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AIRCREW AUTOMATED
ESCAPE SYSTEMS(AAES)

INVENTORY

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DATA ANALYSIS PROGRAM
SYMPOSIUM

VOL. III

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**AIRCREW AUTOMATED ESCAPE SYSTEMS
(AAES)**

**DATA ANALYSIS PROGRAM
SYMPOSIUM**

VOL III

(COPIES OF VISUAL PRESENTATION AIDS & ADDITIONAL INFORMATION)

Presented by:

**NAVAL AIR SYSTEMS COMMAND
NAVAL SAFETY CENTER
NAVAL WEAPONS ENGINEERING SUPPORT ACTIVITY**

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**6,7,8 OCTOBER, 1981
NAVAL SAFETY CENTER
NORFOLK, VIRGINIA**

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(AAES)**

**DATA ANALYSIS PROGRAM
SYMPOSIUM**

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NAVAL SAFETY CENTER
NORFOLK, VIRGINIA**



DEPARTMENT OF THE NAVY
NAVY SAFETY CENTER
NAVAL AIR STATION
NORFOLK, VIRGINIA 23511

IN REPLY REFER TO:

122:gc
3750
Ser 4223
& September 1981

From: Commander, Naval Safety Center
To: Distribution

Subj: Automated Airborne Escape Systems (AAES) Symposium

Encl: (1) Agenda for subject symposium

1. At the request of the Chief of Naval Operations and with the cooperation and support of Commander, Naval Air Systems Command, Commander, Naval Safety Center, will co-host a two-day symposium to review selected topics associated with Automated Airborne Escape Systems (AAES).
2. The symposium will be held at the Naval Air Station, Norfolk, Virginia, on 6, 7 and 8 October 1981. The symposium's format will consist of informative presentations, 30 - 40 minutes in length, followed by open question-and-answer periods. Representatives of the Naval Air Systems Command (Aircrew Systems Division), Naval Weapons Engineering Support Activity (Systems Analysis), and the Naval Safety Center (Aviation Directorate) will present results of selected studies conducted for the purpose of evaluating or monitoring AAES usage, performance and/or maintenance trends. Source data has been derived from historical mishap data files maintained by the Naval Safety Center.
3. The identification, assessment and effective resolution of problem areas related to the effective use, maintainability and operation of AAES has been and will continue to be a major objective of the Navy. Systematic analysis of long-term mishap data is one approach to identifying reliability and maintainability degradation trends, as well as potential system deficiencies. The utility of such analyses in escape system design, acquisition and modification processes is considered to have significant value to both industry and DOD organizations having a direct interest in AAES and their subsystems.
4. The proposed agenda, enclosure (1), is provided for your interest and review. If your organization desires representation at the AAES symposium, please provide names, grade/rate (as appropriate), social security numbers, job title, and security clearance to this Command no later than 15 September 1981. Additional information on approved agenda, time schedule, conference location and travel directions will be forwarded. Due to space limitations, each organization/command will be limited to no more than three representatives.

5. Naval Safety Center points of contact are: CDR V. Voge (Code 14, Autovon 690-7341) and LCDR R. Moe (Code 122, Autovon 690-3494). COMNAVAIRSYSOOM/
NAWESA points of contact are: Mr. F. Guill/Mr. C. Stokes (Autovon 288-3621 or Commercial 202 433-3621).

J. C. Steele
T. C. STEELE

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GENERALDYNAMICS
APPLIED COMBUSTION TECHNOLOGY
MANTECH INTERNATIONAL CORP

AGENDA DAY 1

0800-0850 Registration
0900-0915 Opening Remarks - Welcome
RADM T. C. Steele
0915-0945 Introduction of Host Reps
Area Orientation
0945-1000 Break
1000-1050 AAES Data System Program Introduction
1100-1150 Review of AAES Use and Non-use
1200-1330 Lunch Break
1330-1420 Through vs Jettison Canopy Injuries
1430-1520 Helmet Retention/Loss Factors

AGENDA DAY 2

0900-0950 Flail/Tumbling Factors
1000-1150 In-Service System Reliability
1200-1330 Lunch Break
1330-1420 Overwater Survivability
1430-1520 Aircrew Size/Anthropometry
1530-1620 Expected Impact of AAES Data System Usage

AGENDA DAY 3

To be used as necessary based on progress
during days 1 and 2

Enclosure (1)

PRESENTATION TOPICS

1. Introduction to AAES Data System Program NAVAIR/NAWESA
Objectives
Interface NAVSAFECEN/NAVAIR
Present Status - Future Plans
Constraints
2. Review of historical use and non-use of AAES NAVSAFECEN/NAVAIR
Results: Survivability
Trends in Usage Rates
Non-survived Ejection Cause Factors
Usage Conditions
AAES non-use trends
Success Criteria
3. Through-canopy vs Jettisoned-canopy Injuries NAVAIR/NAVSAFECEN
Vertebral
Upper-lower limbs
Head/neck
4. Helmet Retention/Loss Factors NAVAIR/NAVSAFECEN
Vertebral Injury
Varying levels of consciousness
Head/Neck Injury
5. Ejection Flail-tumbling Factors NAWESA/NAVAIR
As a function of airspeed
As a function of system design
As a function of Escape initiation method

6. In-service Reliability NAWWESA/NAVAIR
 - Ejections attempted but not accomplished
 - Other failure/malfunction modes
7. Ejection Survivability in Low Altitude Overwater Environment NAVSAFECEN/
NAVAIR
 - . Land vs Water Survival
 - . Overwater Fatalities
 - . Parachute/RSSK Divestment and LPA Inflation Variables
8. Aircrew Restraint Factors NAVSAFECEN/NAVAIR
 - . Negative "G" Environment
 - . Research on "G" Restraint Systems
9. Expected Impact of AAES Data System Program NAVAIR/NAWWESA
 - . Short Range
 - . Long Range

PROPOSED ATTENDEES

U. S. NAVY; Representation from:

OPNAV - 05F, 506N
CHNAVMAT
COMNAVAIRSYSCOM
NAVAIRDEVCON
NAVPENCEN CHINA LAKE
BUMED
MONTEREY
CNET
ONR
NAVAIRTESTCEN
NAVORDSTA
NAMRL PNCLA
NAMI PNCLA
NAVAL BIODYNAMICS LAB
NAVAIREWORKFACS (6)
TYCOM - Safety; Flight Surgeons; Physiologists
OPTEVFOR

USAF; Representation from:

NORTON AFB
WRIGHT PATTERSON AFB
BROOKS AFB
ANDREWS AFB
KELLEY AFB

ARMY; Representation from:

FORT RUCKER
ST LOUIS

NASA

LANGLEY AFB
MANNED SPACE CENTER

CONTRACTORS

PRIME AIRFRAME

Grumman; Boeing; Vought; Douglas; McDonnell; Republic; Fairchild-Miller; Lockheed; Convair; Martin-Baker LTD, U.K.

OTHERS

Teldyne Ryan; Stencel Aero Engineering Corp.; Pacific Scientific; Talley; Biotechnology; Humanoid Systems; Dayton T. Brown; East-West Industries; Explosive Technology; Space Ordnance Systems; Person-System Integration; Advanced Logistics Management Inc.; University of Cincinnati; Wayne State University; University of Southern California

FOREIGN GOVERNMENTS (having similar AAES)

CANADA

GREAT BRITAIN

FEDERAL REPUBLIC OF GERMANY

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05 NOV 1980 PAGE 1 OF 3

ADDRESSEE Director, Naval Weapons Engineering Support Activity Systems Analysis Dept. (ESA-31) Washington Navy Yard, Wash.D.C. 20374		AIRTASK NO. A512-512C/184-4/1512-000-055	AMEND NO.
NAVAIR PROJECT ENGINEER Mr. Frederick C. Guill AV 222-7486		WORK UNIT NO. A5312B-04	AMEND NO.
CODE AIR-531C		EFFORT LEVEL NORMAL	
		CLASSIFICATION OF AT/WRU UNCLASSIFIED	

1. The ~~XXXXXX~~ WORK UNIT ASSIGNMENT described below is assigned in accordance with the indicated effort level and schedule. Funding authorization for ~~XXXXXX~~ will be provided in separate correspondence. If this ~~XXXXXX~~ WORK UNIT ASSIGNMENT cannot be accomplished as assigned, advise the NAVAIR HQ cognizant code. No work beyond the planning phase will be accomplished unless the addressee has funds in hand or written assurance thereof.

2. Cancellation, References and/or Enclosures.

Cancellation: Work Unit A5312B-04 dated 13 Dec 1979 and subsequent amendments under AIRTASK A512-512C/184/0512-000-055 amend. 1.

Encl: (1) NAVAIR Consolidated Priority List - Aircraft Systems Fleet Support Projects 10 October 1980
(2) Schedule

3. Technical Instructions.

a. Title. IDENTIFICATION AND REVIEW OF AIRCREW AUTOMATED ESCAPE SYSTEM (AAES), IN-SERVICE RELIABILITY AND MAINTAINABILITY PROBLEMS

b. Purpose. To establish a systematic investigation of in-service AAES data, such as that contained in the 3-M System, Unsatisfactory Reports, Medical Officer Reports of Aircraft Accidents, and Naval Air Rework Facility Data Systems, to identify for potential corrective action the many daily low-grade problems which contribute to the general lowering of AAES in-service reliability and cause the general worsening of AAES in-service maintainability.

c. Background. At present there exist special arrangements for investigating and correcting spectacular AAES in-service problems, particularly those which cause fatalities. This effort is intended for reviewing the pervasive non-spectacular low-grade AAES in-service reliability and/or a general degradation of AAES in-service maintainability. These problems, vastly overshadowed by the spectacular ones, nonetheless are important, and if left unmonitored and uncorrected, occasionally manifest themselves in fatalities, serious injuries and/or very great difficulties experienced by the ejectee, which under slightly different conditions could have caused serious injuries. Some problems also manifest themselves in increased

SIGNATURE (By Direction COMNAVAIR) <i>W. R. BURRIS</i>	DATE 11/5/80
W. R. BURRIS By direction	
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W.U. A5312B-04
AIRTASK A512-512C/184-4/1512-000-055

maintenance efforts and costs and/or increased hazards to maintenance personnel. Since there at present is no systematic review of in-service AAES data, there is no valid method of identifying AAES in-service problems deserving management attention short of awaiting death, serious injury or major complaints. Thus NAVAIR is forced into a "squeaky wheel" reaction mode of operation versus the more desirable mode of allocating resources based on a continuous analysis of the total AAES in-service experience.

d. Detailed Requirements/Cost Estimates. \$90.0 K for FY-81 in support of applicable projects listed on enclosure (1) Priority List, to be obligated quarterly as follows: first quarter \$30.0 K, second quarter \$30.0 K, third quarter \$30.0 K. Program element - 78012N (O & MN).

Continue establishment of a system for the systematic review of such sources of AAES in-service data as 3-M Systems, Unsatisfactory Reports, Medical Officer Reports of Aircraft Accidents, and Naval Air Rework Facility data systems, in a manner designed to identify and assess the significance of the many commonly occurring in-service problems affecting AAES in-service reliability and maintainability. The system outputs shall be structured to provide data of assistance to NAVAIR Headquarters in the management of the scarce AAES resources; e.g., problems experienced, frequency of occurrence, experience severity, potential severity, and range of activities and/or AAES experiencing the problems. Once established and documented the system(s) can be integrated into regular reporting systems to assure regular, early notification to NAVAIR Headquarters concerning in-service problems being experienced and should assist considerably in the identification of causes and development of remedial actions. In addition, perform specific analytical tasks of high priority as assigned.

e. Detailed Program Plan. Not applicable.

f. Field Activity Contact. Mr. G. Opresko, NAVWESA (ESA-31).

g. Headquarters Technical Support. None.

4. Schedule. See Enclosure (2).

5. Reports and Documentation.

a. Reports.

(1) Upon completion of each task, present data and findings in letter-type reports to NAVAIR Headquarters (AIR-531).

(2) A semi-annual program review shall be held at NAVAIR in February and August with NAVAIR publishing a report of findings in March and September.

W.U. A5312B-04
AIRTASK A512-512C/184-4/1512-000-055

(3) NAVWESA shall report to the Commander, Naval Air Systems Command (AIR-512C) the man years and associated cost, cost of materials, travel and cost of contracts awarded by NAVWESA for this project. This report shall be submitted 1 May 1981 and 1 November 1981 for final status.

b. Requirements for Future Planning Information. Prepare and submit to NAVAIRHQ (AIR-531) for approval, a letter-type project plan. The primary effort shall be for establishment of baseline data to aid in subsequent identification of trends and specific problems. Subsequent tasks shall be for extending previous analytical techniques and data sources investigating efforts to identify specific AAES in-service reliability and maintainability problems.

6. Contractual Authority. Contracts to perform all or portions of the Work Unit are hereby authorized within the funding indicated by the Work Unit cost estimate.

7. Source and Disposition of Equipment. Not applicable.

8. Aircraft Requirements. None.

9. Status of Applicable Funds. Funds for this Work Unit will be provided separately.

10. Security Classification. All prescribed work under this Work Unit is unclassified. In performing the prescribed work, access to information which is classified and/or to areas containing classified equipment may be required. Any reference to such classified material shall be in accordance with the applicable materials security classification. Particularly, reference to information concerning survivability/vulnerability shall be classified in accordance with OPNAVINST. C5513.2A, Encl. (63); OPNAVINST. S5513.8, Encl. (7).

Copy to:

Addressee (3)
NAVMATDATASYSGRU, Morgantown, W.Va. 26505
NAVAIRDEVCCEN (CSD), Warminster
NAVAIRTESTCEN (SY-70), PAXRIV
NAVORDSTA (Code 5123), Indian Head
- NAVORDSTA (Code 515), Indian Head
NAVWPNCEN, China Lake (Code 64)
NAVSAFECEN, Norfolk
COMNAVAIRPAC, North Island
CGFMFLANT
CGFMFPAC
NAVPLANTREPO, Bethpage
NAVPLANTREPO, Dallas
NAVPLANTREPO, Burbank
NAVPLANTREPO, Long Beach
AFPRO, St. Louis
DCASMA (DCRA-GACB), Marietta

