delays/ shortages building up in their supply chain for identified critical sector and / or goods. Such monitoring shall include, but not limited to, disruptions / delays/ shortages building up in the supply of critical sectors and / or goods or supply chain components that are essential to the production of critical goods, including services.

Such identification and monitoring in potential disruptions / delays/ shortages in the supply chain shall be done on continuous basis.

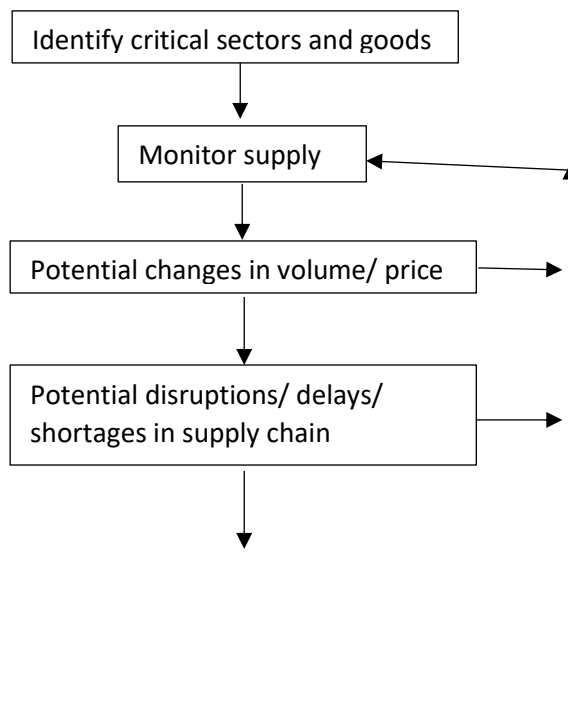
#### 5.1.1.3 Other disruptions in supply chain

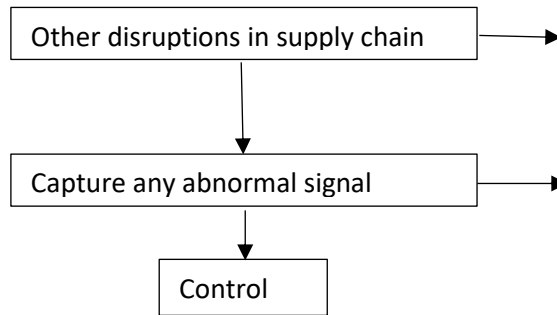
Organizations shall establish means to identify and monitor other disruptions in their supply chain for identified critical sector and / or goods. Such monitoring shall include, but not limited to, disruptions in air, sea, land or marine transport and logistics.

Such identification and monitoring in other disruptions in the supply chain shall be done on continuous basis.

#### 5.1.2 Capture any abnormal signal

During the monitoring, organizations shall capture any abnormal signal observed by them. Such signal, qualitative or quantitative, shall be analysed for any fluctuation in established trends in the supply chains.





**Fig 1: Establishing Resilient Supply Chain**

## 5.2 Early Warning System (EWS)

Organization shall build, establish, and operate an Early Warning System (EWS), however named. EWS thus established shall monitor products and fluctuations in price, supply and demand, shall identify critical goods that can hamper the smooth operation of the supply chains and capture any abnormal signals in the supply chains. Several factors including efficient use of limited resources, possible disruptions to the entire supply chain due to issues with small insignificant products, other internal and external factors etc can be considered.

### 5.2.1 Data collection

The data generated in operating the EWS shall be collected and analysed for any short term or long term supply chain vulnerabilities. The data may be collected from any source available, domestic and/ or international. The data shall be collected for each sector and good.

The use of IT, Artificial Intelligence and machine learning tools may be used to capture and study any deviation in complex supply chain ecosystem in real time and predict disruptions. Organizations shall employ and standardise the type and formats for data collection.

### 5.2.2 Data analysis

The data thus collected shall be analysed for any deviation/ disruptions and action shall be taken accordingly. The analysis may be done by segregating each sector and /or good on the basis of disruptions detected in the supply chain system. Different identifications criteria for sectors and/or goods may be used for the detected disruption.

**Note:** The traffic light system may be used for Analysis of the data.

**Green light:** Supply chains are functioning normally, or only minimal signs of disruptions are observed.

**Yellow light:** Disruptions have been detected, and situation may evolve into supply chain risk.

**Red light:** Disruptions to supply chains are being observed, situation has been turned/ likely to turn into a full-fledged supply chain risk.

### 5.2.3 **Legal backing for EWS**

Organization shall establish a legal framework and identity for EWS. In places where such identity or framework already exists, EWS may be established accordingly. In case framework or identity is yet to be established for EWS, action shall be accordingly taken by the organizations.

## 5.3 **Establish crisis response mechanism**

Organization shall plan and establish a list of measures that can be taken in case of supply chain disruptions. A crisis response mechanism shall be established to identify and respond to any crisis in supply chains. Other similar organizations at other places may be also involved in establishing a joint/ collective crisis response mechanism. Such joint/ collective crisis response mechanism will enable prompter and more efficient responses to a crisis.

### 5.3.1 **Short term response**

Organization shall identify, develop and maintain short term crisis response mechanism. Such short term crisis response may include, but not limited to, actions on fast track clearances, customs clearances, adjusting tariffs, actions for stopping stockpiling and cornering of goods, modifications in regulations etc.

### 5.3.2 **Long term response**

In addition to short term responses, organizations shall identify, develop and maintain long term crisis response mechanism. Such long term crisis response may include, but not limited to, actions on increasing production capabilities, development of regulations, etc.

