

STAMPEDES AND DISASTER MANAGEMENT

“anything that can go wrong, will go wrong” Murphy’s Principle



DR W G PRASANNA KUMAR

PROFESSOR AND HEAD

CLIMATE AND DISASTER MANAGEMENT

DR MCR HRD INSTITUTE



Crowd Movements



Dangerous Crowding

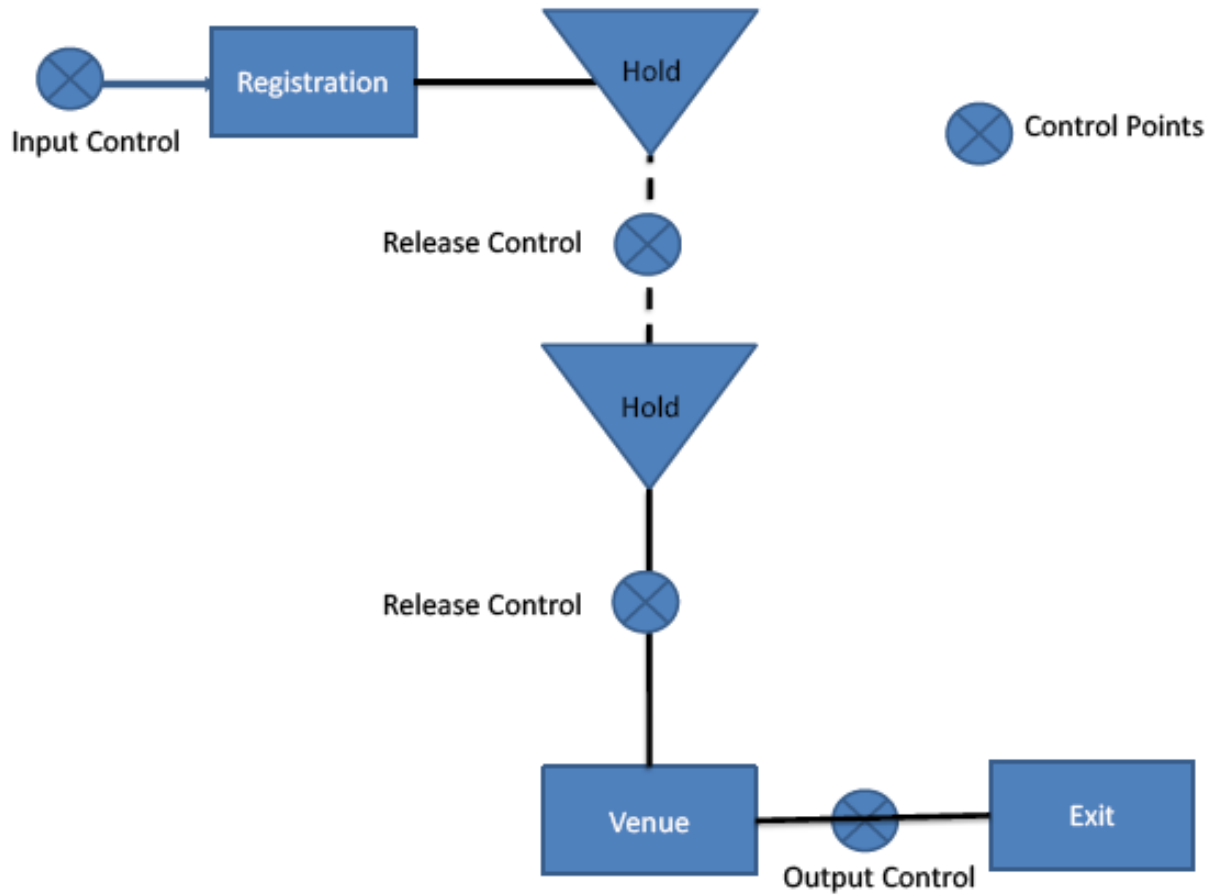


Infiltration, pass through, social group

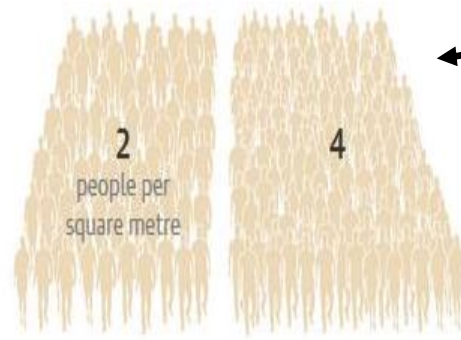


Attractions

Crowd Control

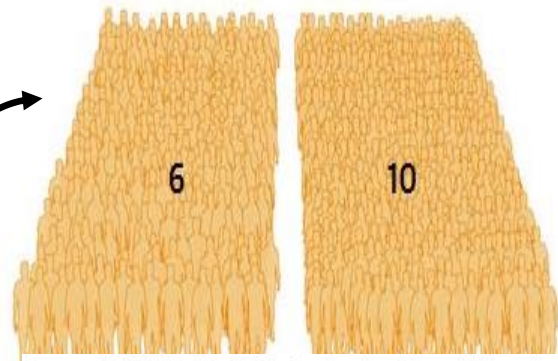


Risk of accident in moving crowds



Low Risk:
Enough space to make decisions and move accordingly.