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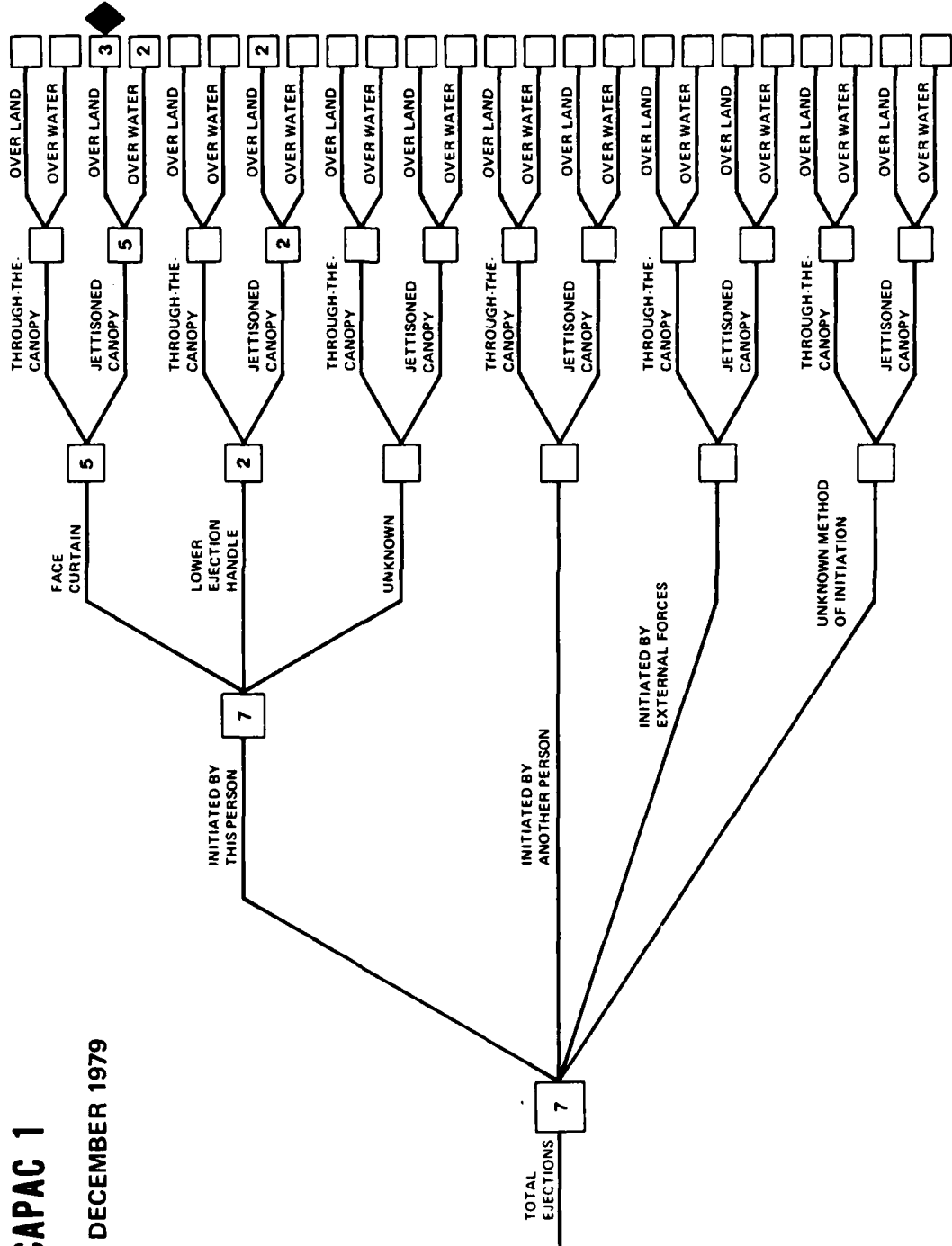
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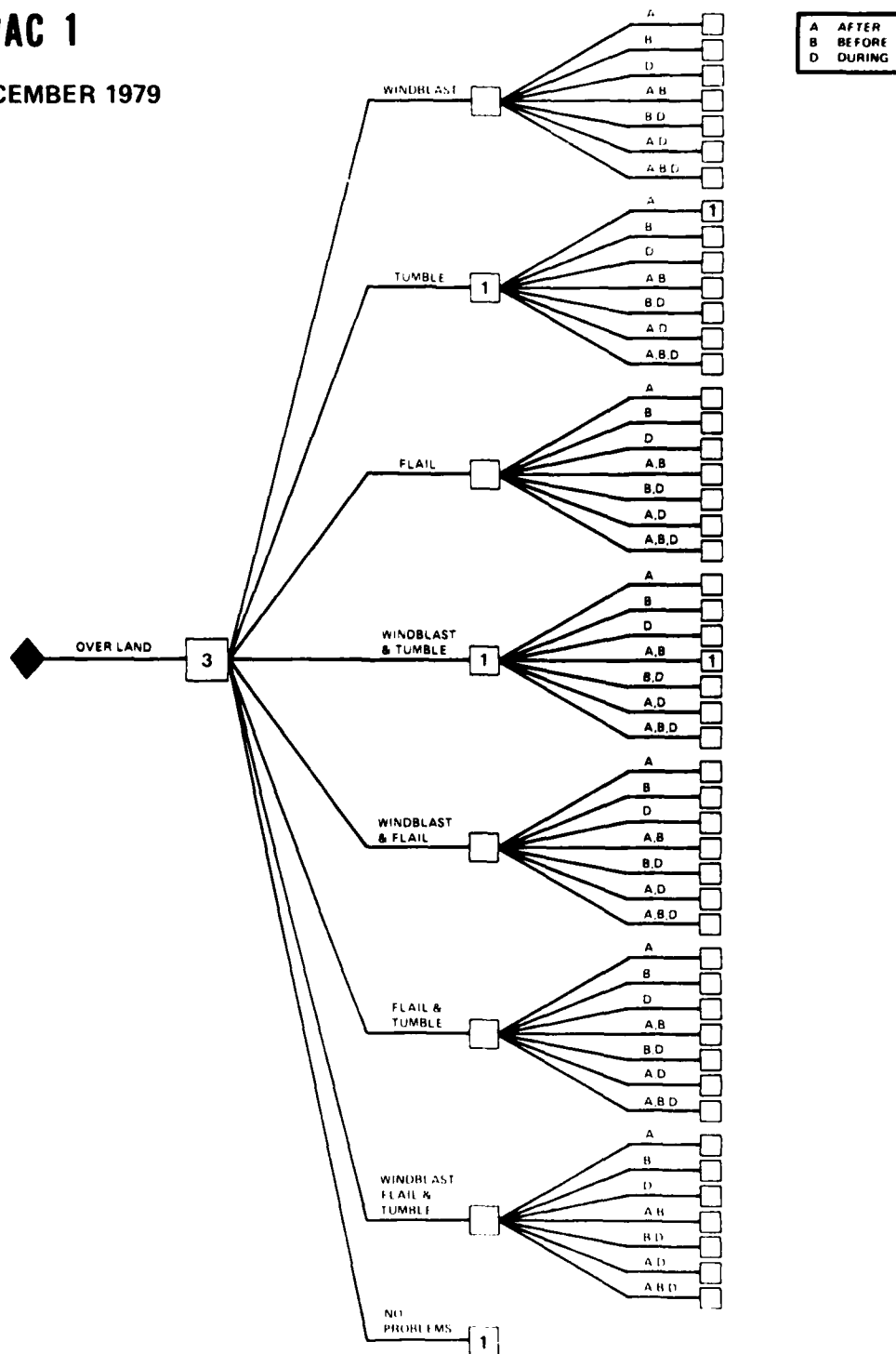
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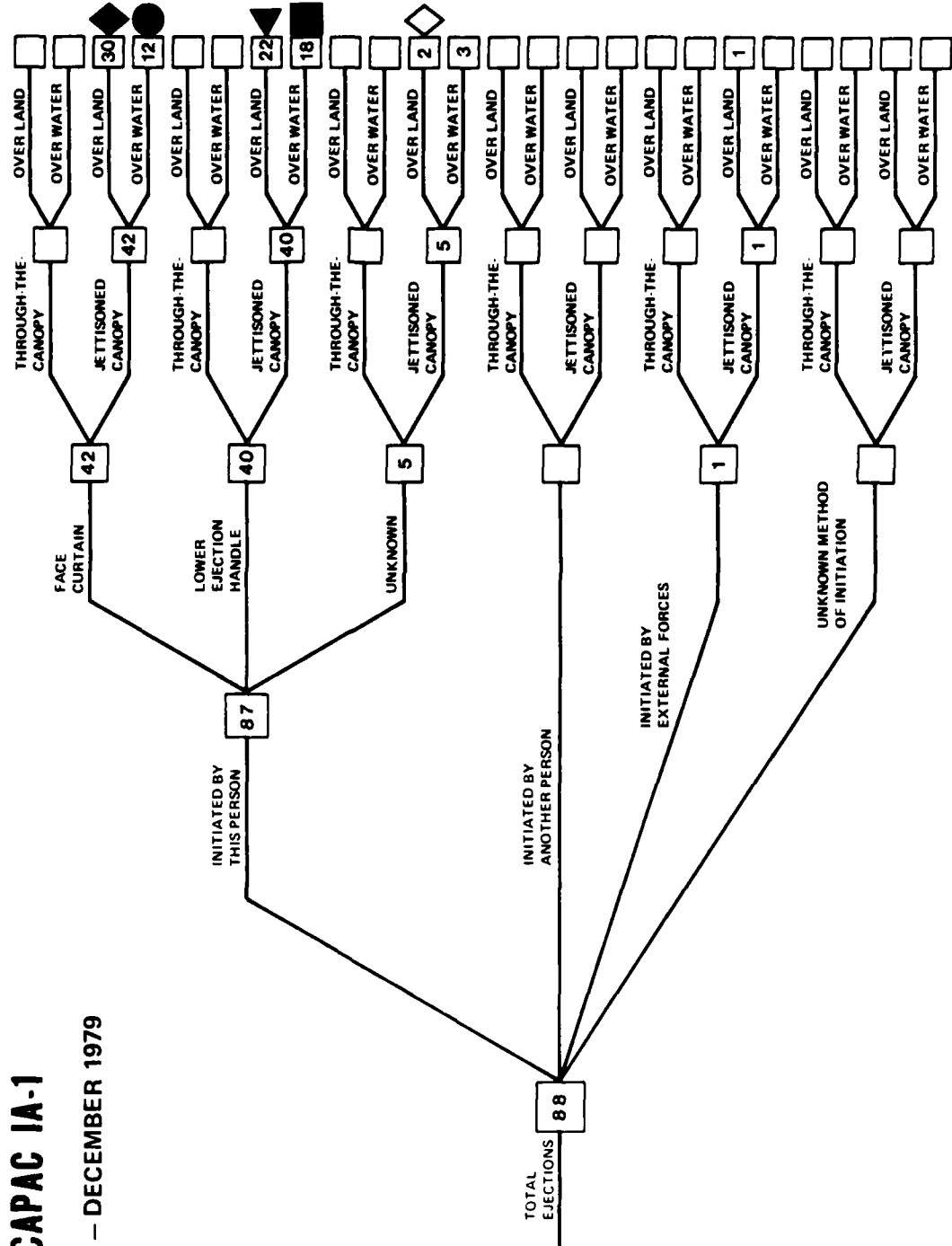
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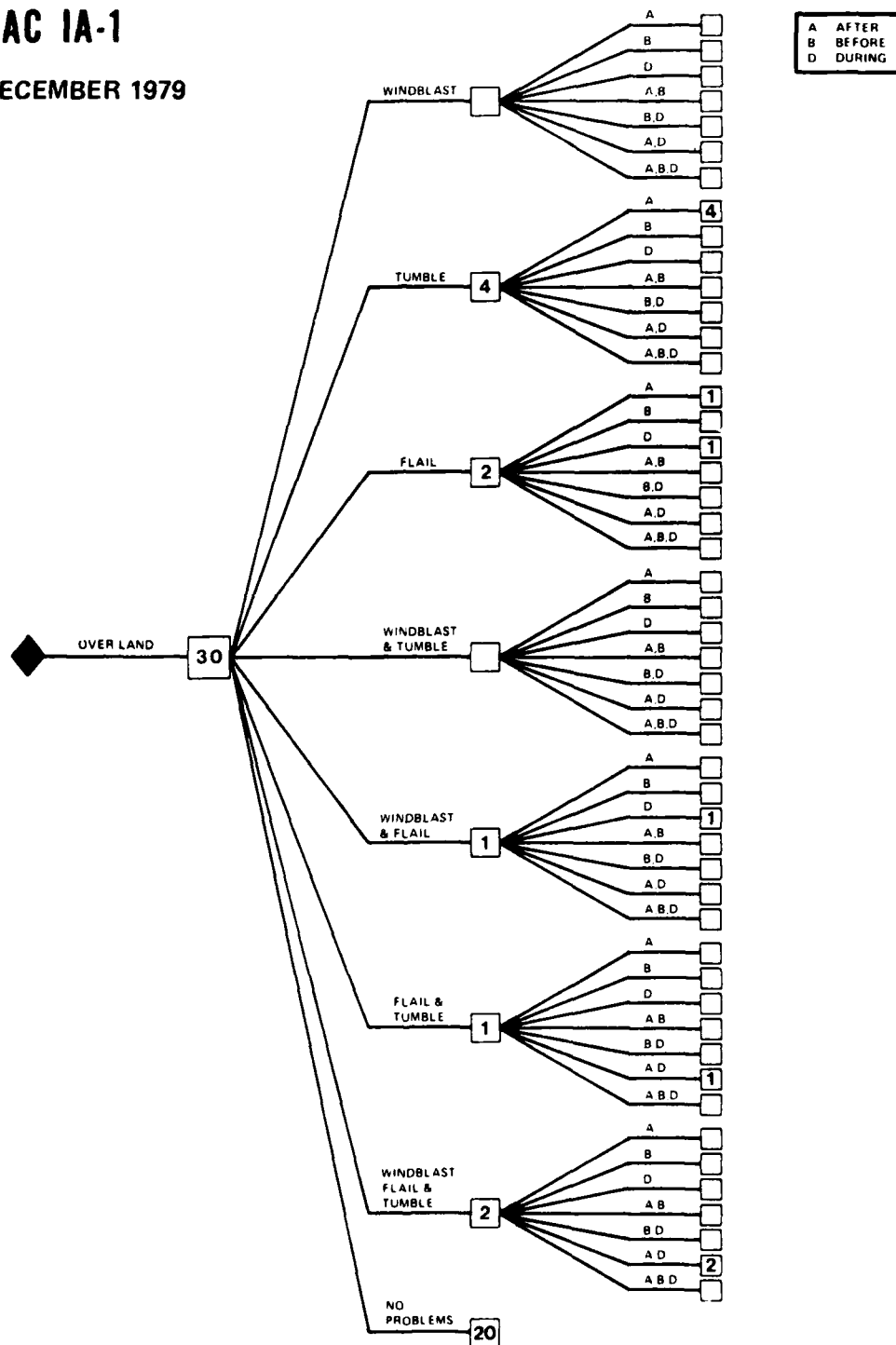
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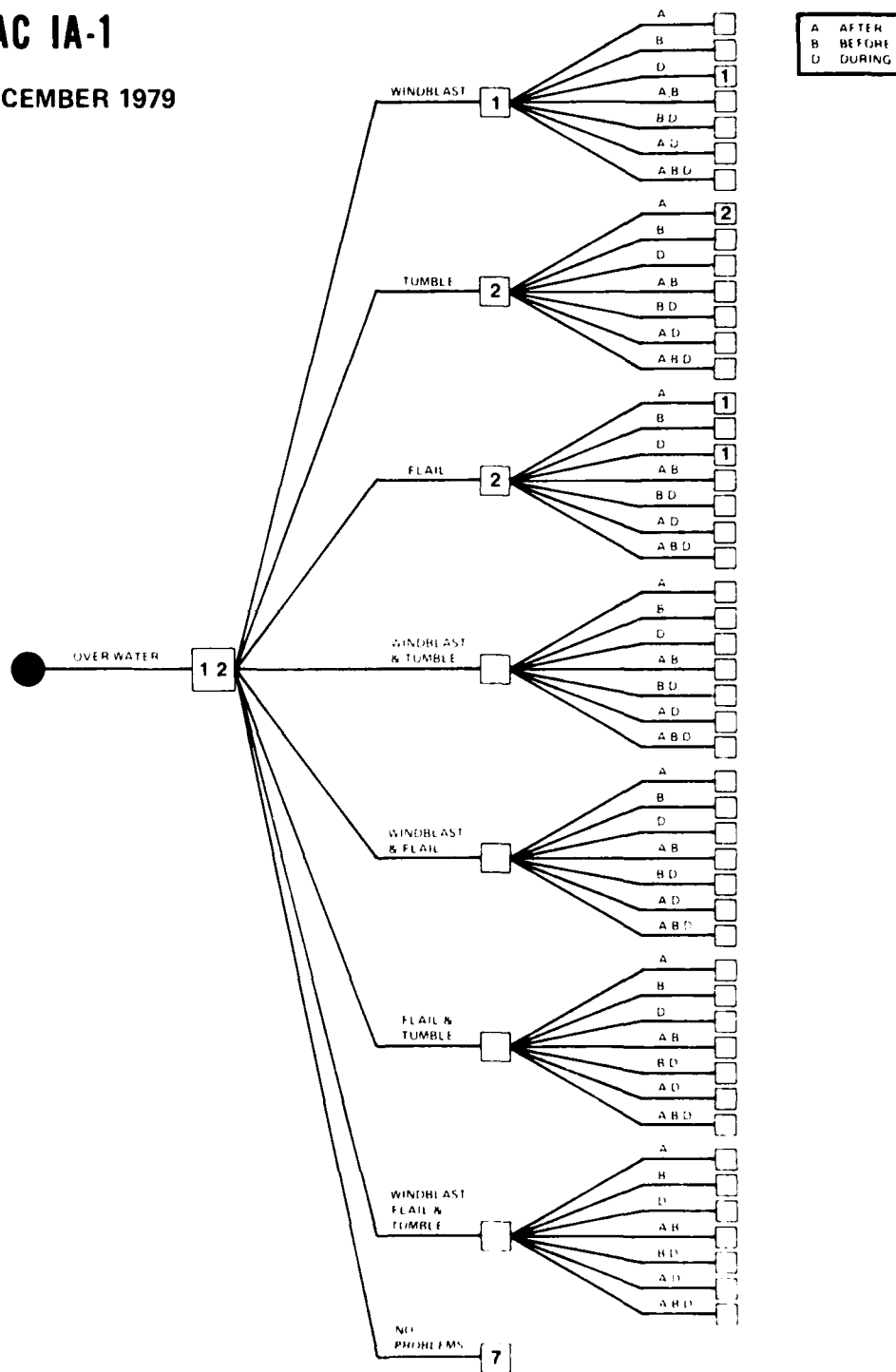
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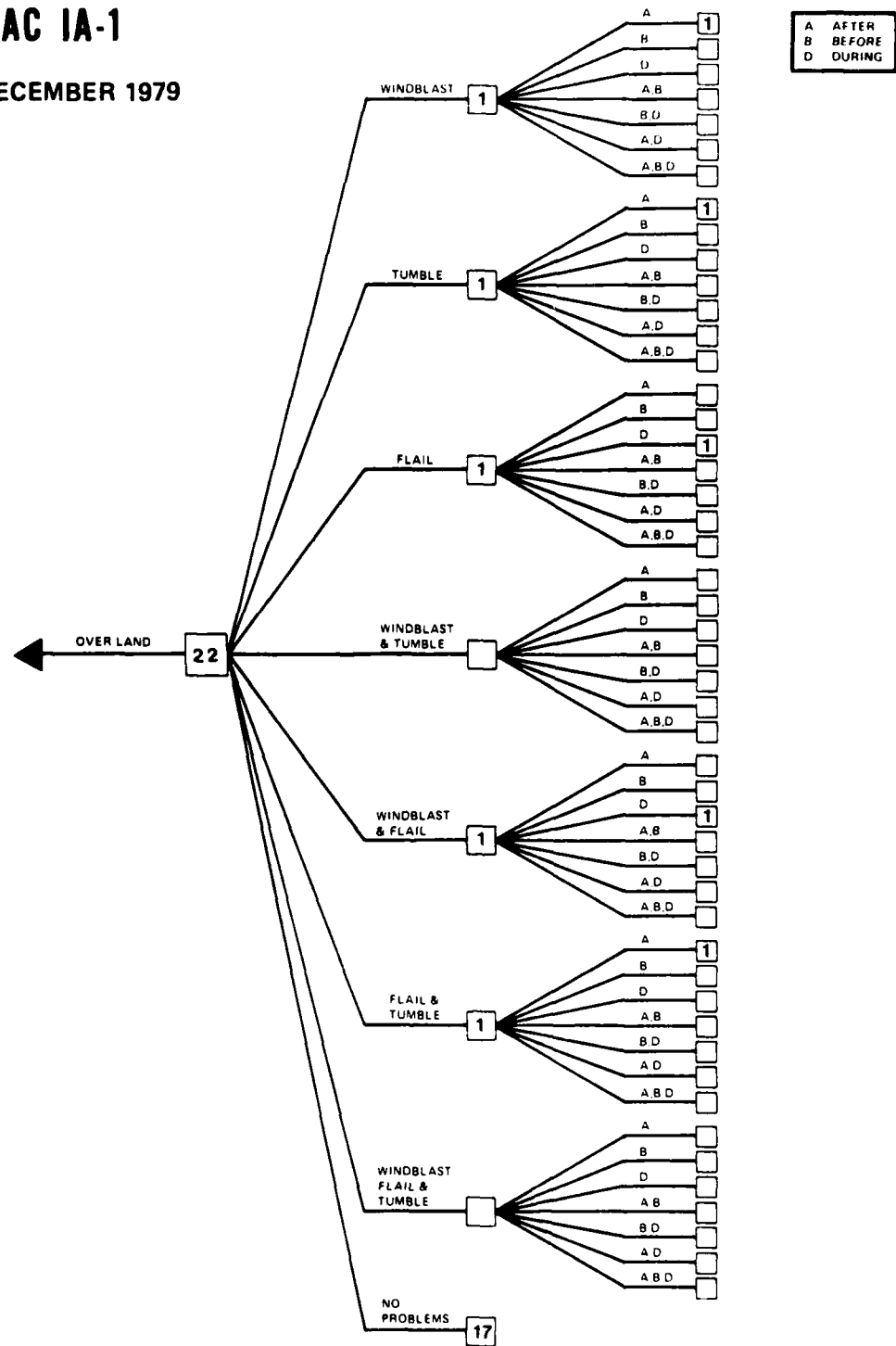
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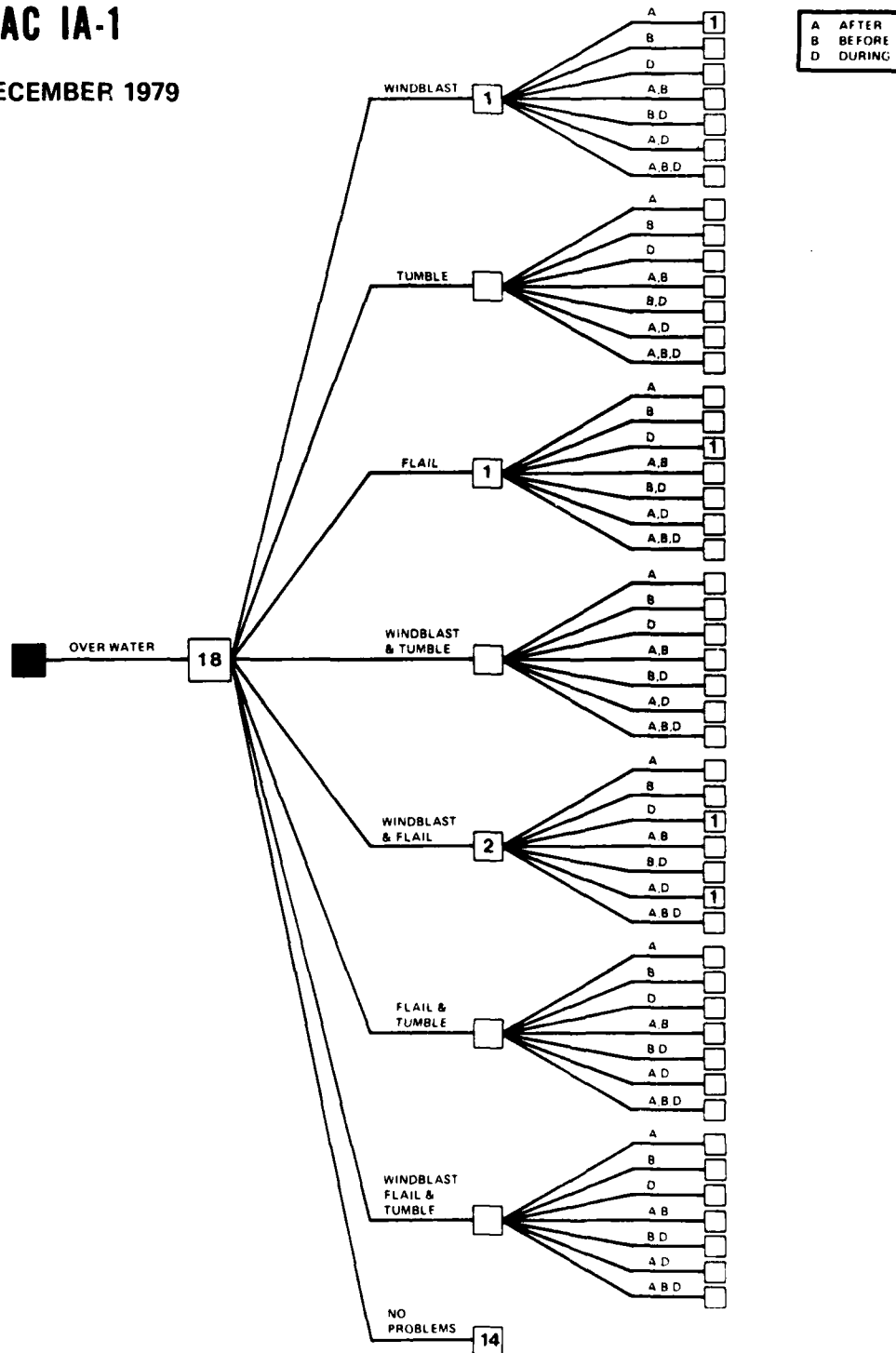
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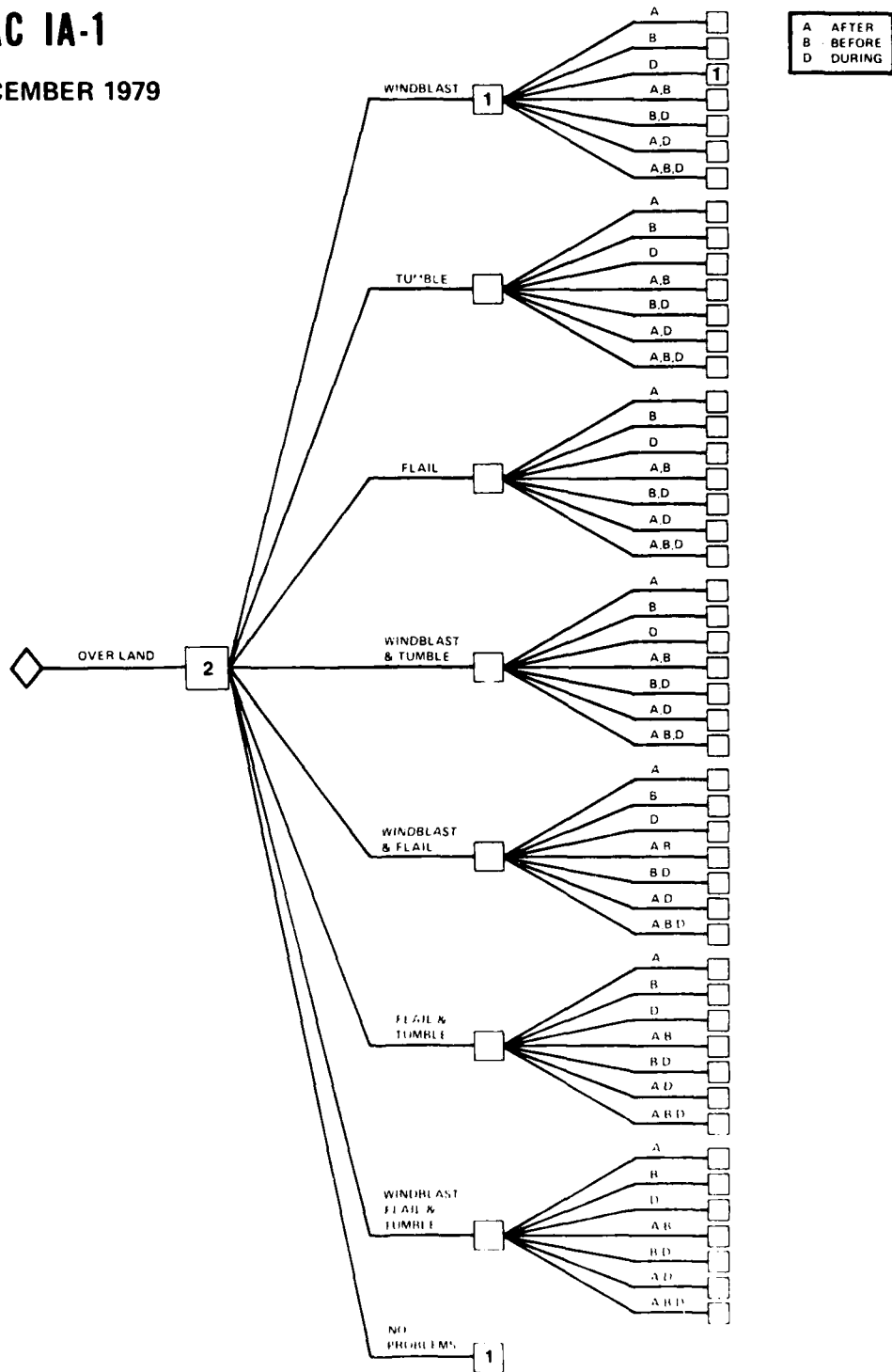
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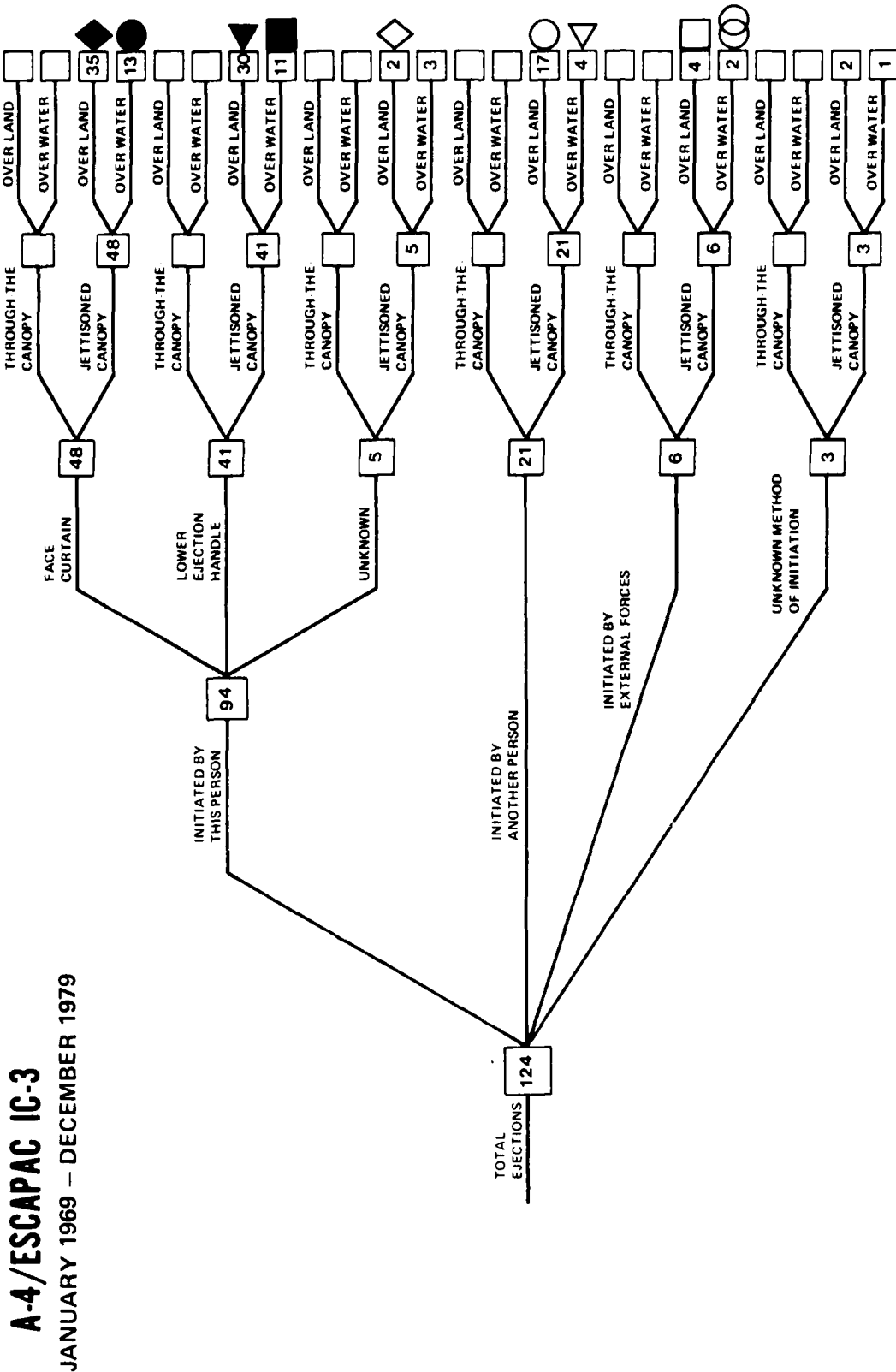
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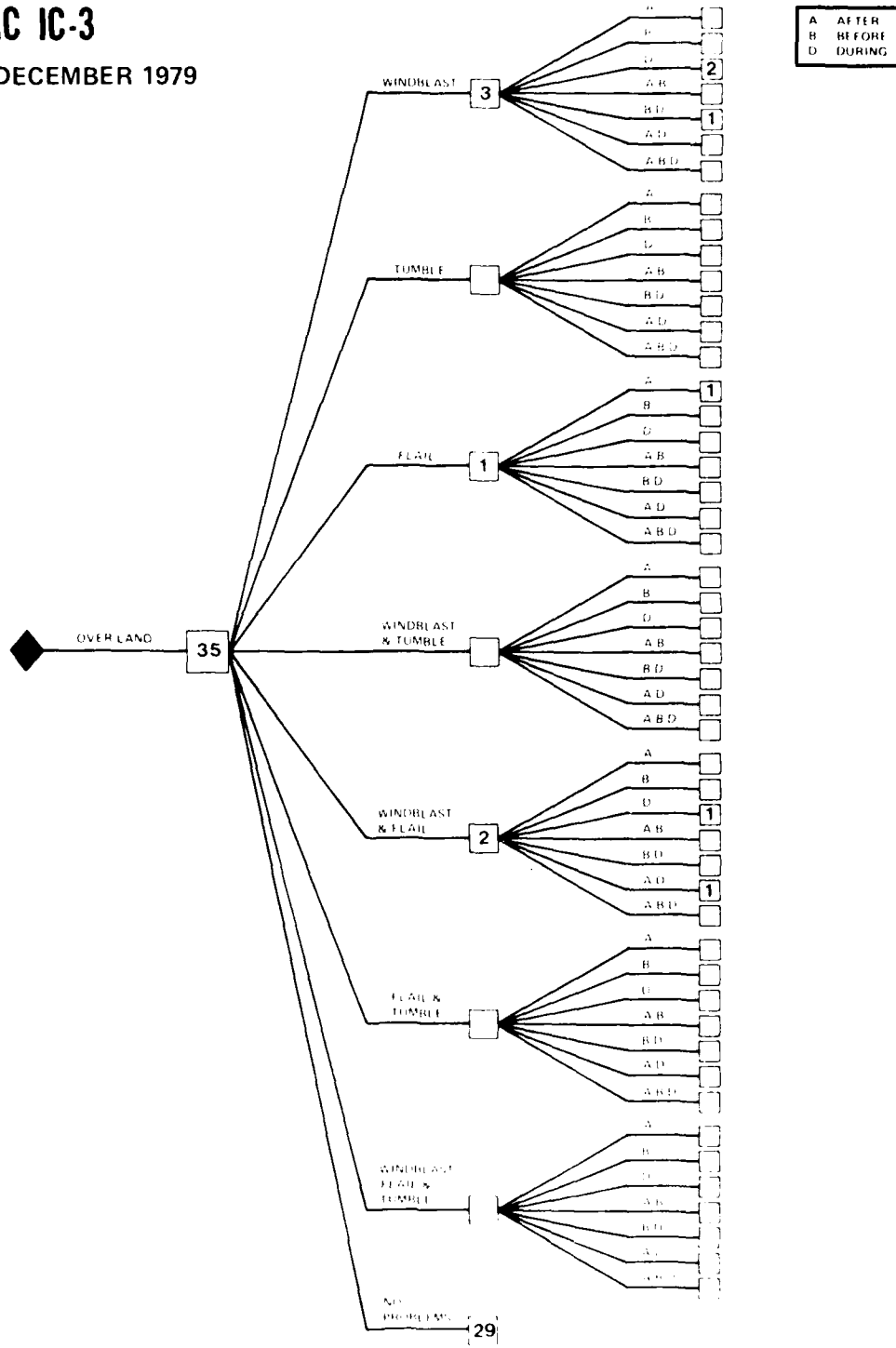
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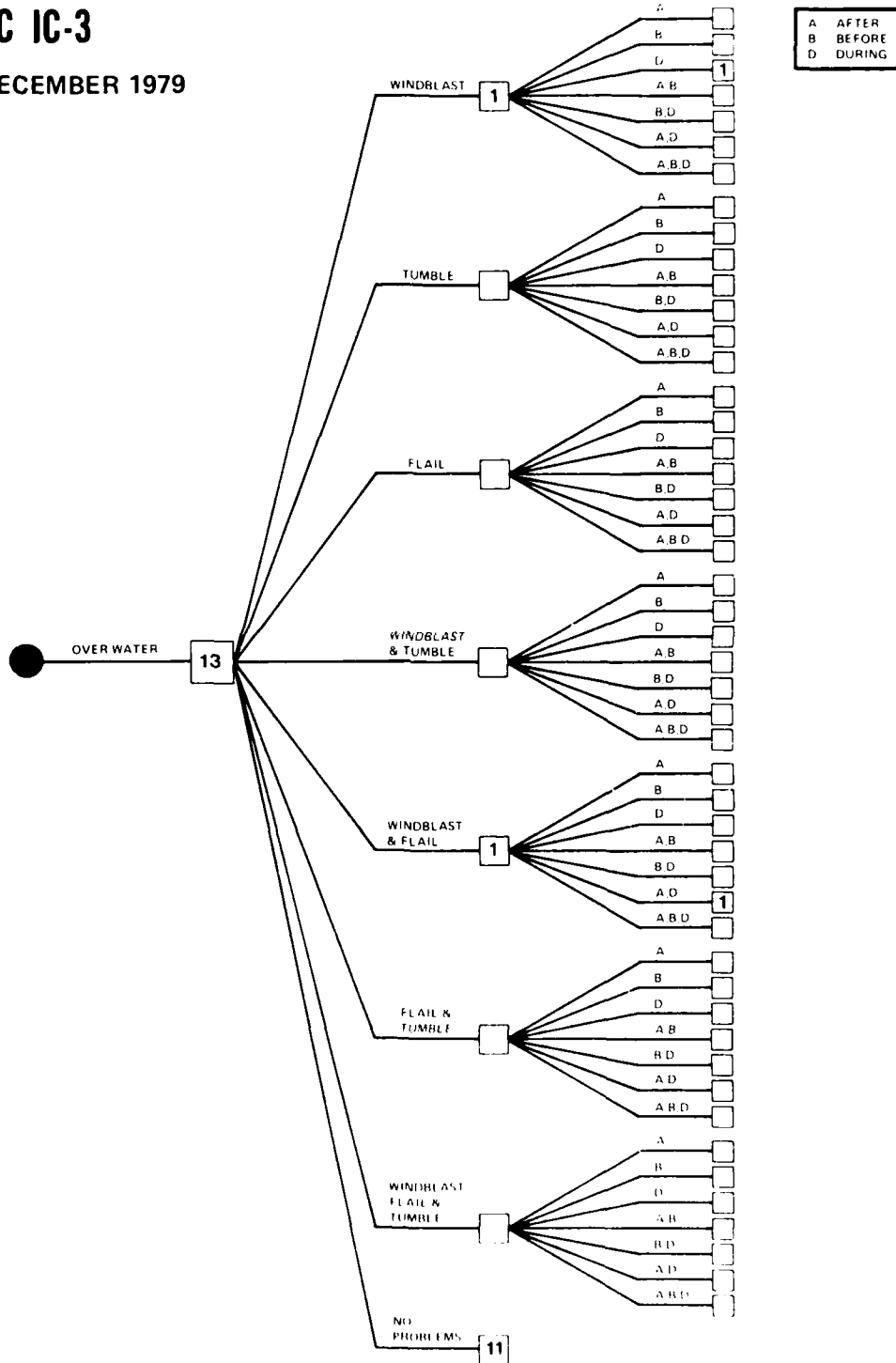
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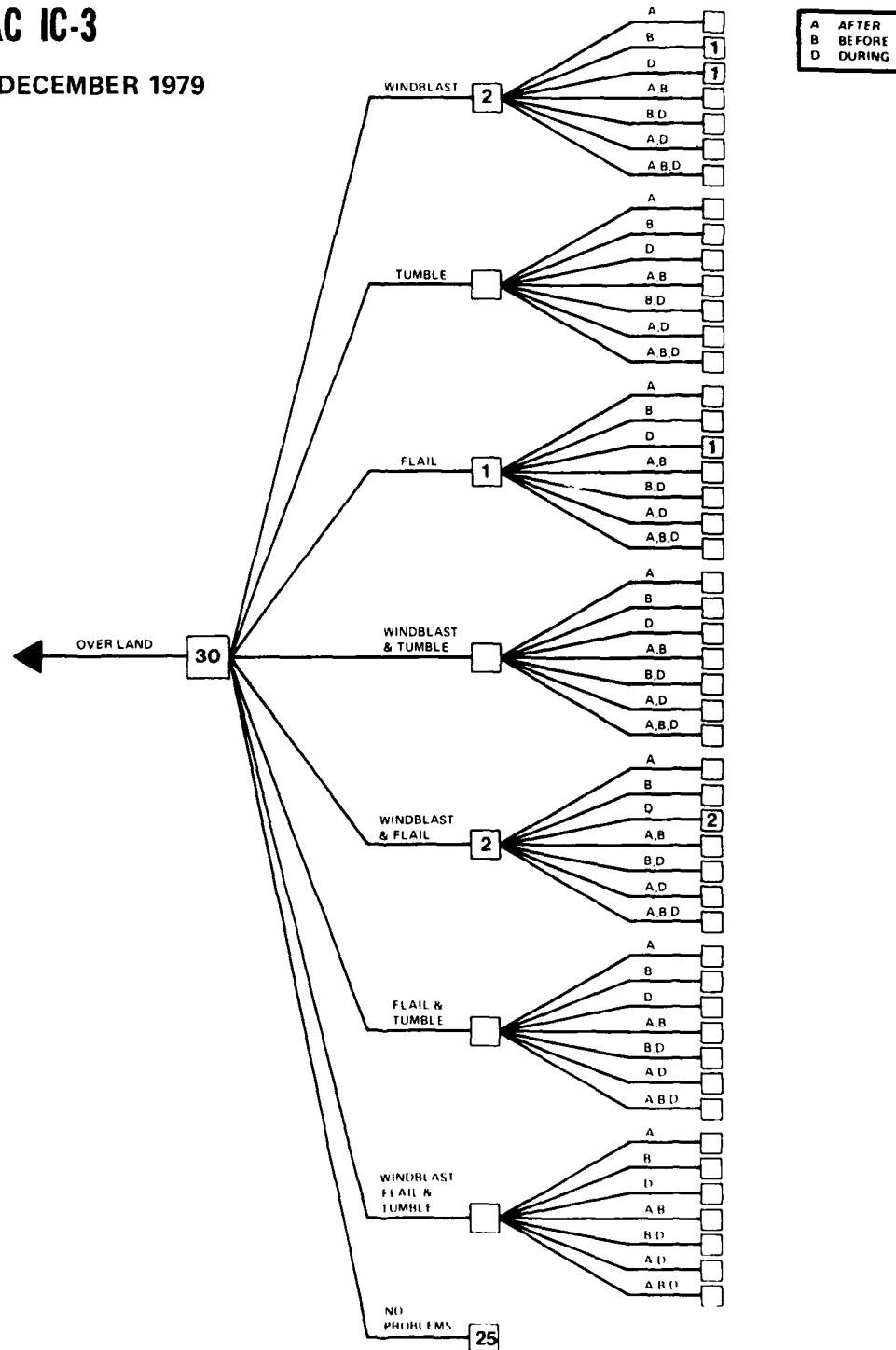
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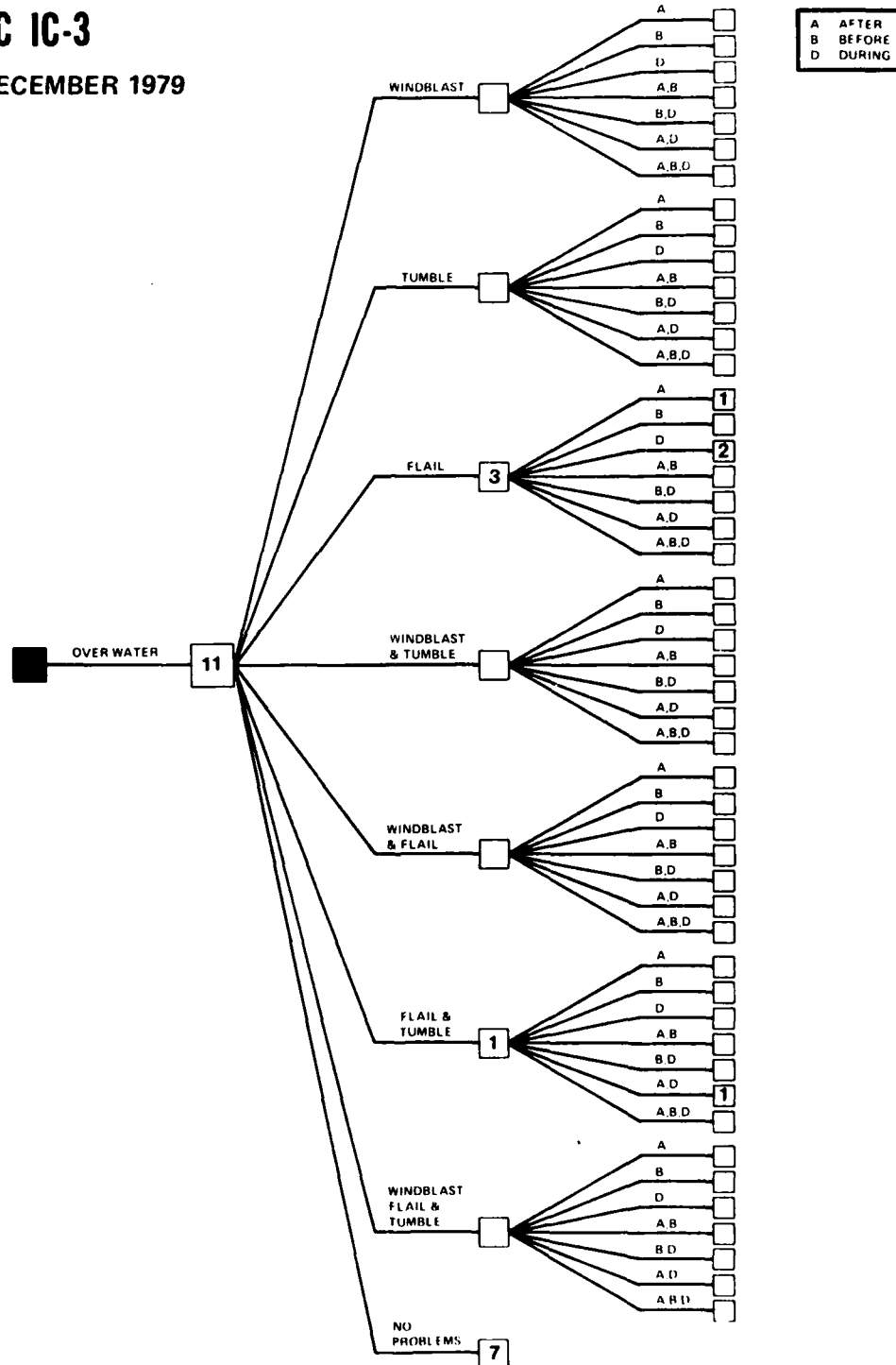
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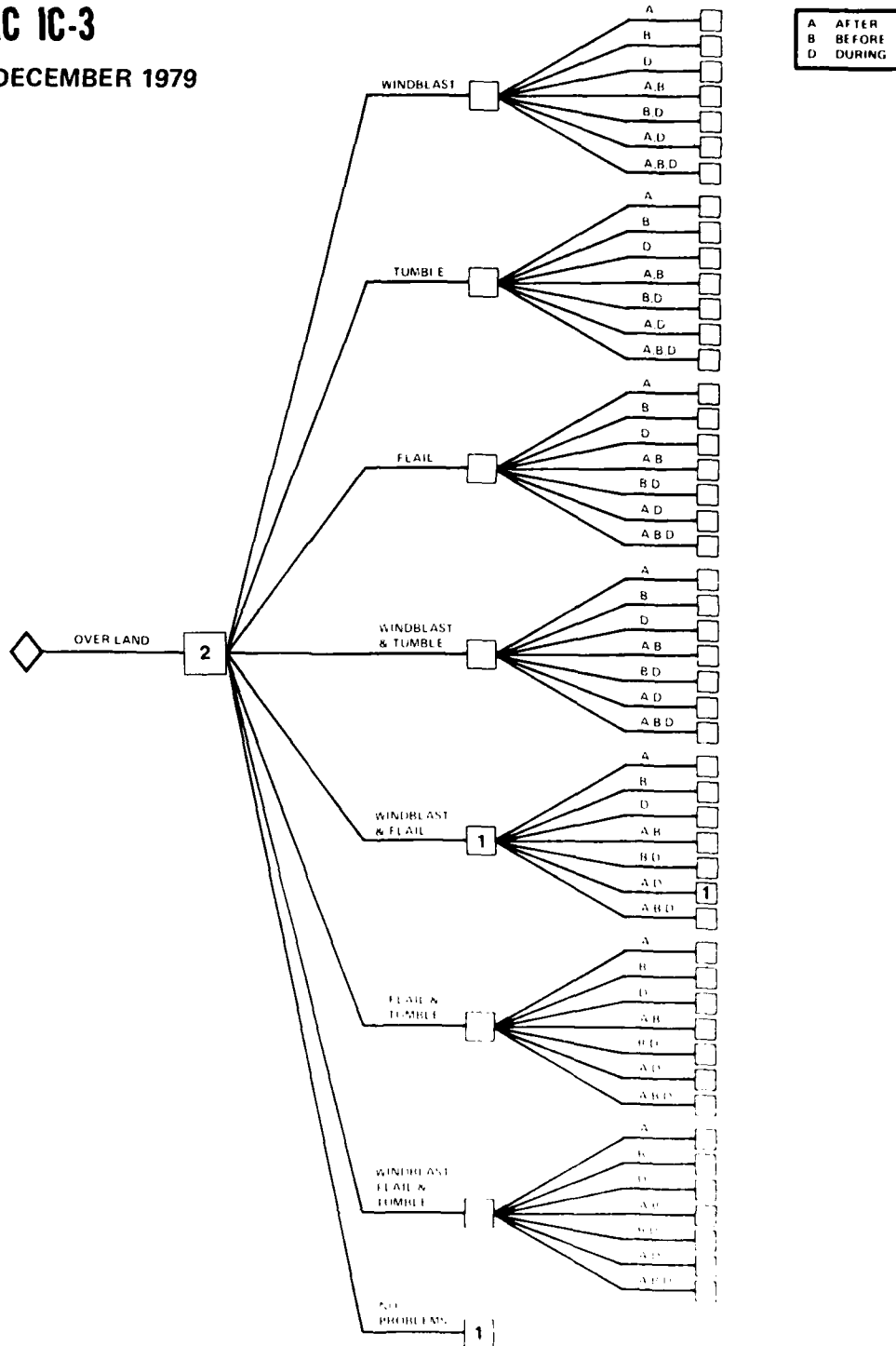
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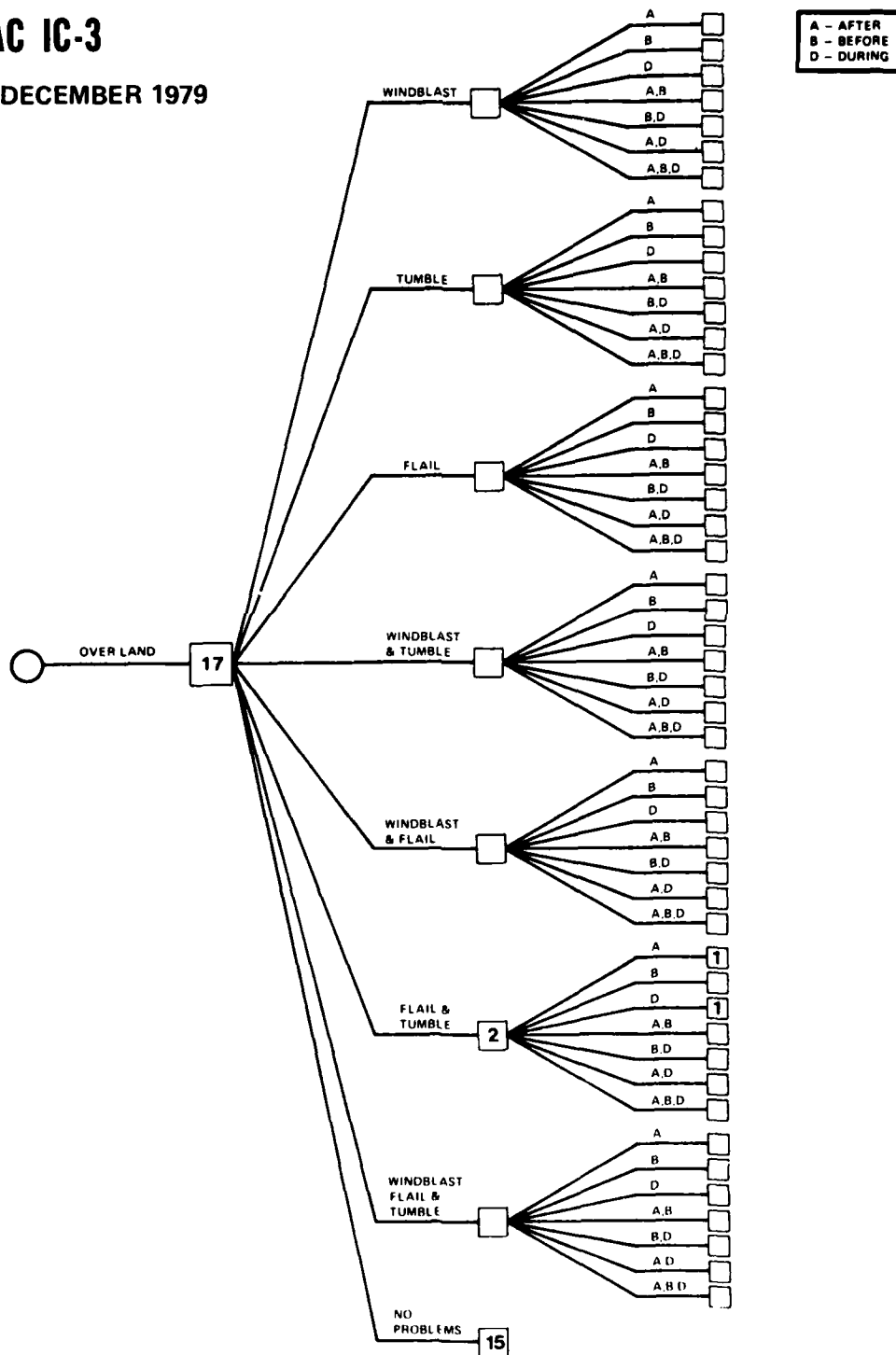
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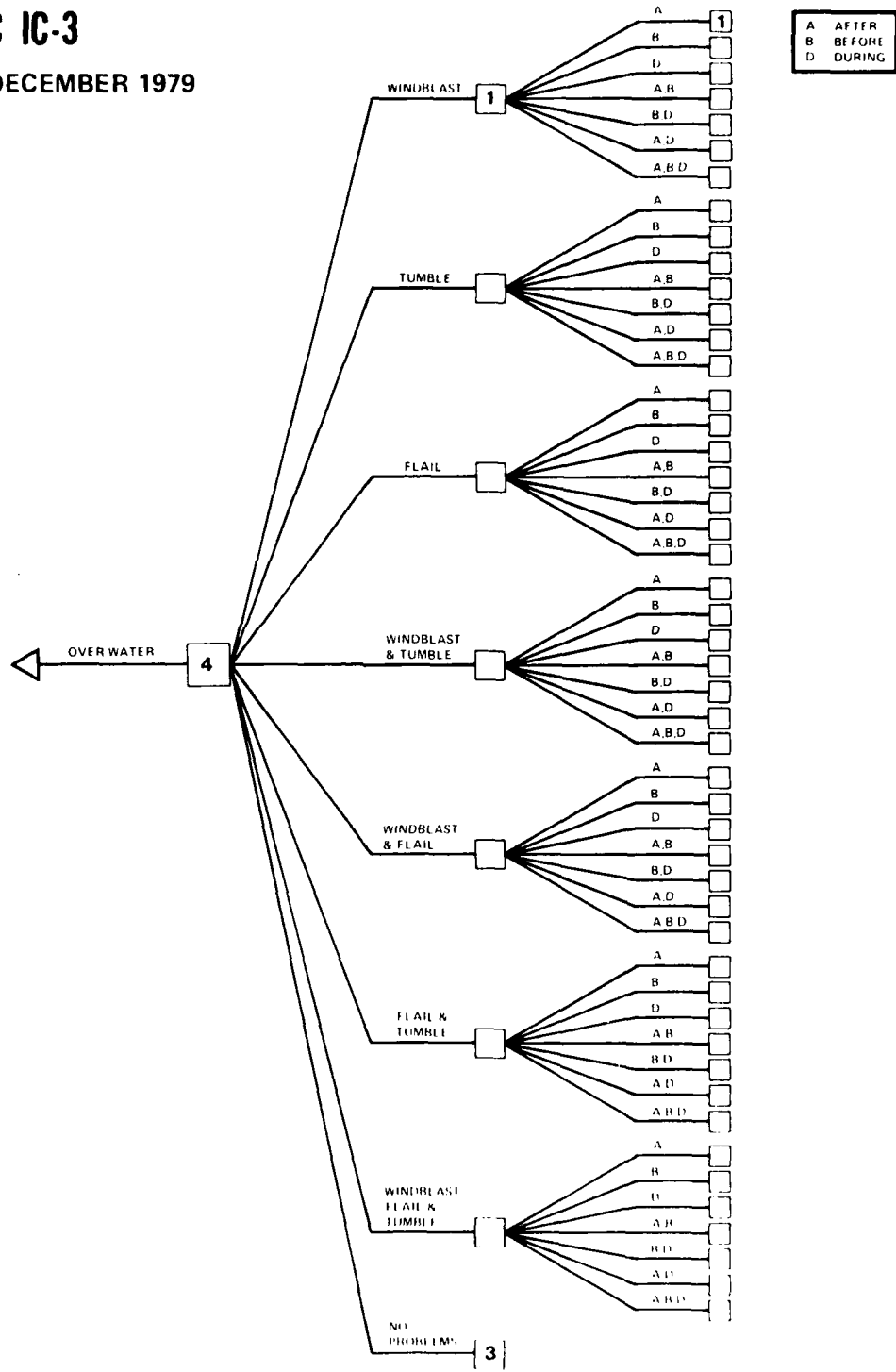
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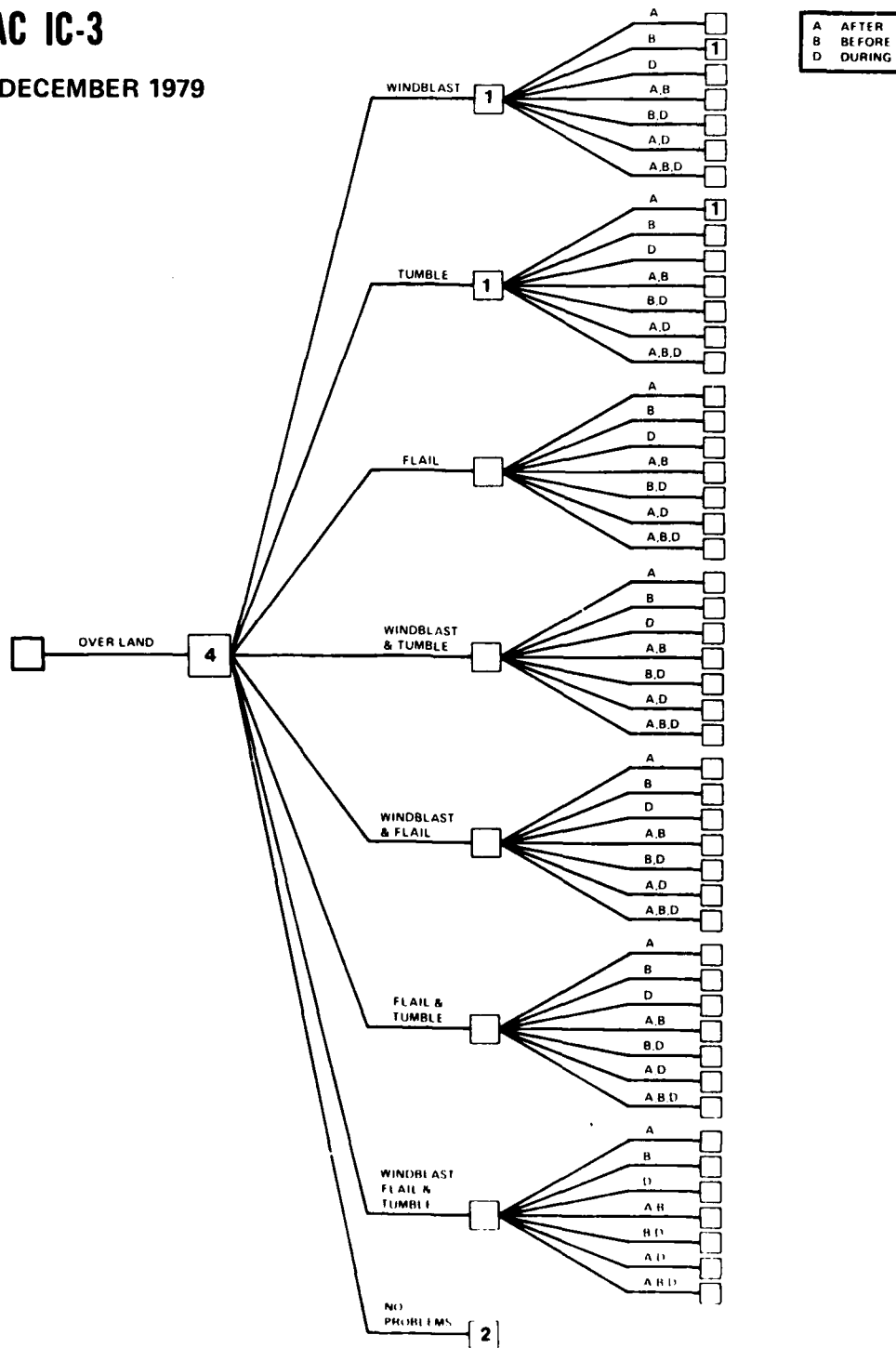
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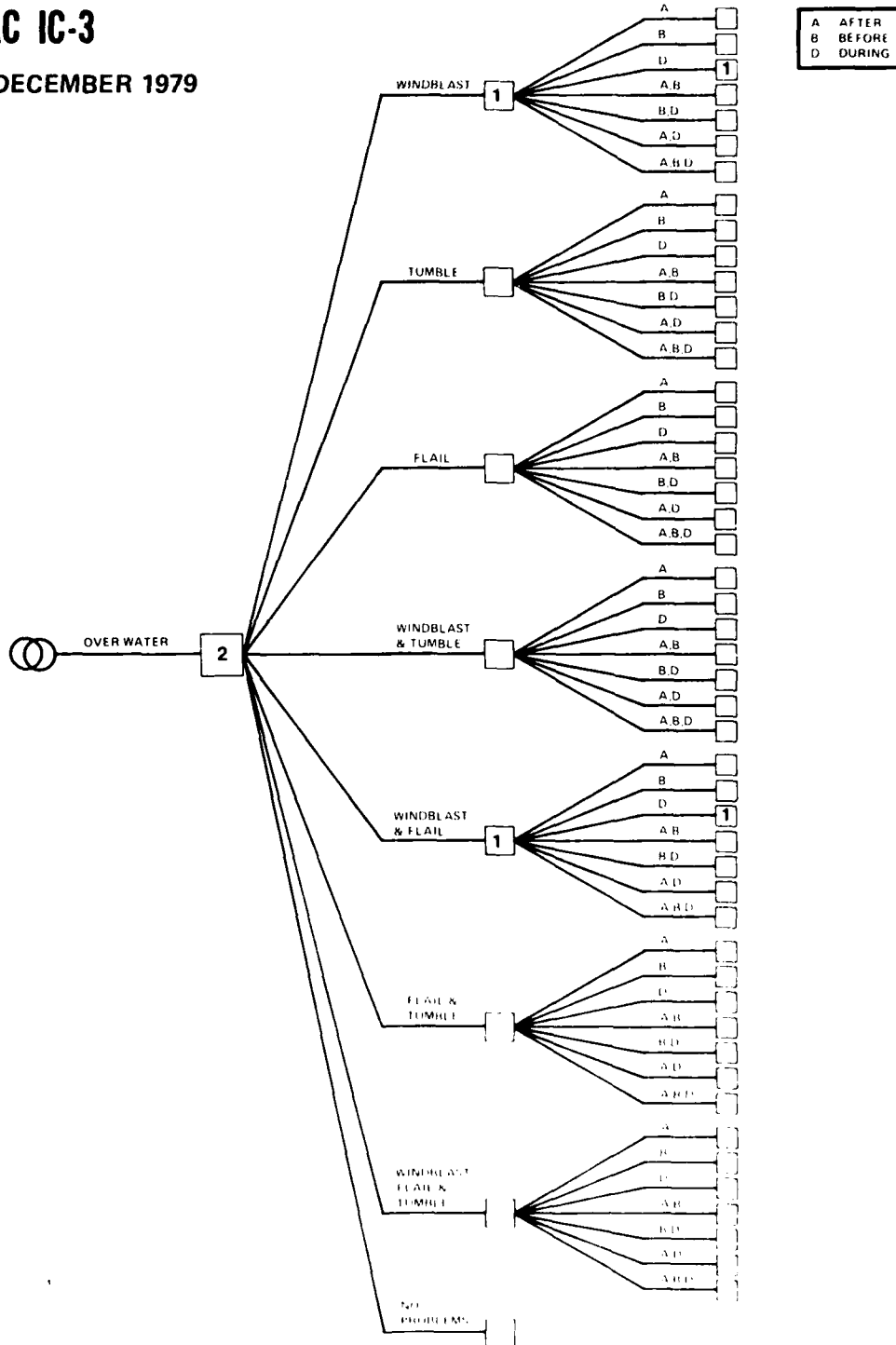
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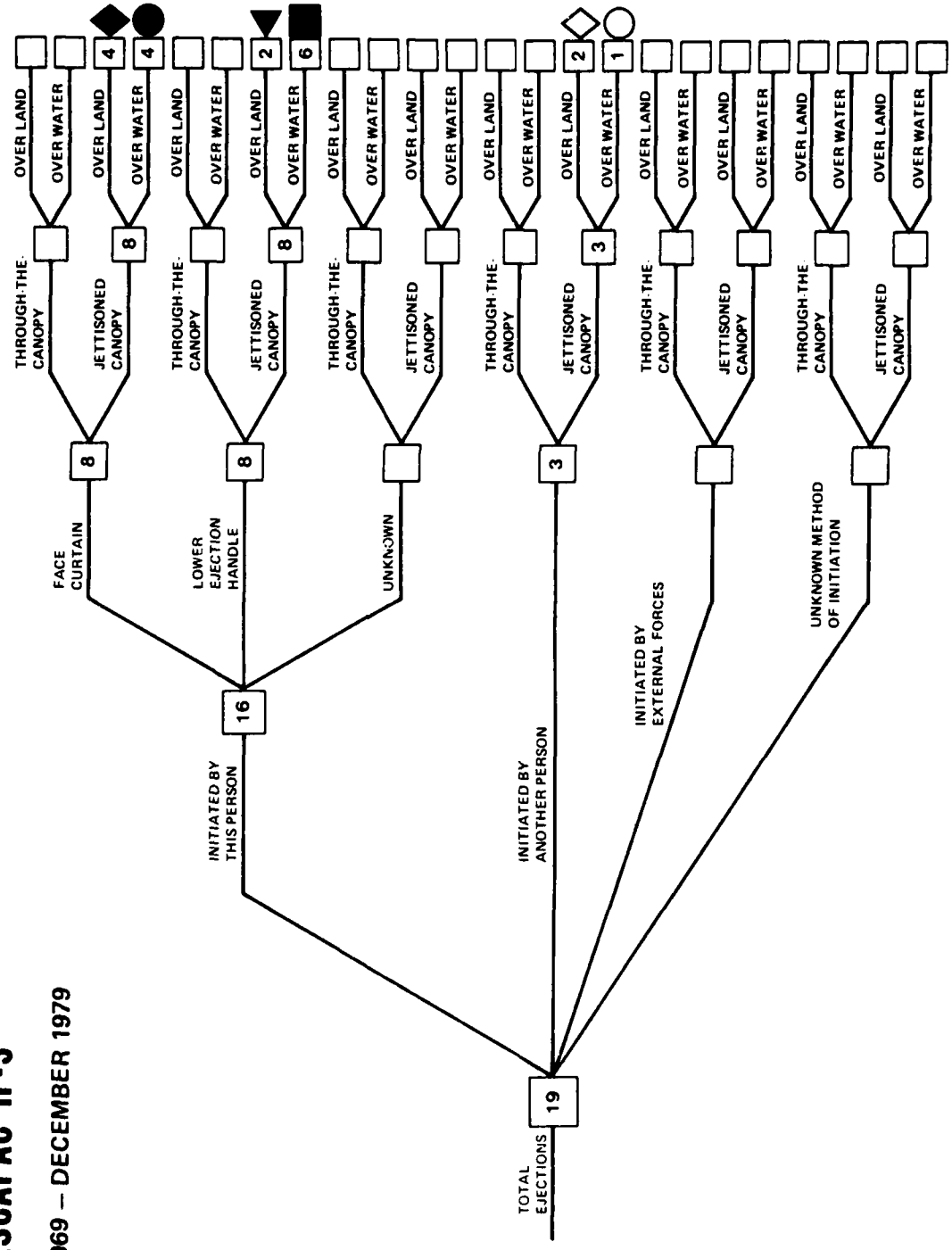
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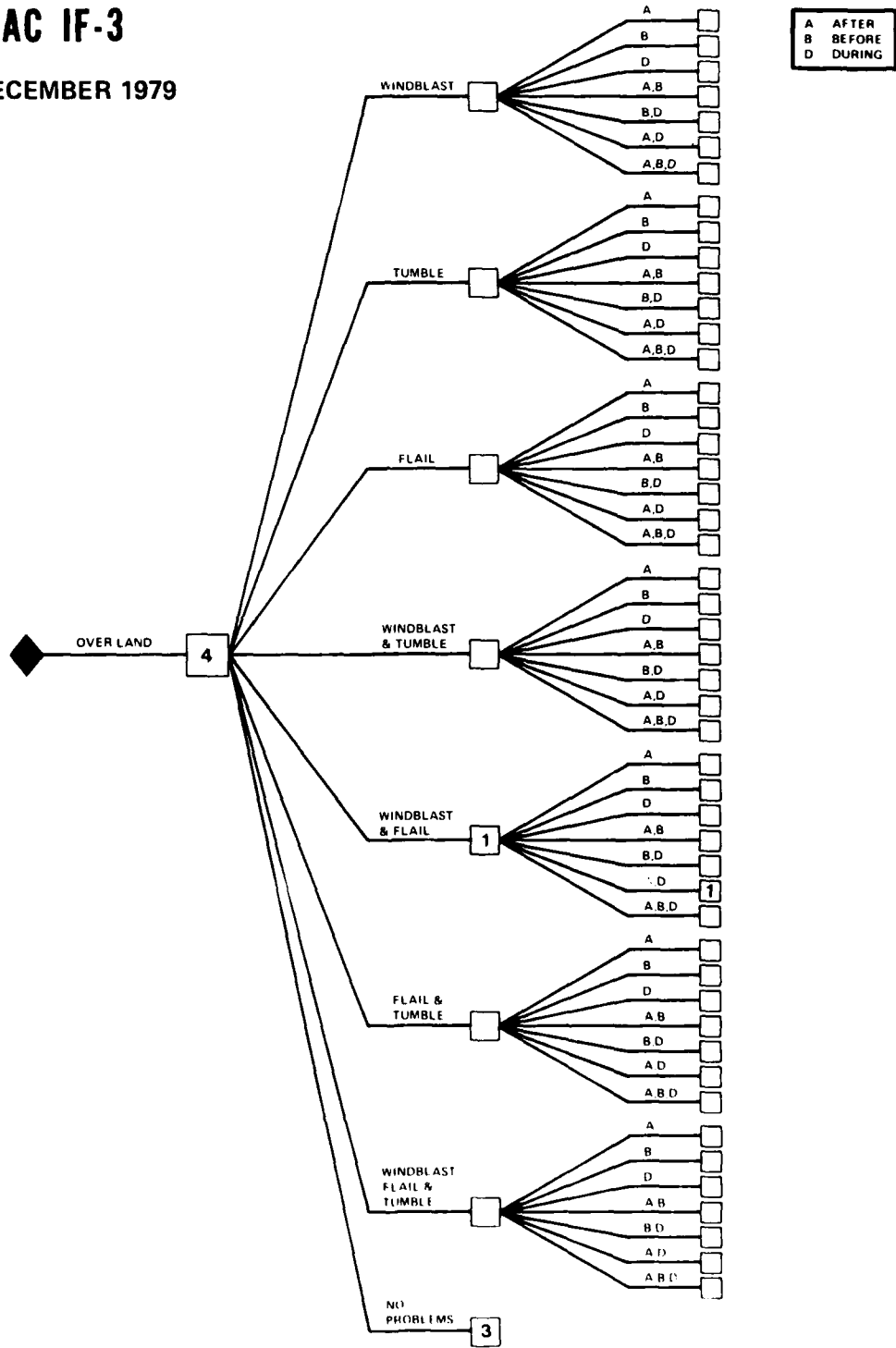
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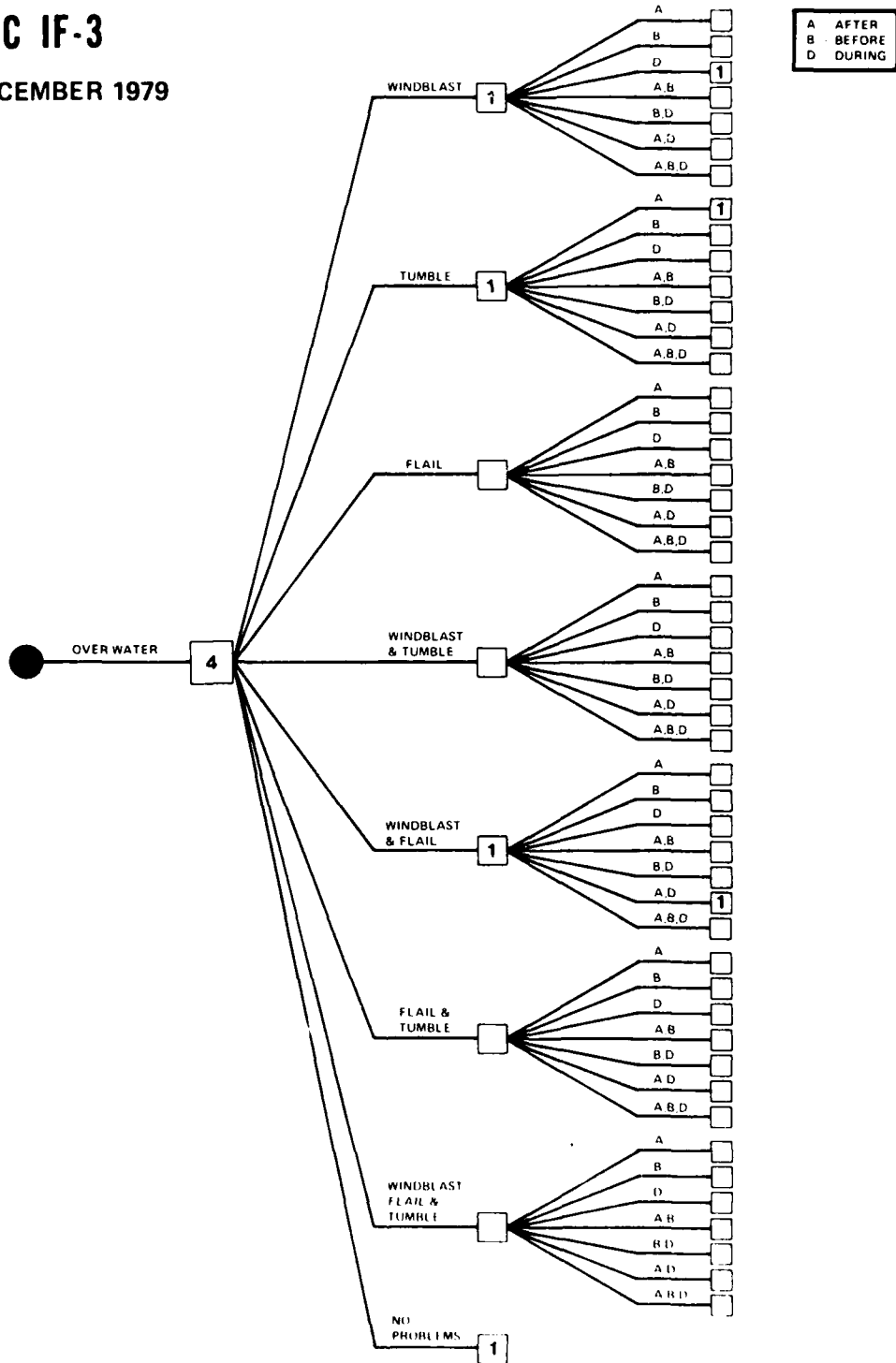
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IF-3