## 6.0 **Communication**

The organization shall establish, implement, and maintain internal communication between the various levels and functions of the organization and external communication with its supply chain and other partner entities and stakeholders. The organization shall adopt and integrate a national or regional risk or threat advisory system or equivalent into planning and operational use. Such a system shall be able to:

- a) assure availability of the means of communication during a crisis situation and disruption;
- b) facilitate structured communication with immediate and emergency responders;
- c) assure the interoperability of multiple responding organizations and personnel; and
- d) record vital information about the incident, actions taken, and decisions made.

The documents shall be maintained.



## **6.1 Communication link with stakeholders and other parties**

The organization shall establish, implement, and maintain a formal and documented communication and consultation process with stakeholders and supply chain partners. Organization shall share intelligence with its supply chain and other partner entities and stakeholders and alert them in case of any disruptive incident. The organization shall ensure that interests of stakeholders, as well as dependencies and linkages within the supply chain are understood and clear.

## **6.2 Data sharing**

The organizations shall share any available data about any potential and actual supply chain disruptions identified in the monitoring process. Any data collected and analysed by the organization (see 5.1, 5.2) that may have any impact on supply chain disruption shall be shared with other partner entities and stakeholders. Data related to forward procurement schedule may also be shared for upcoming significant procurement of critical goods.

### **6.2.1 Trade and customs data**

Organizations shall share data related to trade and customs with other partner entities and stakeholders on regular basis. Such data sharing may include information on regulatory decisions that may potentially impact the supply chains of critical goods.

## **6.3 Information sharing**

Organizations shall also share information at the organization-to-organization level related to supply chains of critical goods. Organizations shall establish a common contact point in organization for such information sharing. Information on advance procurement schedules may also be shared by the organization.

### **6.3.1 Information on regulatory decisions**

Organizations shall Information on regulatory decisions that may potentially impact supply chains of critical goods shall also be shared with other partner entities and stakeholders.

## **7.0 Planning the Supply mechanism**

Organizations shall plan supply chain mechanism, including logistics, that may hamper supply chains of critical goods. The planning shall consist of, but not limited to, logistics and labour issues.

### **7.1 Alternate transport mechanisms**

Organizations shall plan for alternate transport mechanism in advance in case of disruptions in logistics and supply chains of critical goods. Such alternate transport

mechanism may be planned for land, air and water routes, including for international and local logistics.

## **7.2 Role of workers**

Organizations shall ensure availability of trained and sufficient manpower (workers) for ensuring uninterrupted working of supply chains.

### **7.2.1 Labour rights**

Organizations shall promote implementation and enforcement of labour rights in supply chains. Organization shall also take actions to improve health, safety and resilience of workers for efficiency, productivity, sustainability and fairness. A work force committee may also be established to identify the worker's priorities.

### **7.2.2 Capacity building**

Organizations shall train the workers and ensure their qualification and skill is appropriate for the given task in the supply chains. If required, organizations shall plan to certify the workers in the supply chains of critical goods.

## **7.3 Stress testing of supply chain**

Organizations shall plan and stress test their supply chains and logistics for any resilience and other long term measures. Such testing may be done in consultation with firms providing critical goods, and shall be performed periodically involving participants from other partner entities and stakeholders. The result of stress test could be based on data and modelling of participating firms.

## **8.0 Preventive actions**

Organizations shall take preventive actions in order to prevent disruptions in logistics and supply chains of critical goods. Such preventive actions shall be planned activity and shall be undertaken at regular intervals.

ANNEX A  
COMMITTEE COMPOSITION  
Management and Productivity, MSD 04

<i>Organization(s)</i>	<i>Representative(s)</i>
International Management Institute, Nagpur	Prof Rajeev Aggarwal ( <i>Chairperson</i> )
Asper School of Business	Prof. Kiran Pedada
Centre for reliability and Diagnostics, Mumbai	Dr. Tarapada Pyne
Cubic Turnkey Private Limited	Shri Tejas Sura
Directorate General, Factory Advice and Labour Institutes (DGFASLI)	Shri Satyendra Singh
International Management Institute, Nagpur	Dr. B. A. Metri
Indian School of Business, Hyderabad	Prof. Chandan Chowdhary Prof. Pratap Sunder ( <i>Alt.</i> )
Indian Institute of Materials Management, New Delhi	Shri V. K. Jain
International Institution of Technology and Management	Shri V. K. Gupta
Indian Institute of Management, Mumbai	Prof. Ruchita Gupta Prof. Milind Akarte ( <i>Alt.</i> )
IIM Shillong	Dr. Naliniprava Tripathy
Microsoft Corporation India Pvt. Ltd., New Delhi	Shri Samik Roy Shri Dhiraj Gyani ( <i>Alt.</i> )
National Productivity Council, New Delhi	Shri N. K. Chanji Shri Kumud Jacob Lugun ( <i>Alt.</i> )
Ordnance Factory Board, Kolkata	Dr. Onkar. S. Mondhe, IOFS (PM) Dr. H. S. Negi ( <i>Alt.</i> )
Siemens Ltd., Maharashtra	Shri S. Venkatesh Shri Manoj Belgaonkar ( <i>Alt.</i> )
In personal capacity, New Delhi	Shri Divakaran P. Kaiprath
In personal capacity, New Delhi	Prof. Ved Prakash
In personal capacity, [(RPS) DDA Flats, Sheikh Sarai Phase-I, New Delhi - 110007]	Ms. Renu Sharma
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Shri Ashish V Urewar,  
Scientist 'D' (Management and Systems), BIS