High Risk:
Tightly pack, no longer choose where y go and start behaving as a fluid.



Source: Keith Still; Fire Safety Engineering Group, University of Greenwich

People are squeezed to such an extent that y no longer inflate their lungs, and die of compressive asphyxiation.

Open air Events and Venue consideration

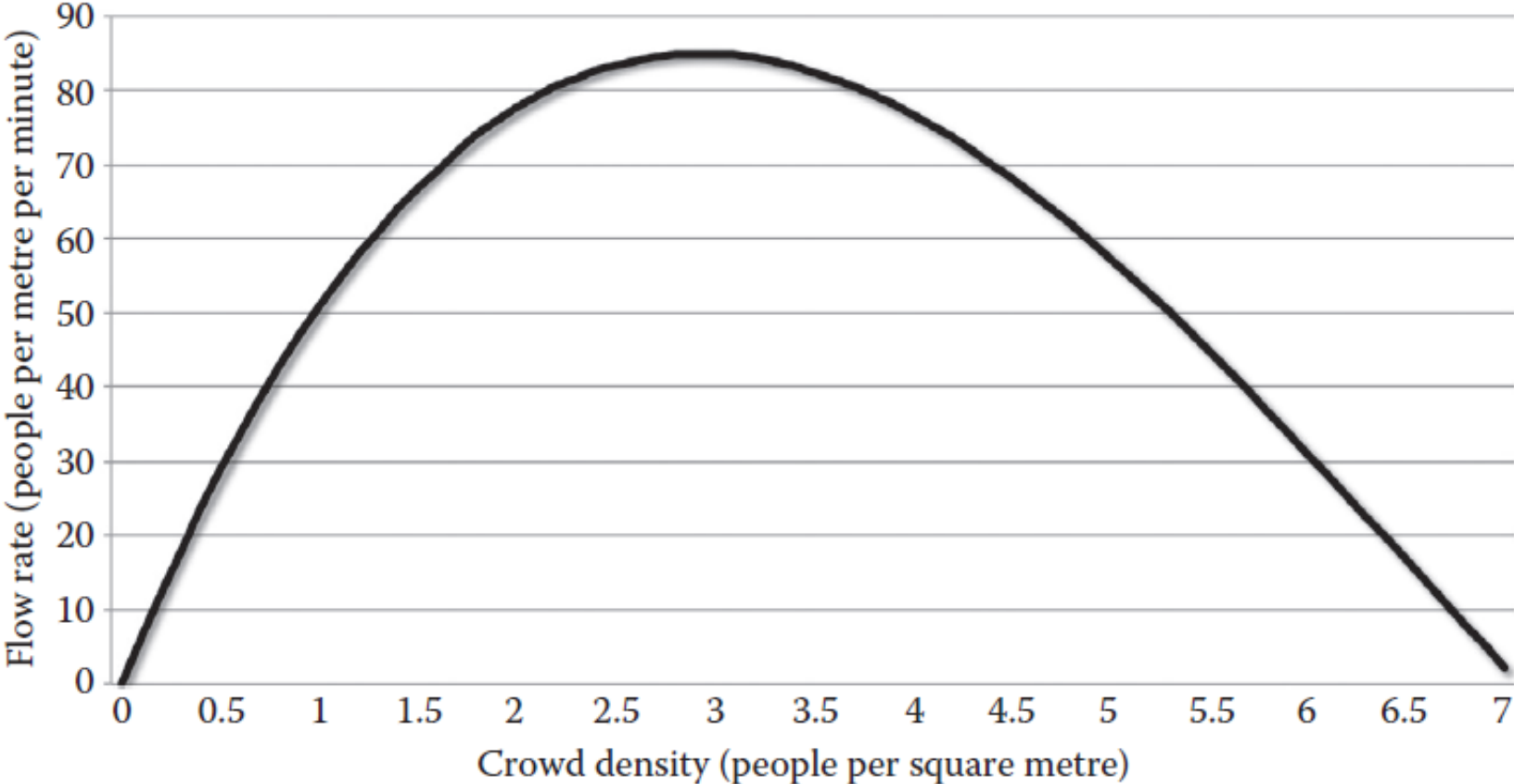
Risk Type	Time
<i>Higher</i>	<5 minutes
<i>Normal</i>	>5 <10 minutes
<i>Lower</i>	<10 minutes

(Source: fire safety risk assessment)

Occupied Area Type	Density (m²/P)
Standing Spectator	0.3
Assembly area/ Dance floor	0.5
Dining area/restaurent	1
Sports Area	2
Display gallery	5
Camping	6
Sales	2

State of queuing	Flow Rate	Average space taken	Density (P/m²)
Free Flow	<=49	>0.65	1.54
Constant	>49 <66	<0.65 >0.28	>1.54 <3.27
Congestion	>66 <82	<0.28 >0.19	>3.27 <5.26
Stampede	>=82	<=0.19	>=5.26