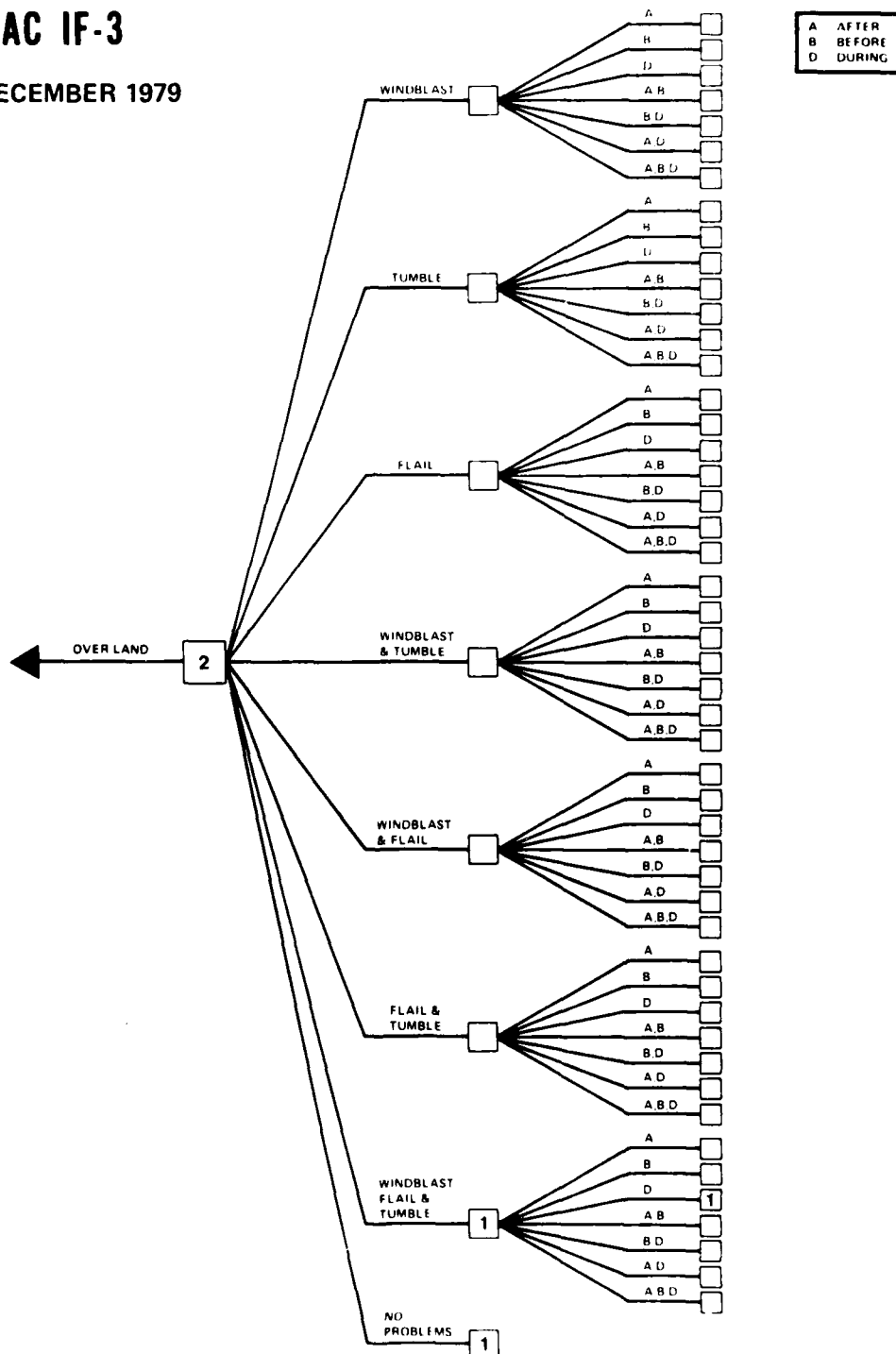
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IF-3