Crowd density versus flow rates



Problem Areas

- Inward Bus Stands
- Outward Bus Stands
- In Bus Stands
- Railway Stations
- Base Camps
- Enroutes
- Event Venues
- Ghats
- Pindapradanam Locations
- Temples
- Tourist Places



Risky



Before Stampede



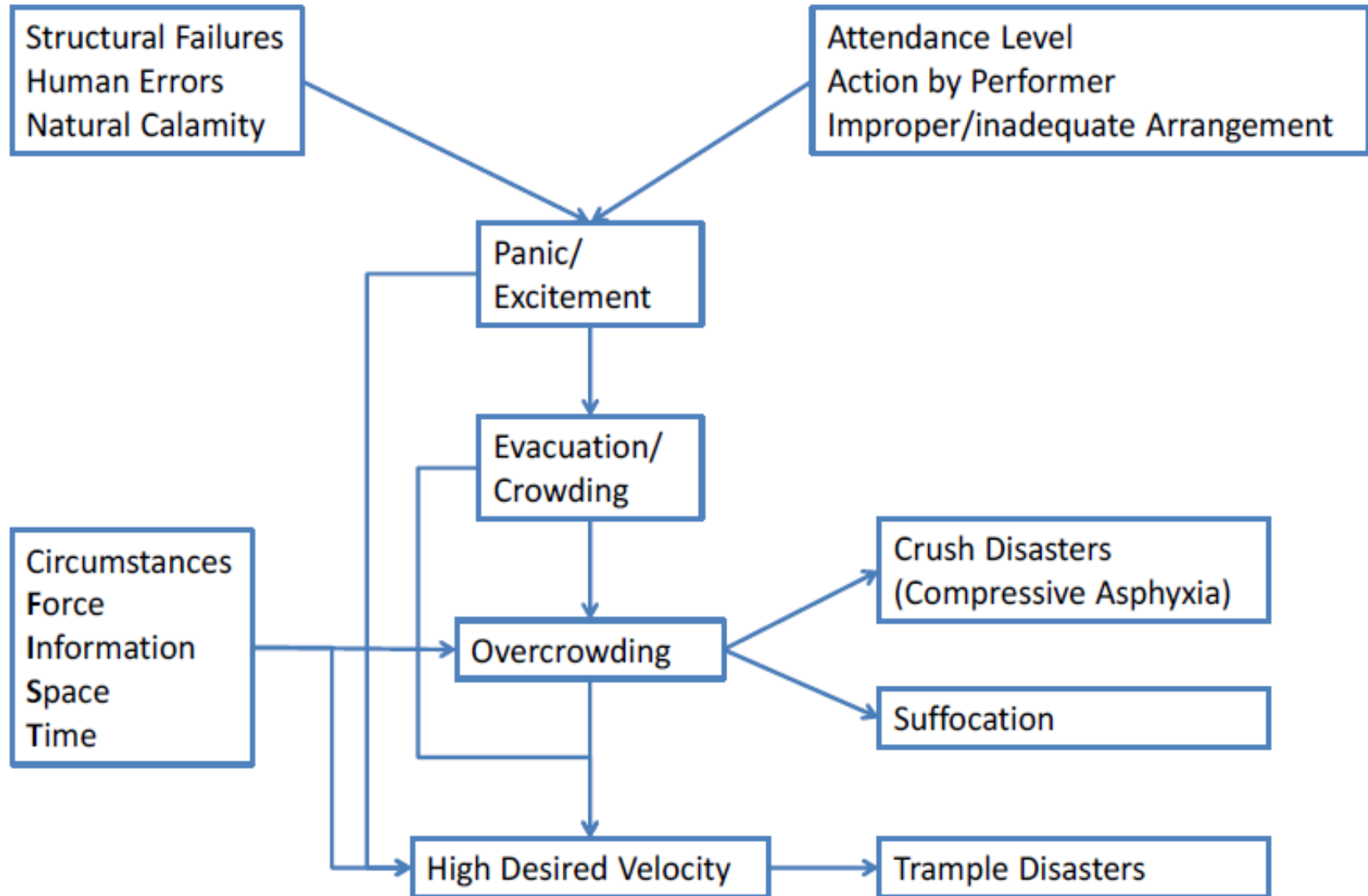
Before Stampede



Before Stampede



Crowd Disaster Process



Source and Destination



Inside Outside



After Stampede



After Stampede