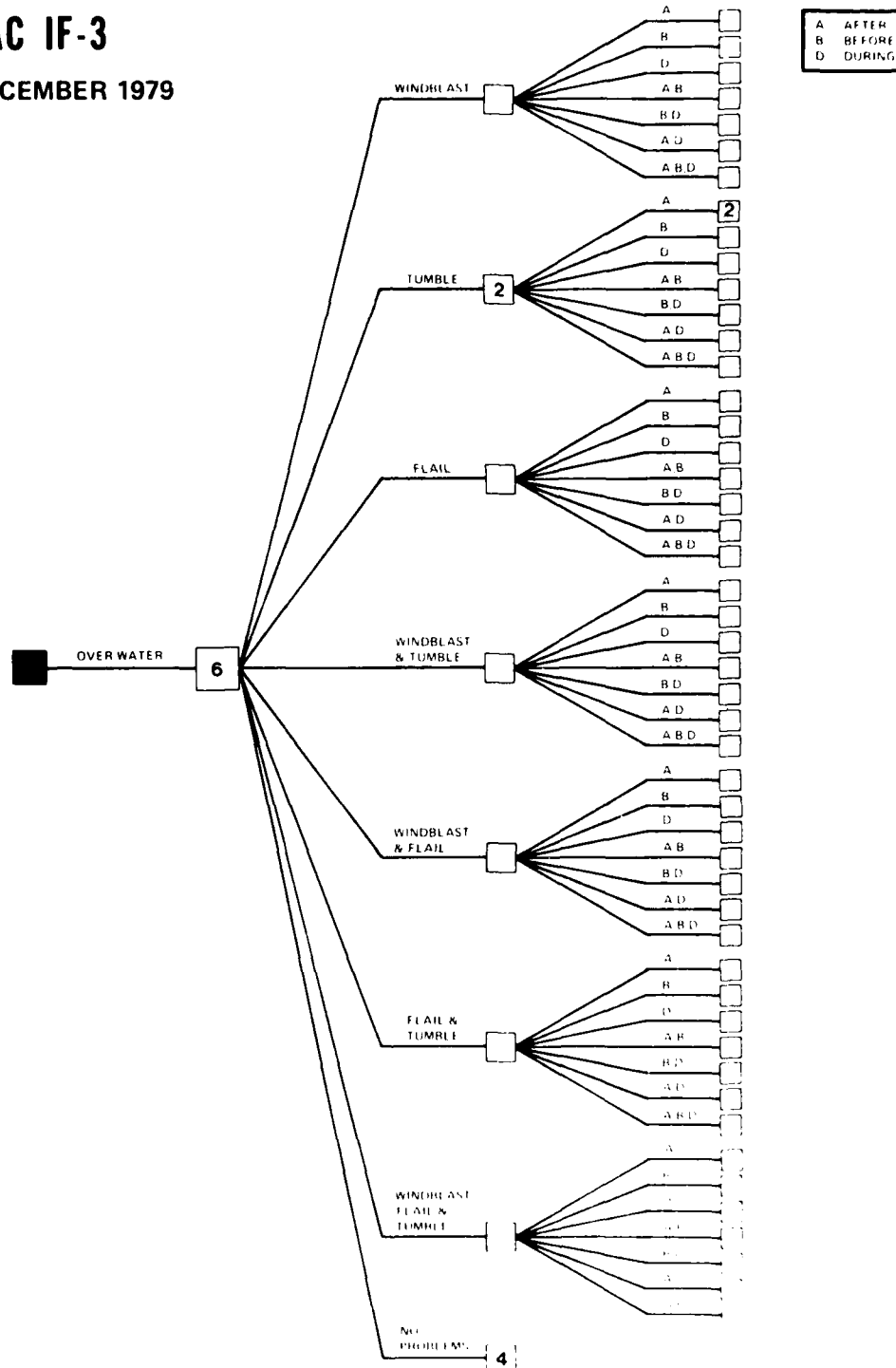
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IF-3

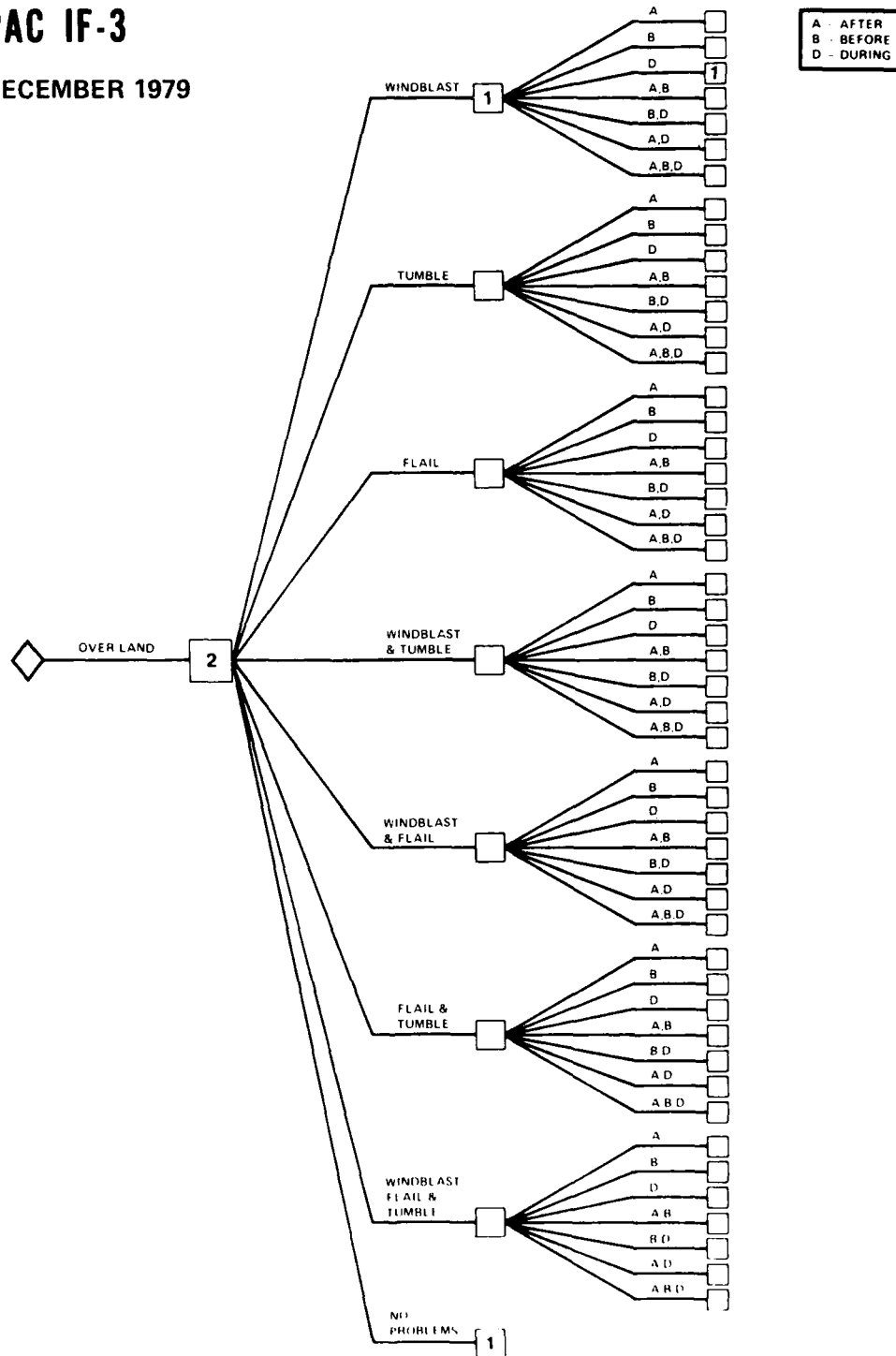
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IF-3