After Stampede



After Stampede



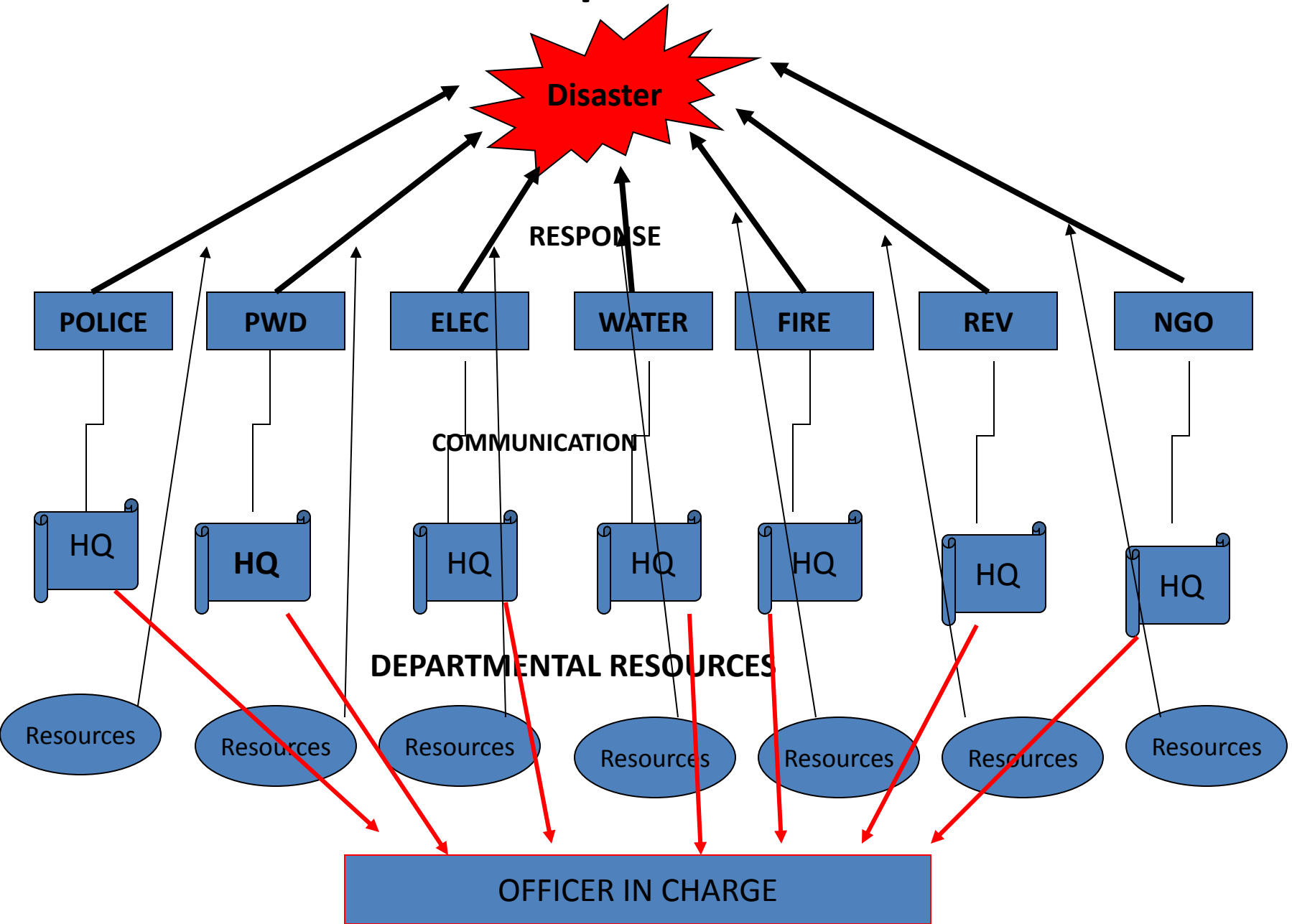
After Stampede



After Stampede

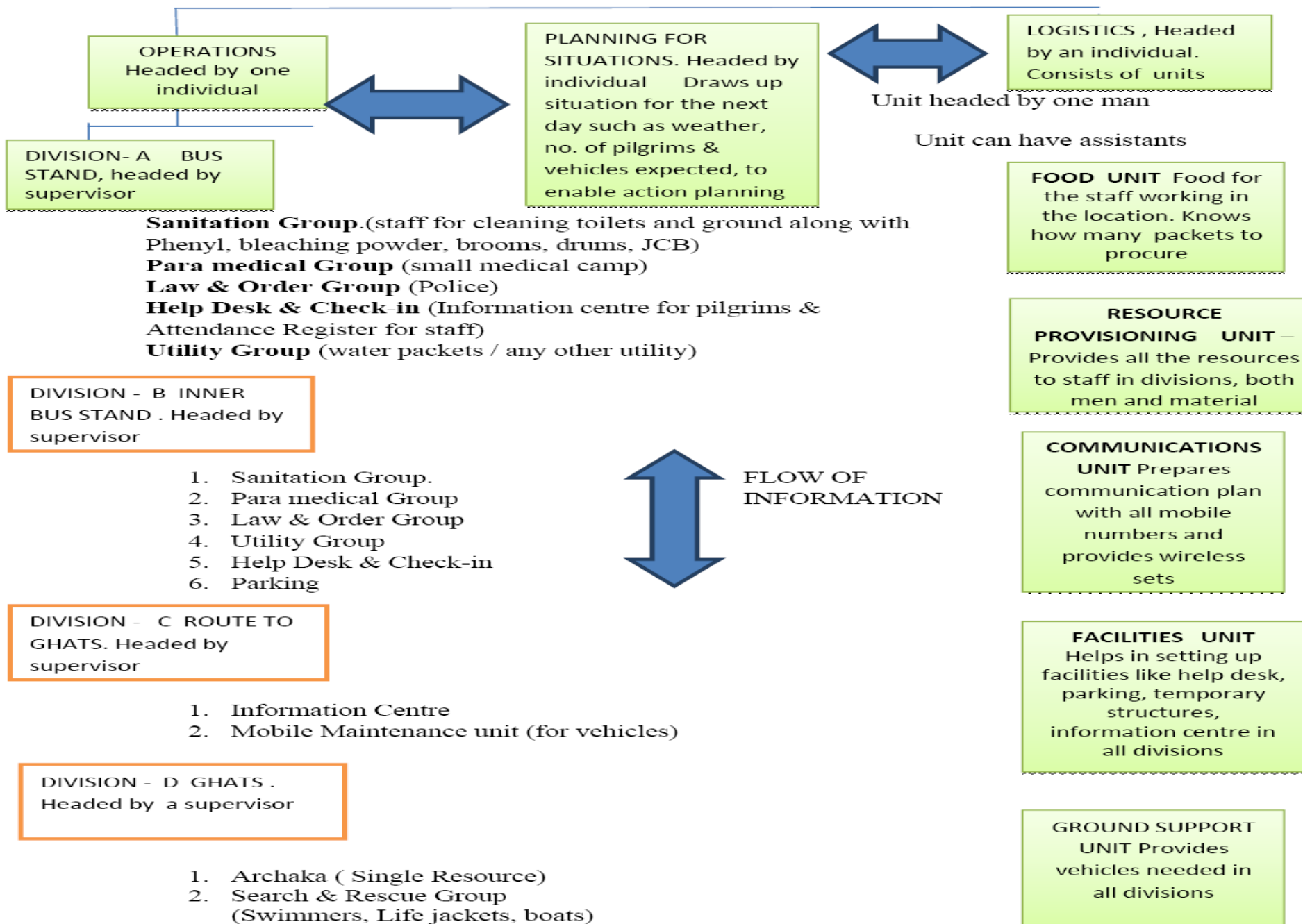


Present Response to Disasters

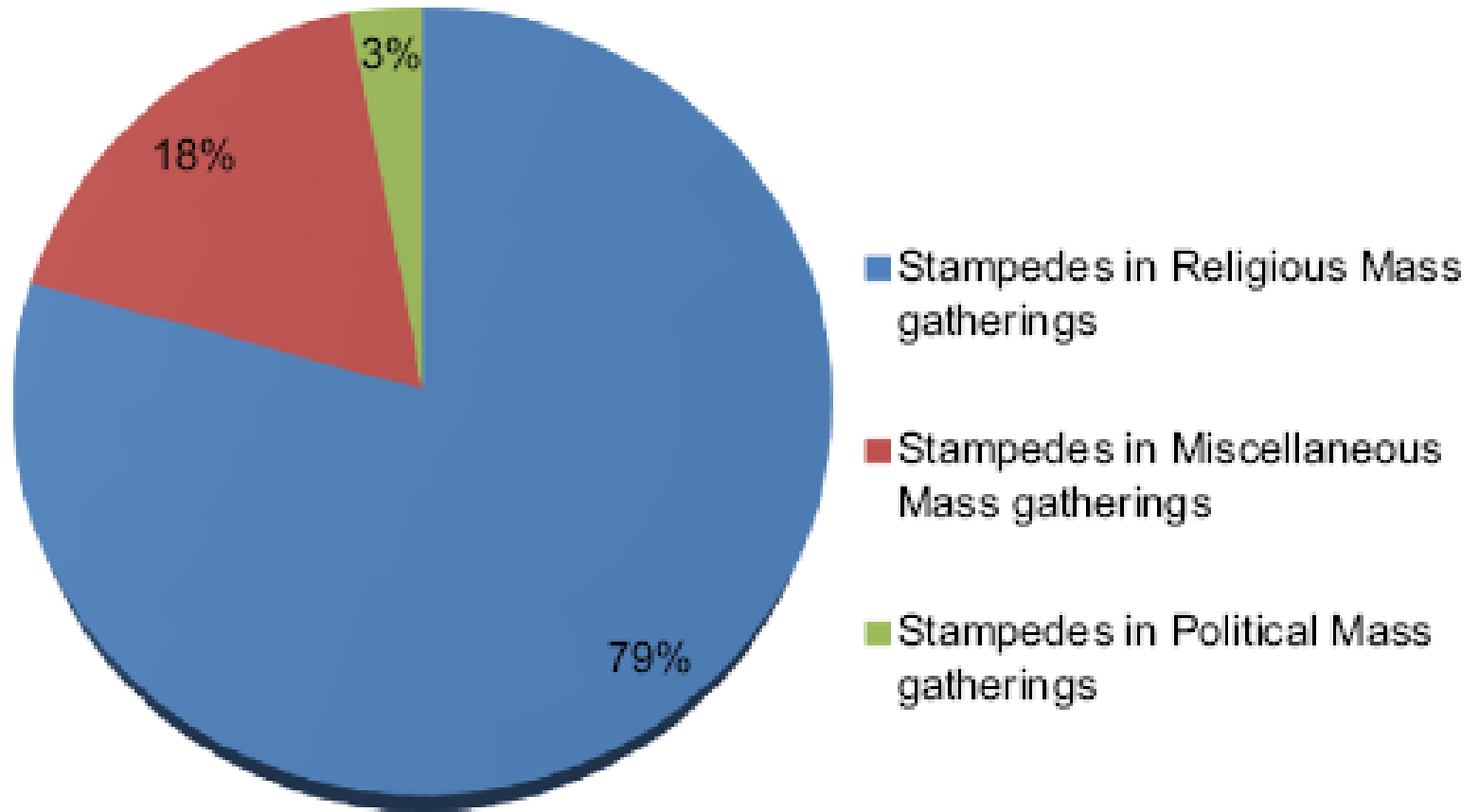


INCIDENT RESPONSE SYSTEM FOR GODAVARI PUSHKARAM

Godavari Pushkaram: The Team at Each Location



STAMPEDES AND DEATHS IN INDIA



Crowd Management

Short Comings in Crowd Management	Crowd Management Capacity Building
Inefficient deployment of staff and resources	Systematic and complete planning process
Unclear chain of command and supervision	Clear cut chain of command
Missing inter-agency coordination	Accountable incident response team members
Adhoc planning, no accountability and no training	Well thought out pre-designated roles for each member of the response team
Improper communication plan	Effective staff and resource management
Lack of orderly risk assessment, infringing into autonomy of systematic planning process, proper communication plan and inefficient use of available resources	System for effectively integrating independent agencies into the planning and command structure retaining concerned agency independence with coordinated communications
No integration of community resources, NGOs and professionals in response effort	Integration of local community resources and people in the response effort