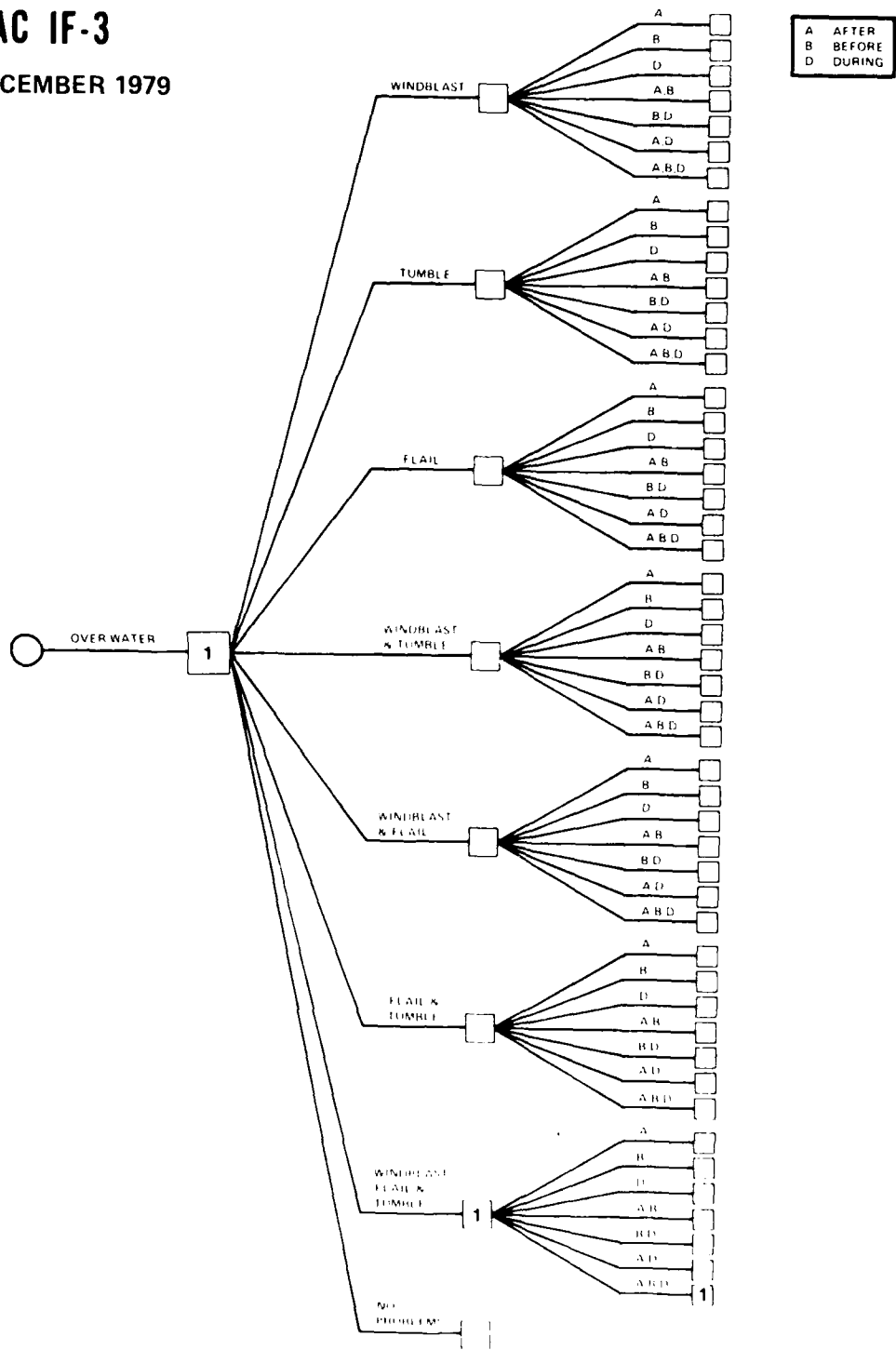
JANUARY 1969 – DECEMBER 1979



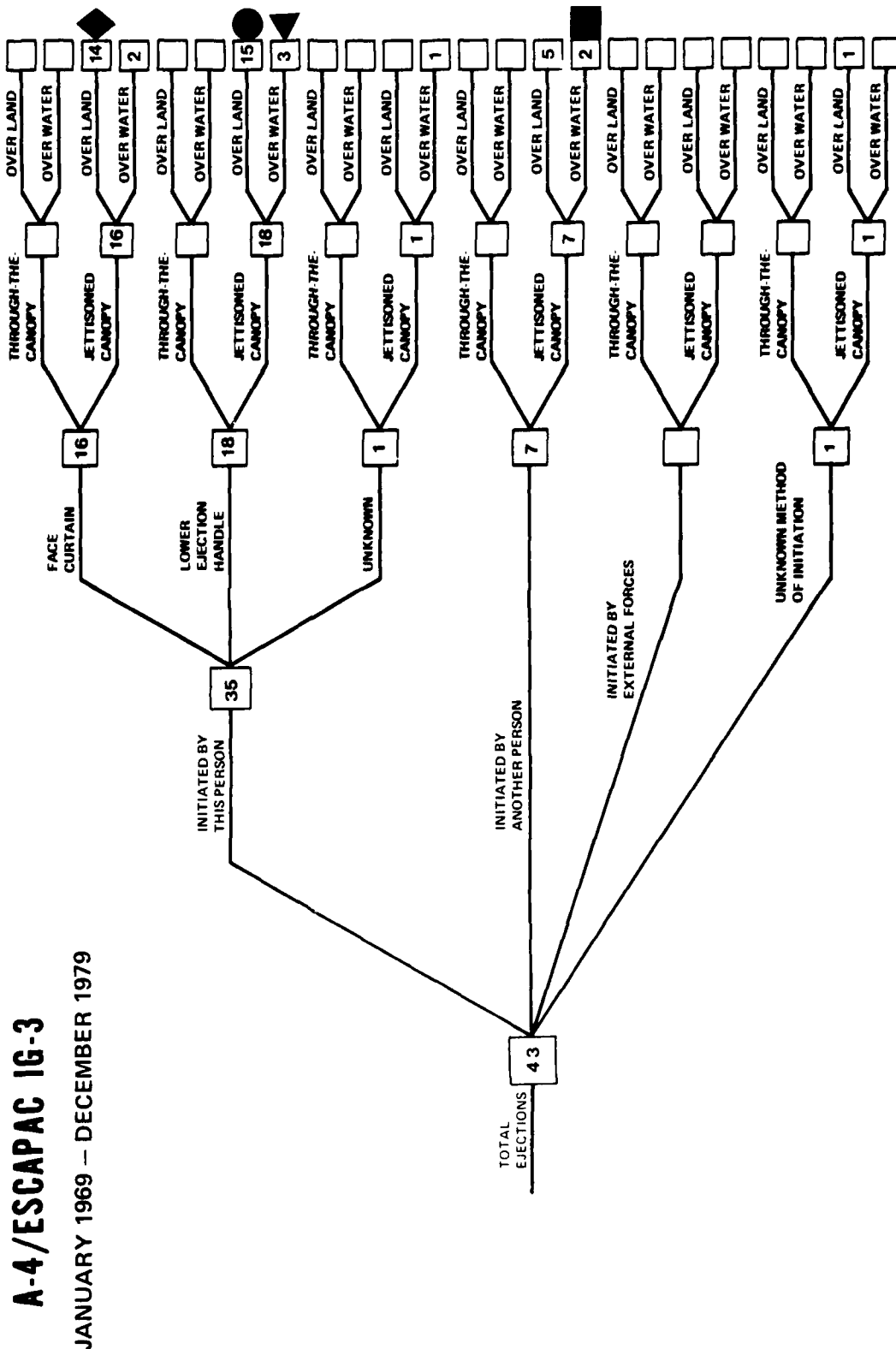
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IF-3

JANUARY 1969 - DECEMBER 1979



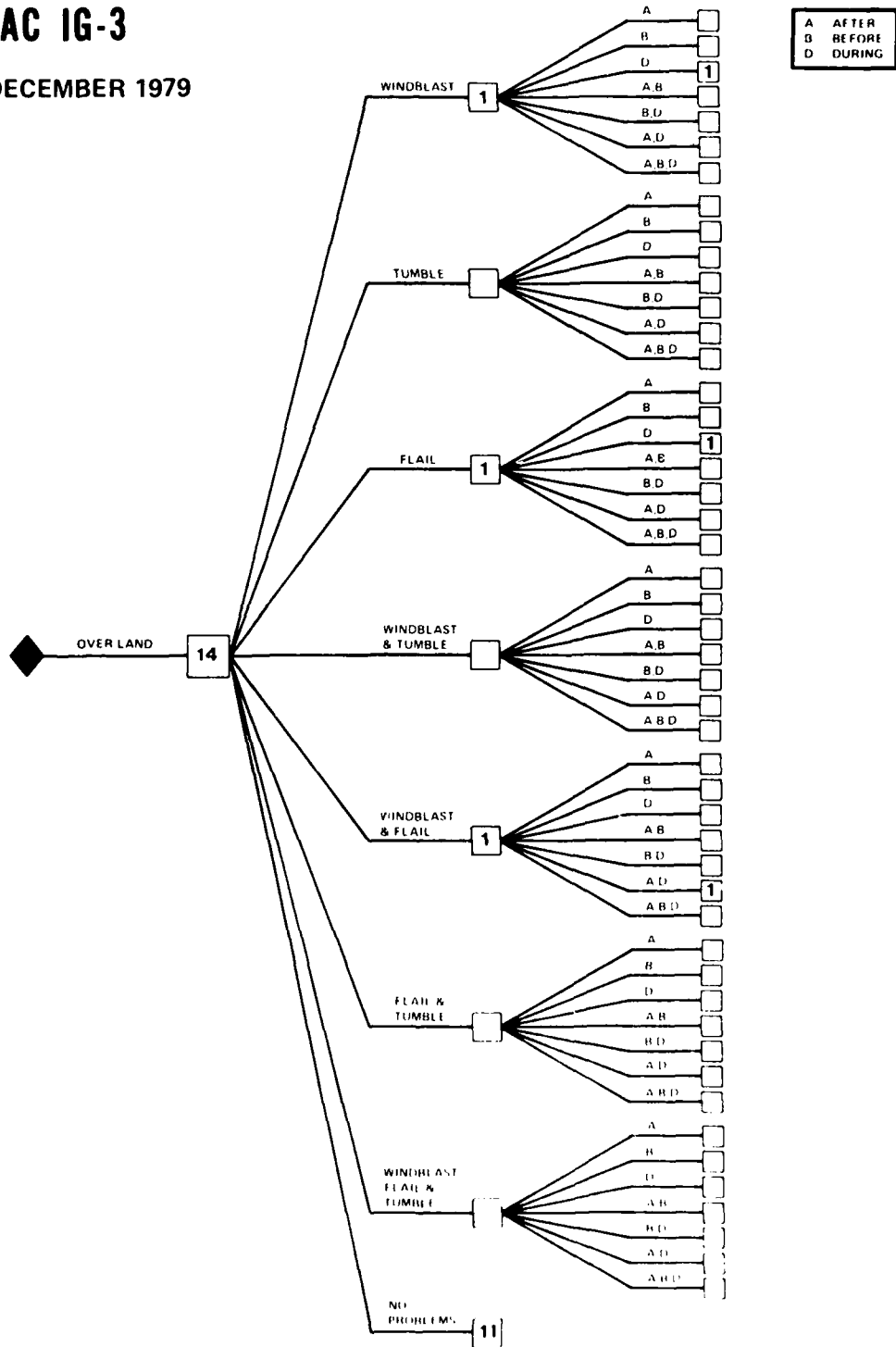
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IG-3

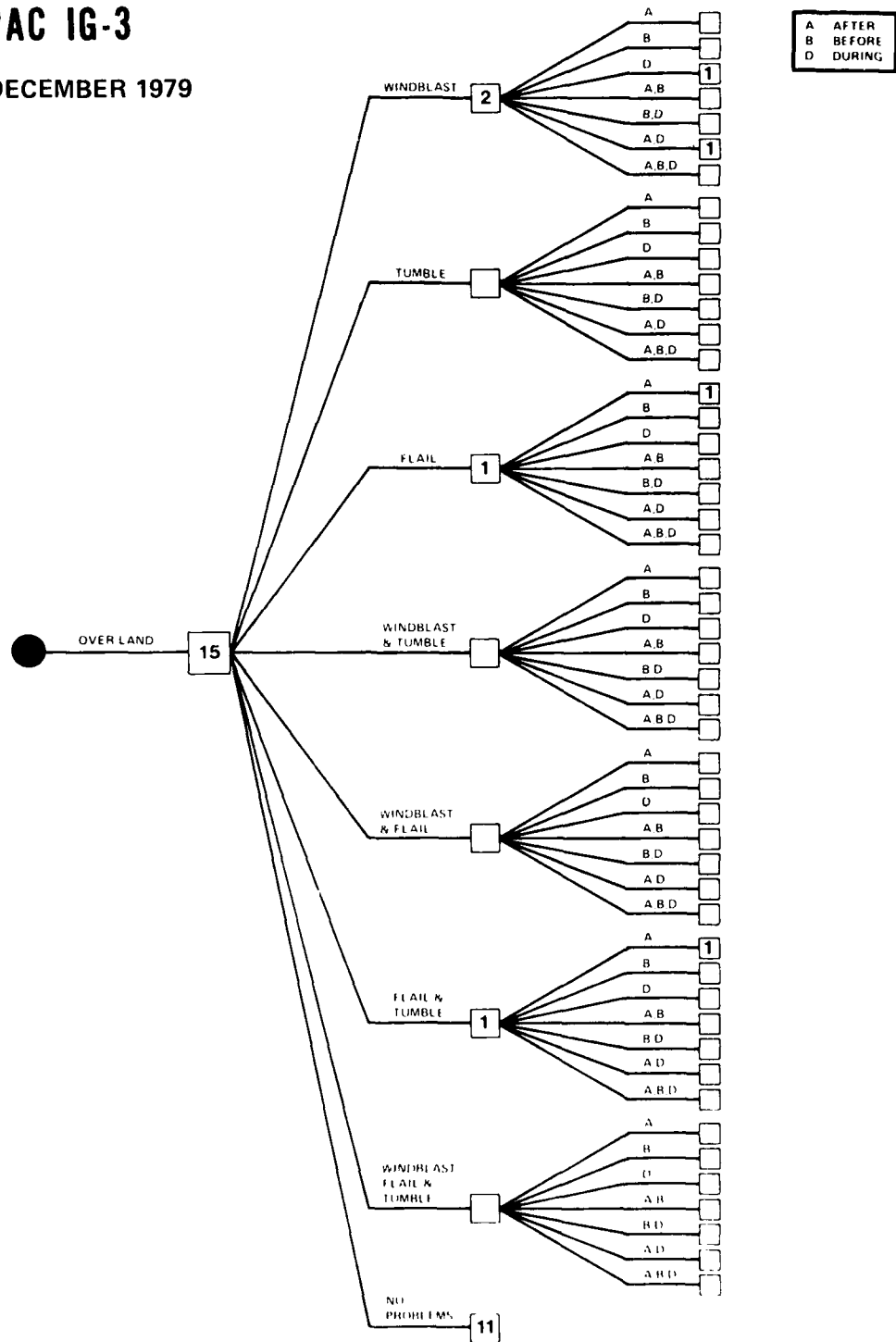
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IG-3

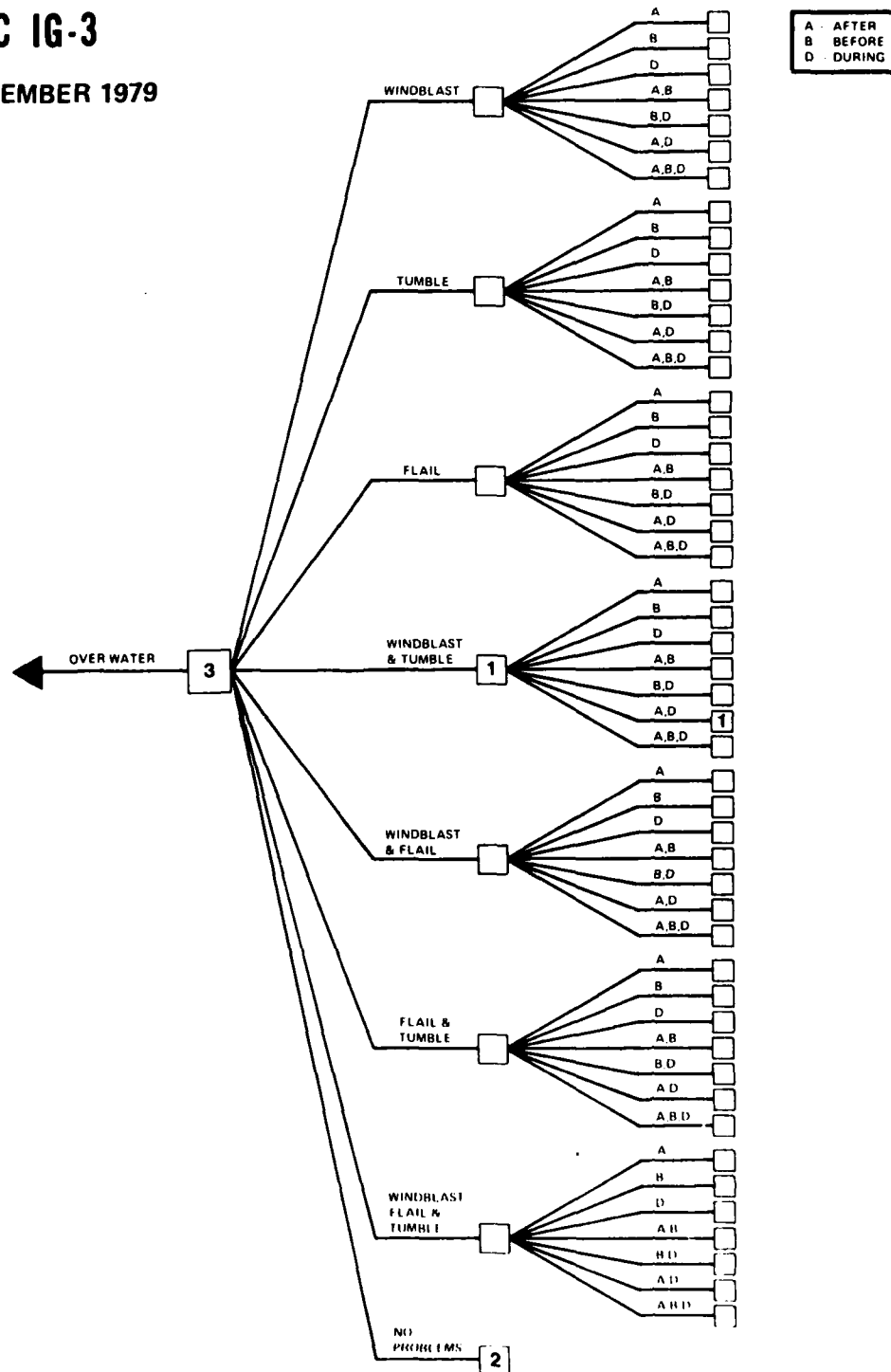
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IG-3

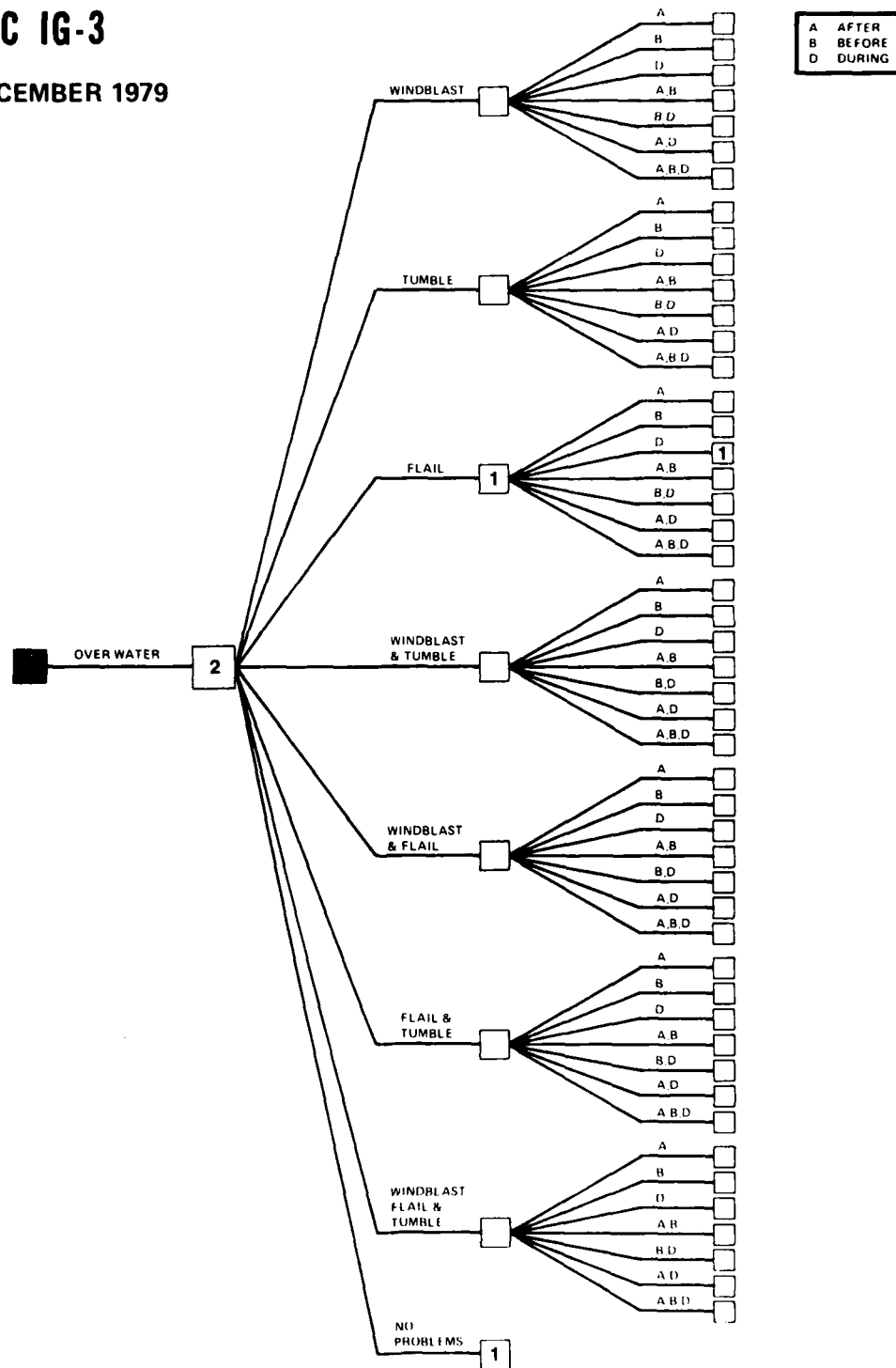
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-4/ESCAPAC IG-3

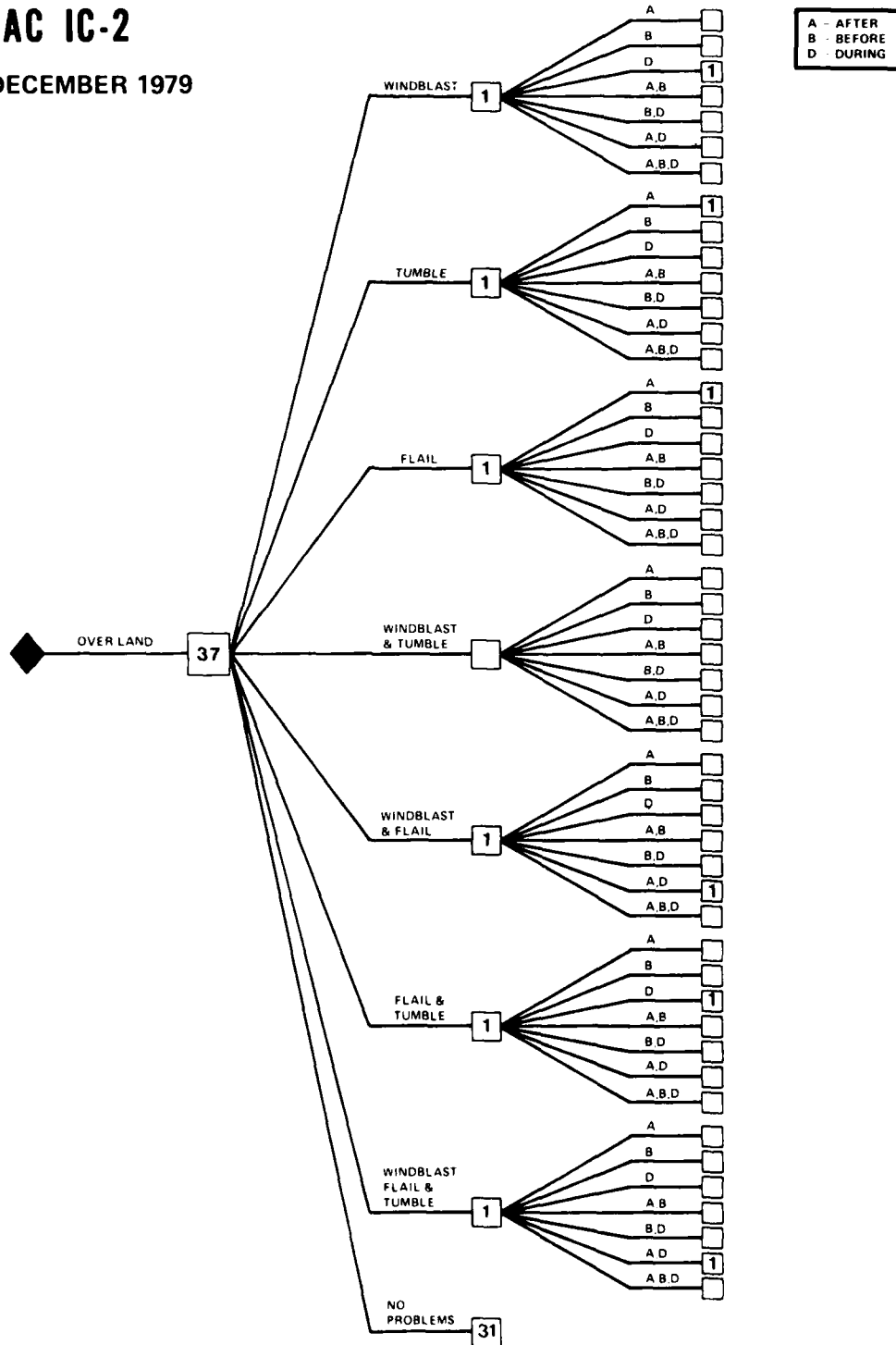
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IC-2

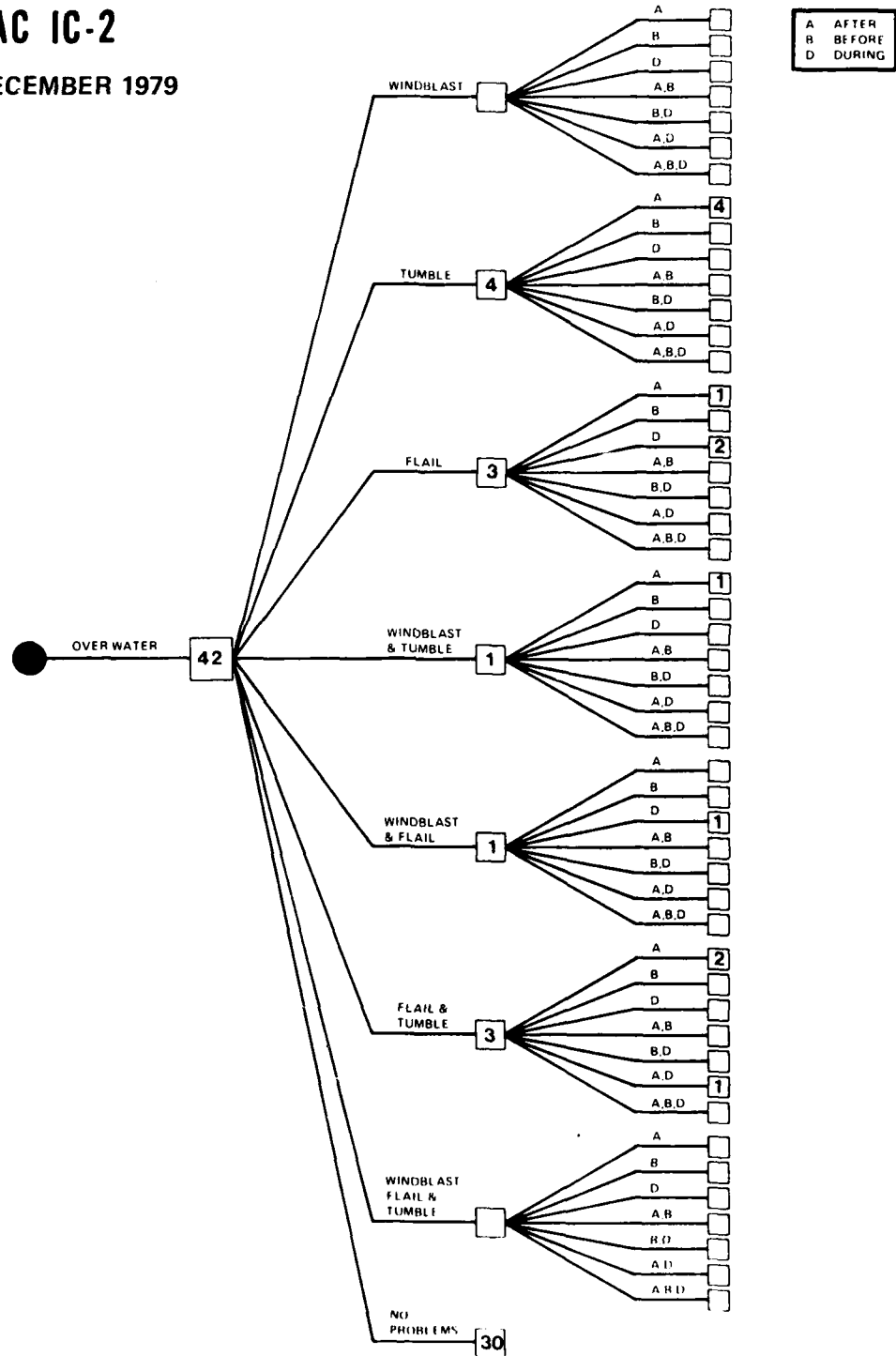
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IC-2

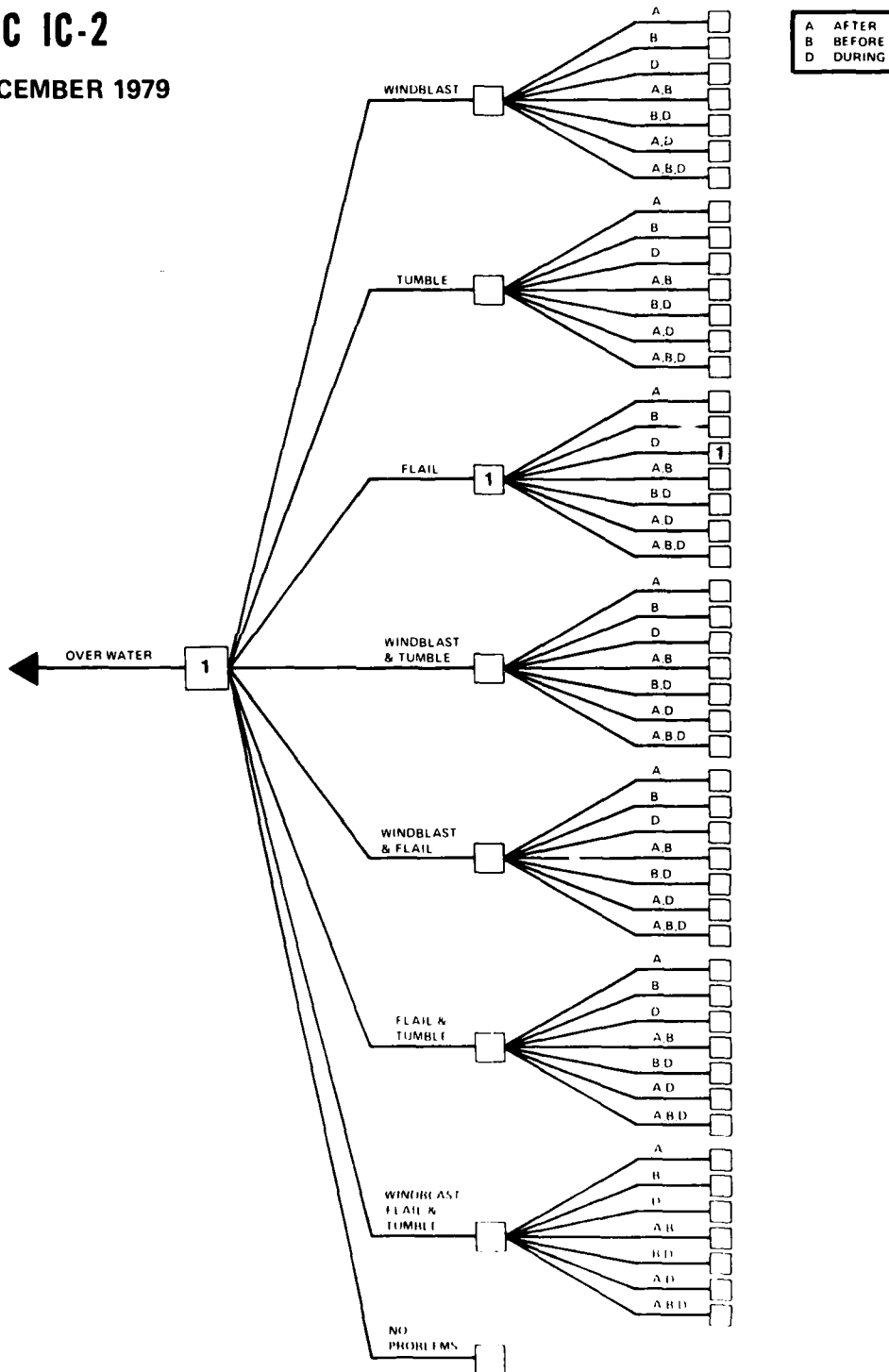
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IC-2

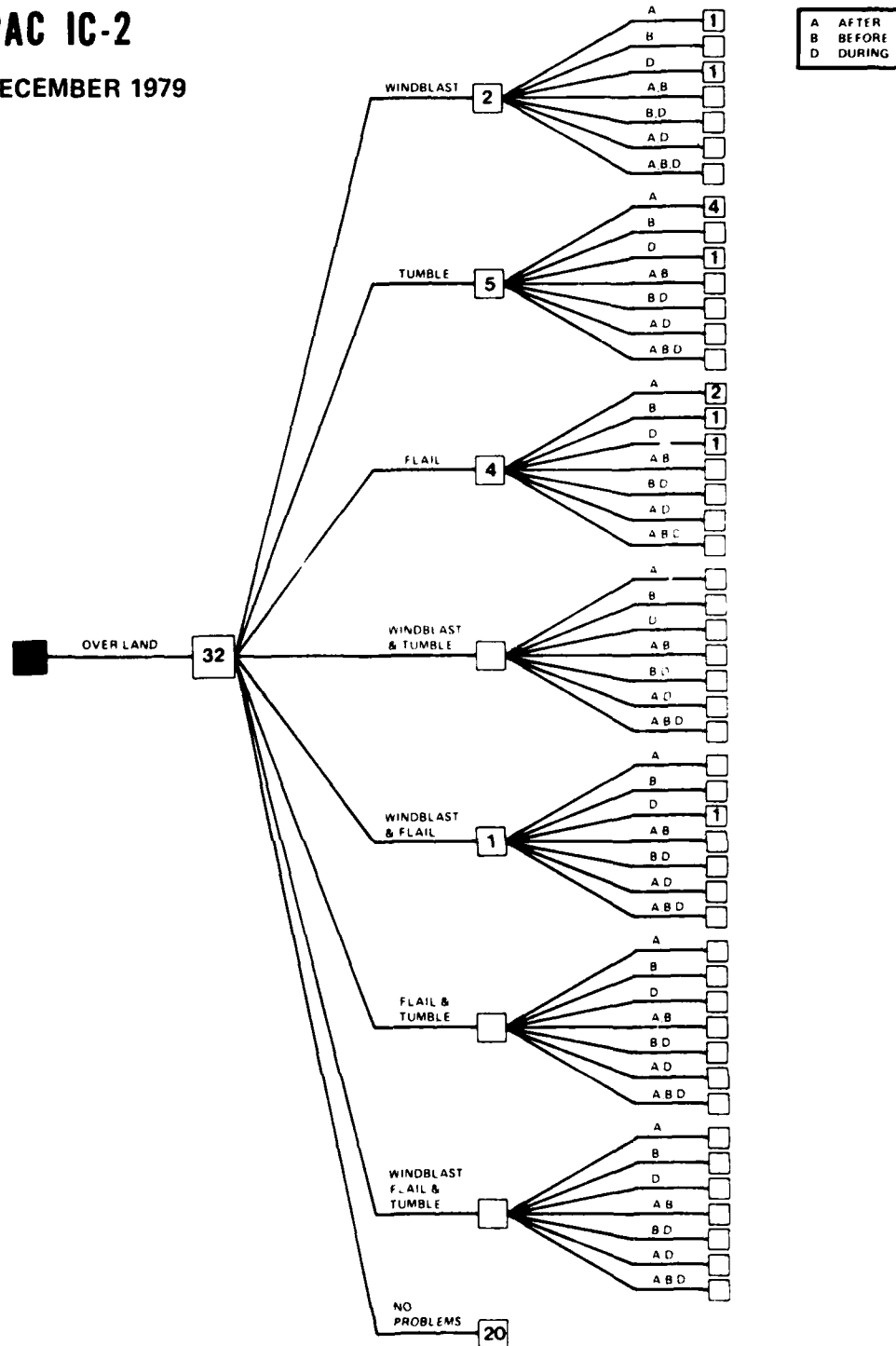
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IC-2

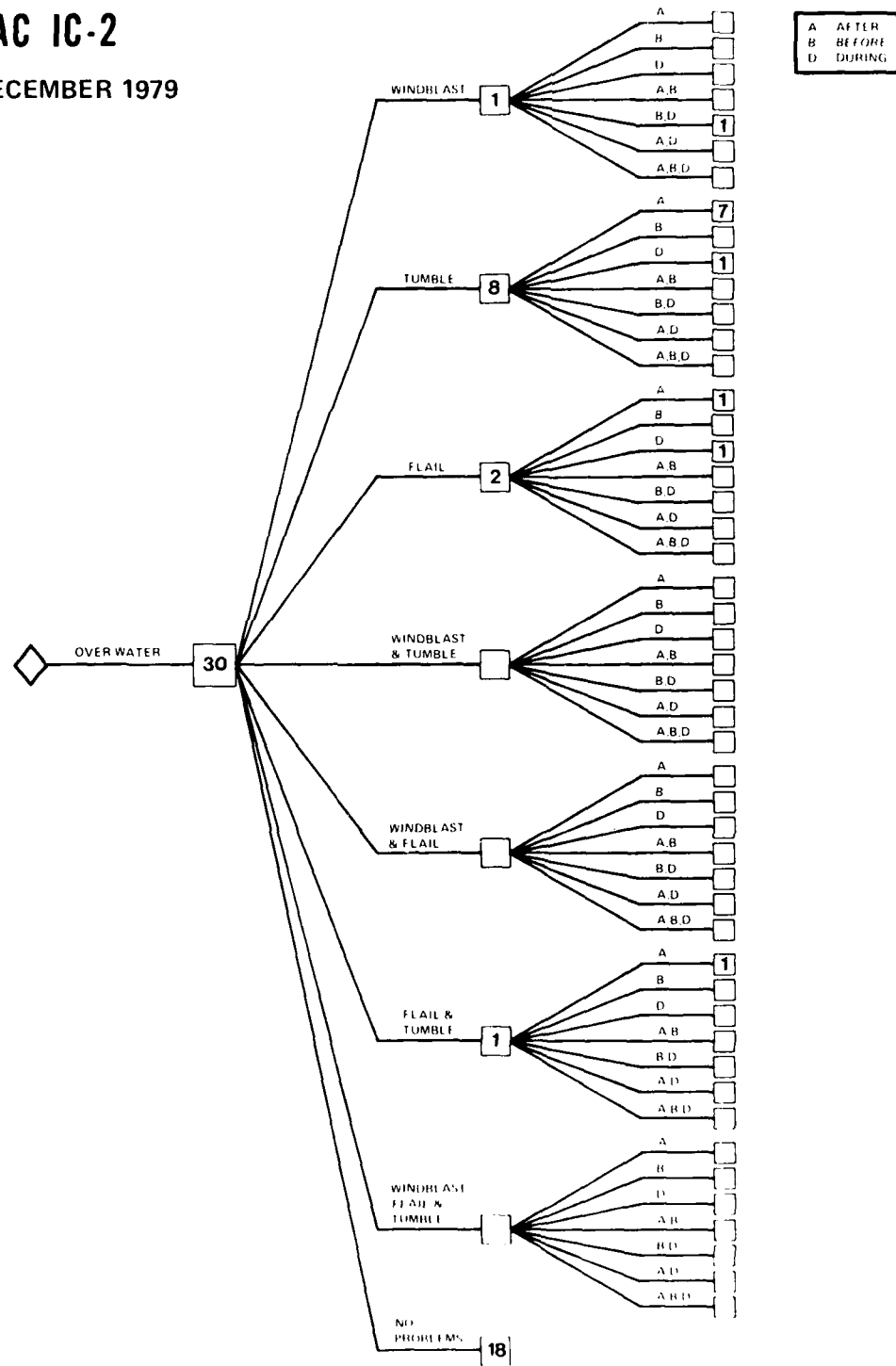
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IC-2

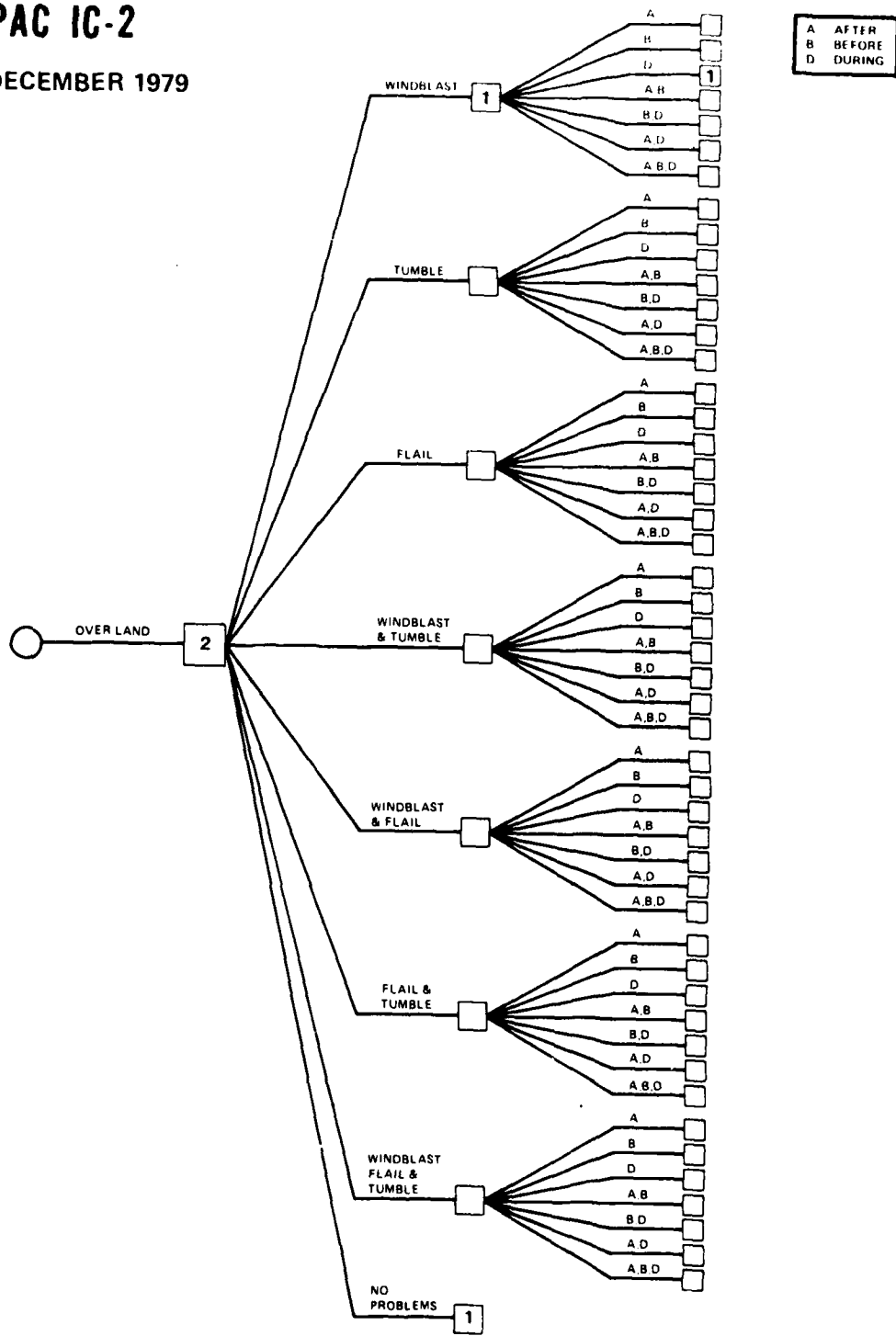
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IC-2