Human Stampede Risk Reduction Framework for Mass Gathering Occurrences

Decision to hold the Event

Event Approval

Risk Assessment

Integrated Planning

Risk Reduction Measures

Event -religious, entertainment, political

Capacity of organizers

Crowd mood and age group

Available resources-estimation

Control room

Event Duration

Expected Crowd size

Spectators and their characteristics

Crowd density monitoring

Live Surveillance

Indoor/outdoor

Site visit

Weather and natural hazards

surge of people management

Venue Layout and sign boards

Location

Safety measures

Analysis of previous accidents

Competition control

Public addressing system

Historical incidents/Facilities

Licensing and permit

Accidents & Intentional acts

Bottle necks release

Emergency Services

Evacuation Plans

Safeguards & barriers

Medical Care Team

Exercise and review

Mass Gatherings

Organized at Same Location

Organized at Different Locations

Religious

Entertainment

Political

Miscellaneous

Annual festival

Special prayer days

Sport events

Celebrity shows

Rally/Procession

At Public Service points

All other

IRS-INCIDENT RESPONSE SYSTEM

Standard Organization Structure

Incident Commander IC

DY IC

INFORMATION OFFICER

LIAISON OFFICER

SAFETY OFFICER

OPERATION SECTION

PLANNING SECTION

LOGISTICS SECTION

STAGING AREA

BRANCHES

AIR OPS BRANCH

DIVISIONS

GROUPS

STRIKE TEAM

TASK FORCE

SINGLE RESOURCE

RESOURCE UNIT

SITUATION UNIT

DEMOBILISATION UNIT

DOCUMENTATION UNIT

TECHNICAL SPECIALIST

SERVICE BRANCH

COMMUNICATION UNIT

MEDICAL UNIT

FOOD UNIT

SUPPORT BRANCH

SUPPLY UNIT

FACILITIES UNIT

GROUND SUPPORT UNIT

FINANCE & ADMIN SECTION

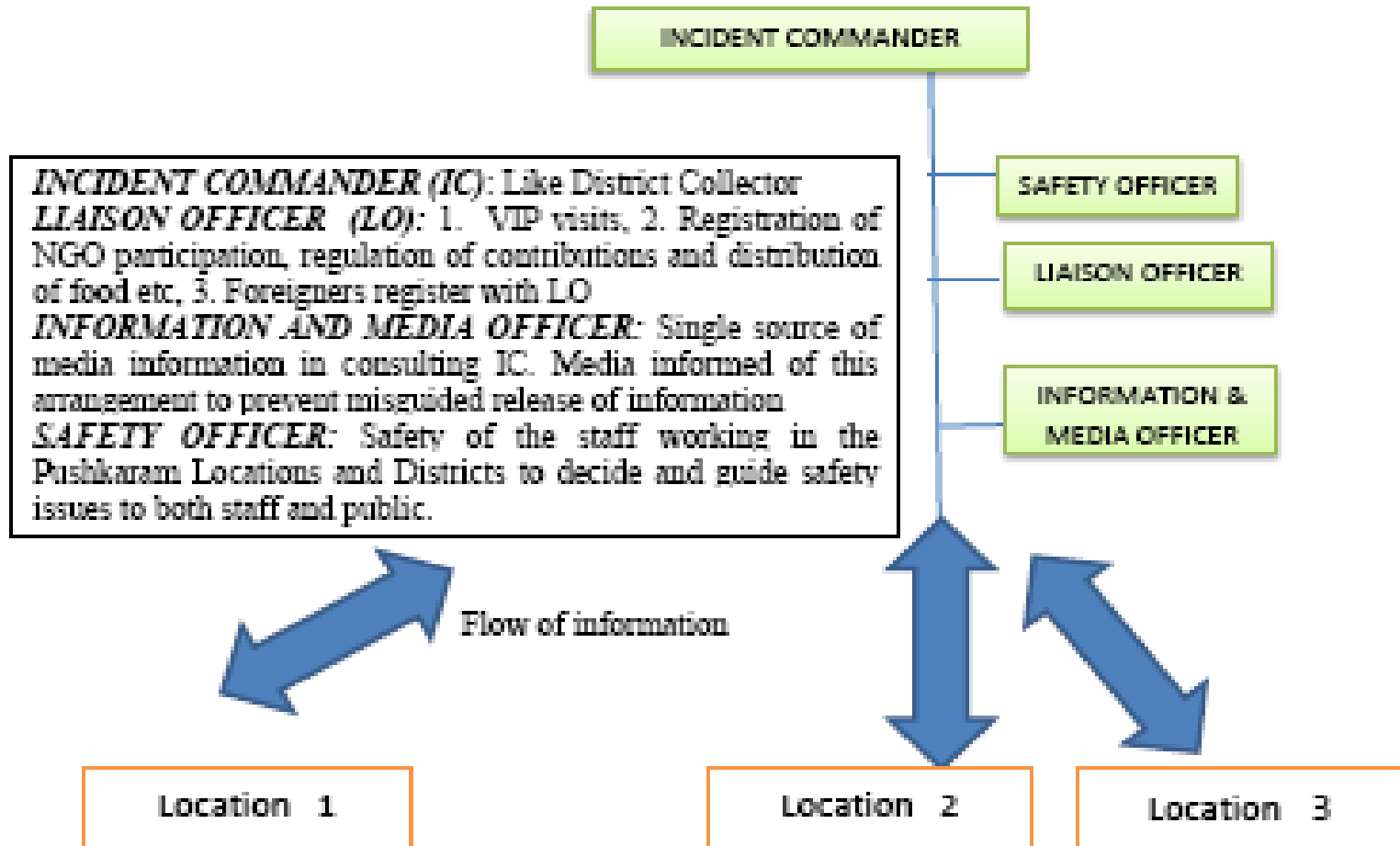
TIME UNIT

COST UNIT

PROCUREMENT UNIT

CLAIMS & COMPENSATION UNIT

Incident Response System At the District Level



Organisation of Pushkaram IRS

- Incident Commander (Collector/JC)
- Intelligence Officer (SP/ADDL SP/Police)
- Liaison Officer (DRO)
- Information and Media Officer (PRO)
- Safety Officer (Fire)
- Deputy Incident Commander (JC/RDO)
- Operation Section (SP)
- Planning Section (DIG/ Addl SP)
- Logistics Section (PD DRDA/Mpl Commr)
- Admin Section (DRO)

IRS Staffing

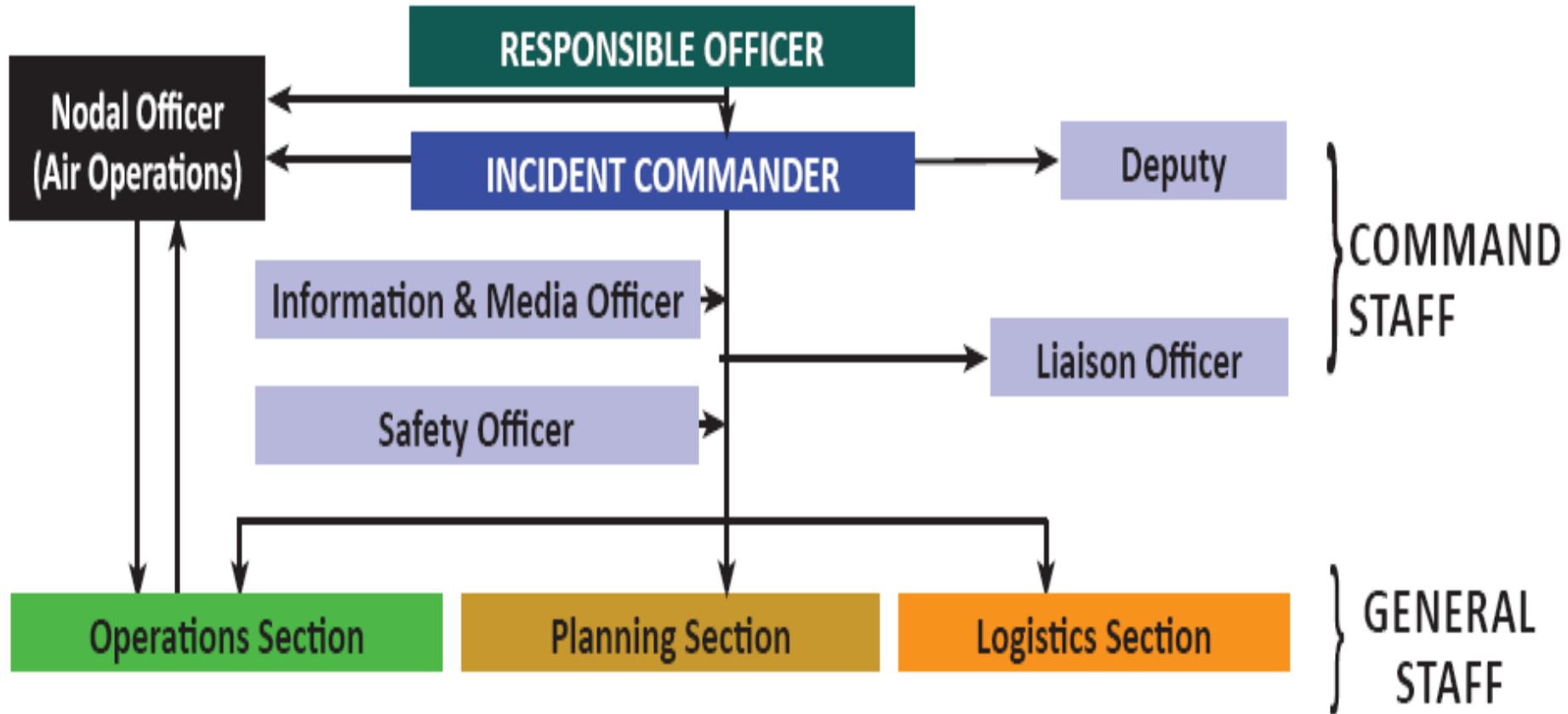
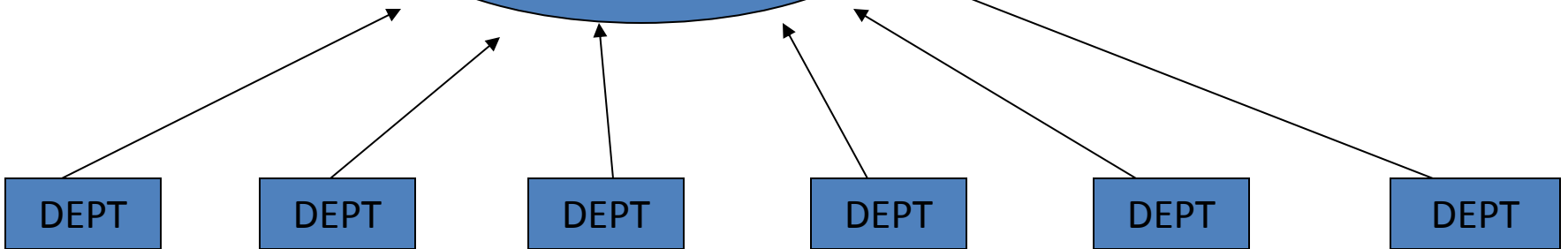
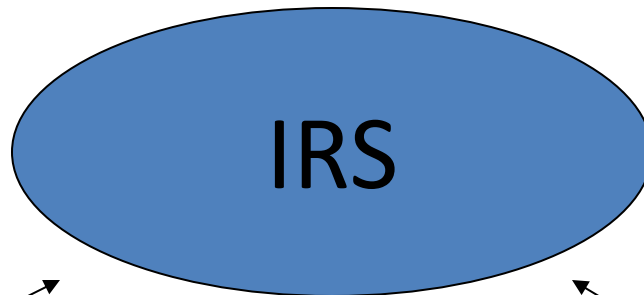
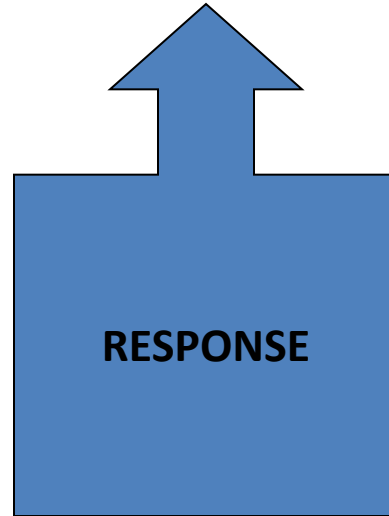


Fig. 1. IRS Organization

RESPONSE THROUGH IRS



IRS: Standard Organization Structure

Incident Commander

DY IC

INFORMATION OFFR

LIAISON OFFR

SAFETY OFFR

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PLANNING SECTION

LOGISTICS SECTION

STAGING
AREA

BRANCHES

AIR OPS BR

DIVISIONS

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RESOURCE

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SITUATION
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DEMOBILISATION
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DOCUMENTATION
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TECHNICAL
SPECIALIST

SERVICE
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