JANUARY 1969 – DECEMBER 1979

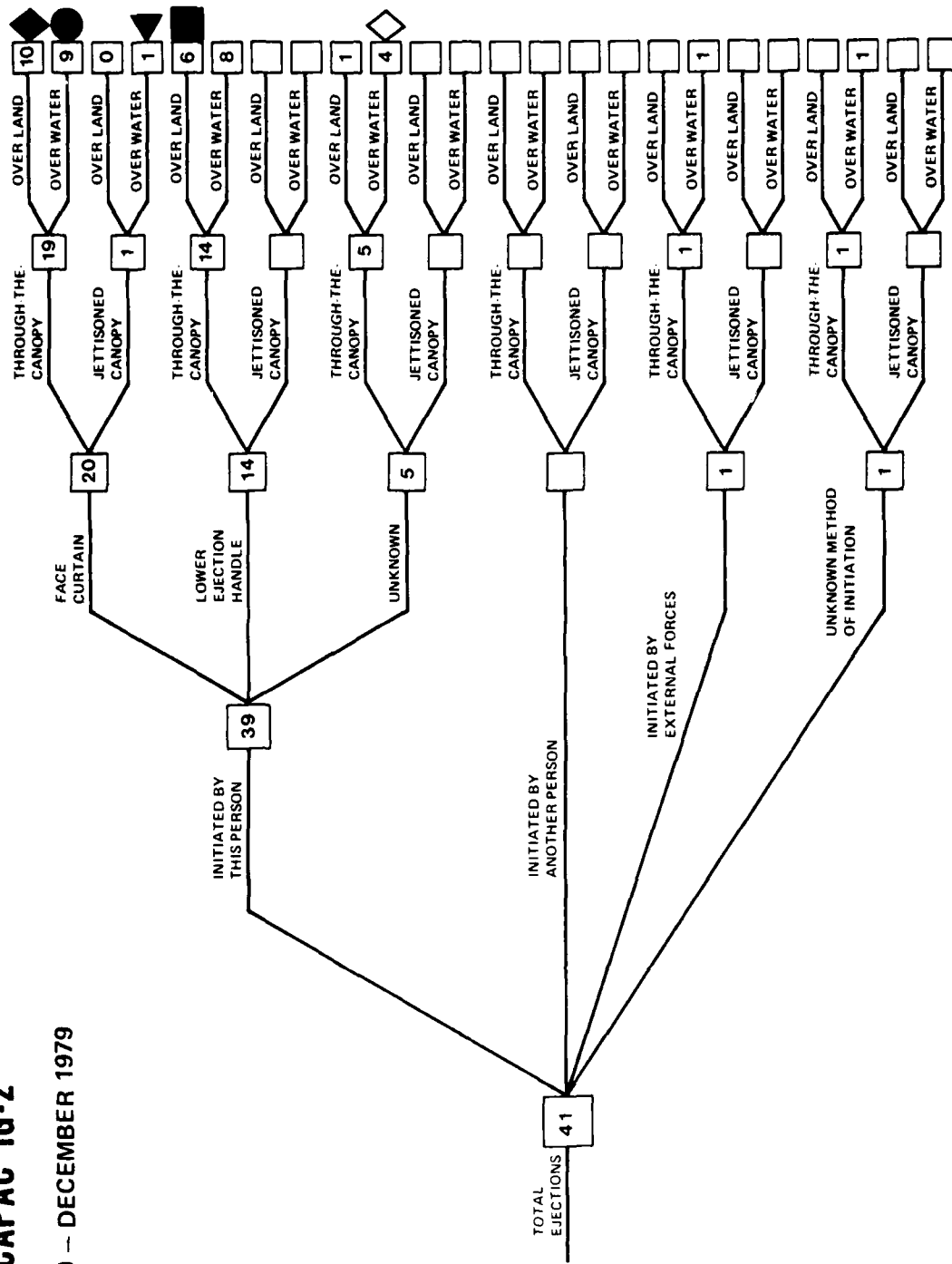


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

A-7/ESCAPAC IG-2

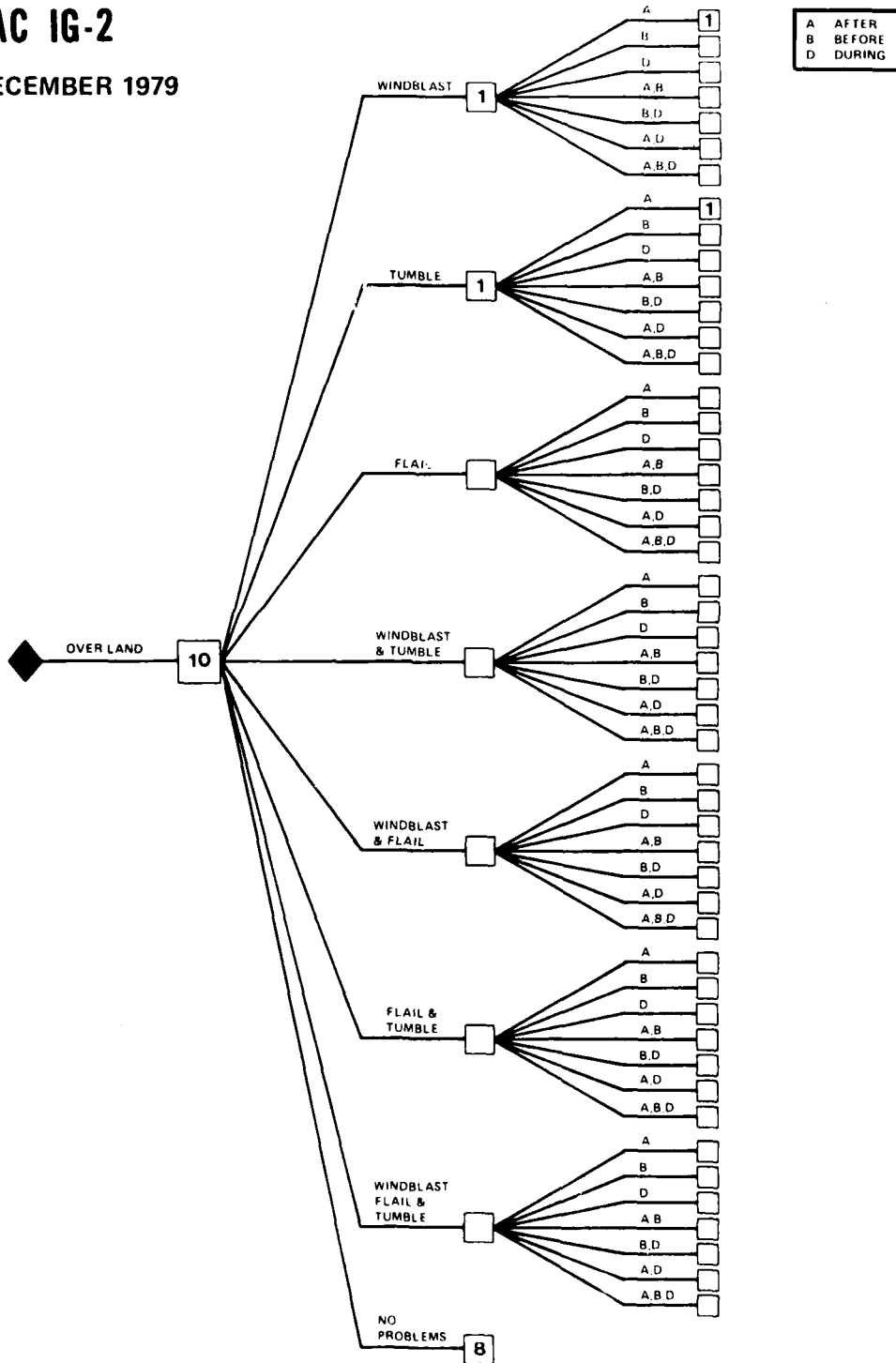
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IG-2

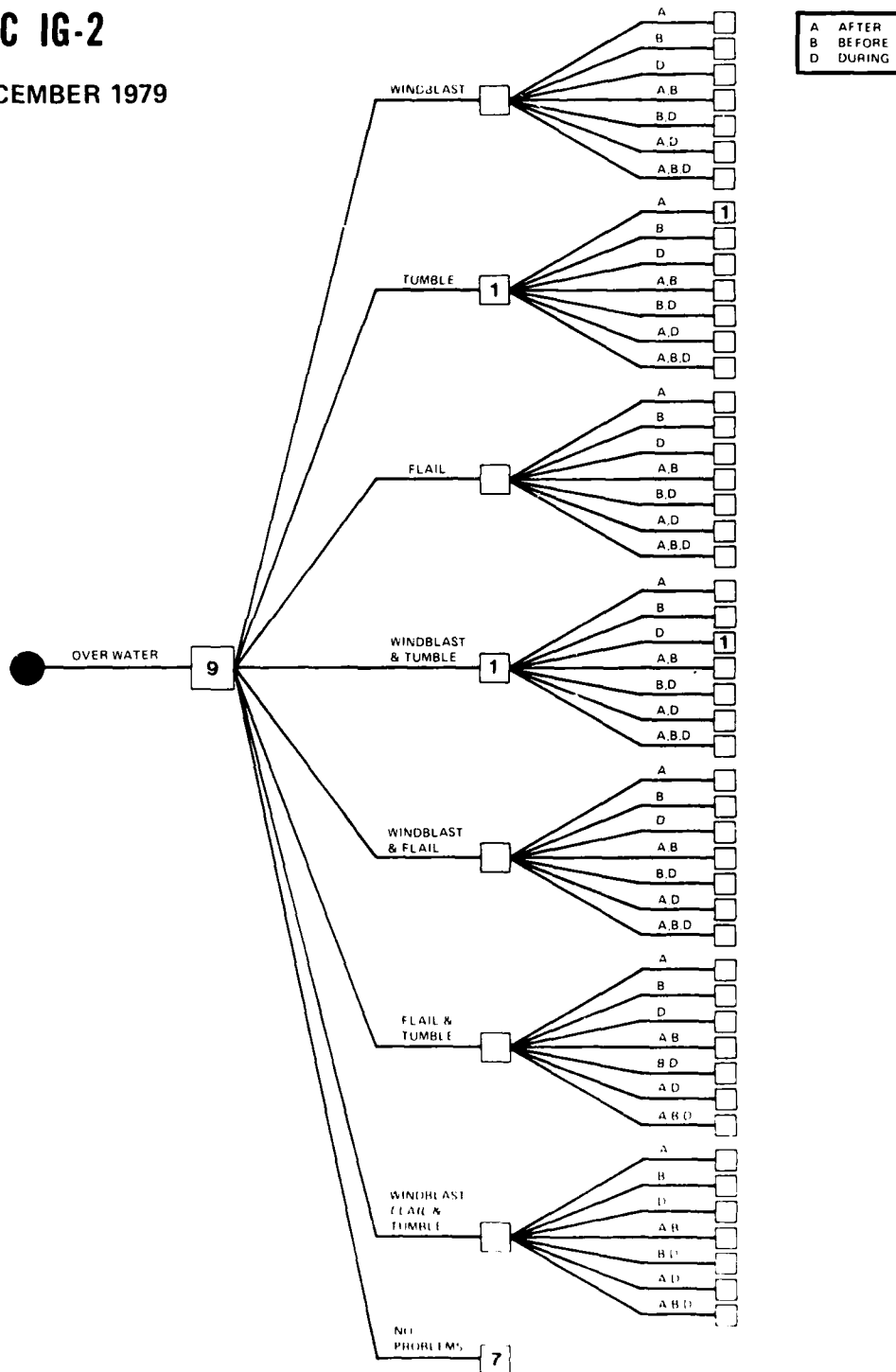
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IG-2

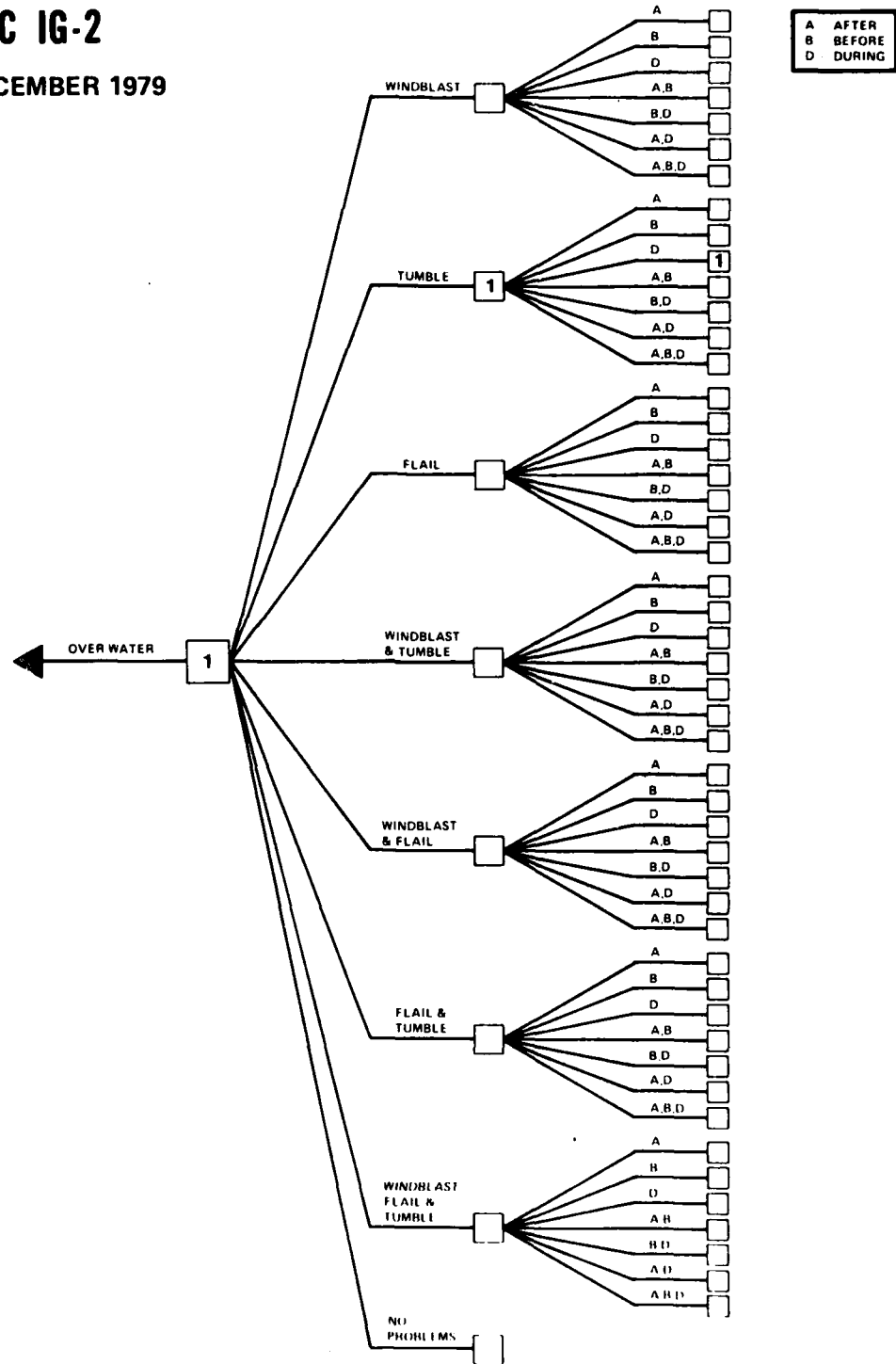
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IG-2

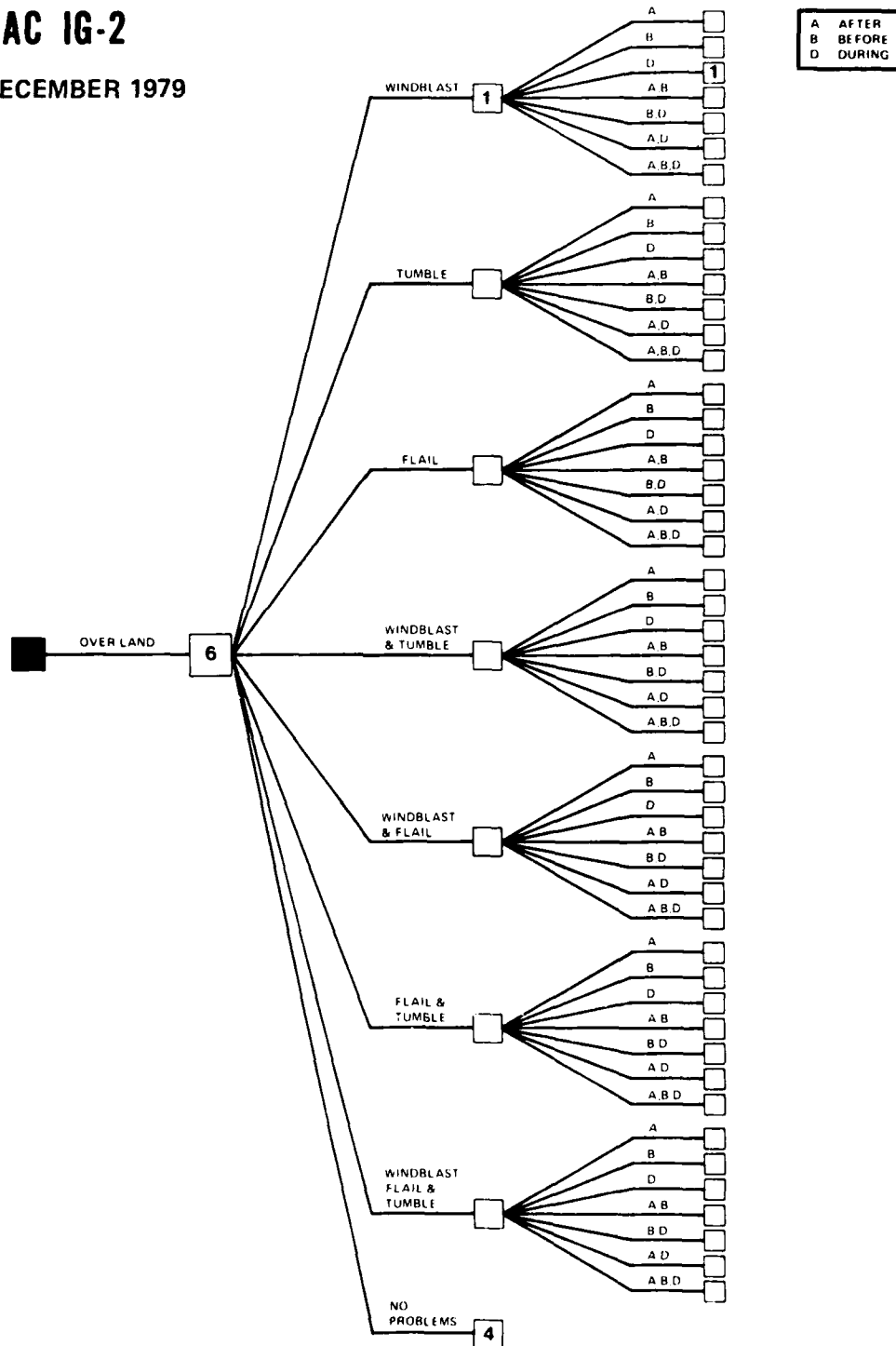
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IG-2

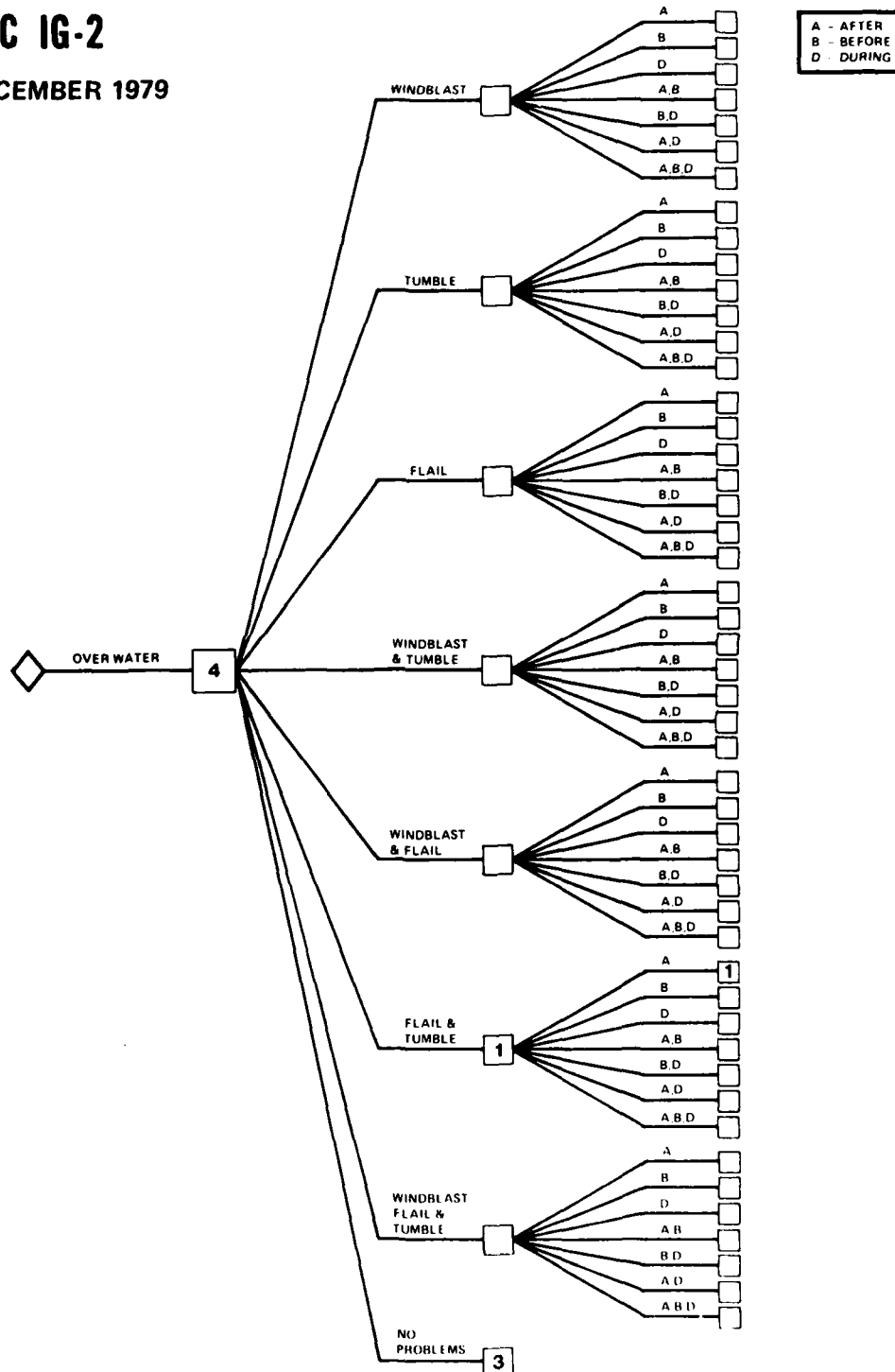
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IG-2

JANUARY 1969 - DECEMBER 1979

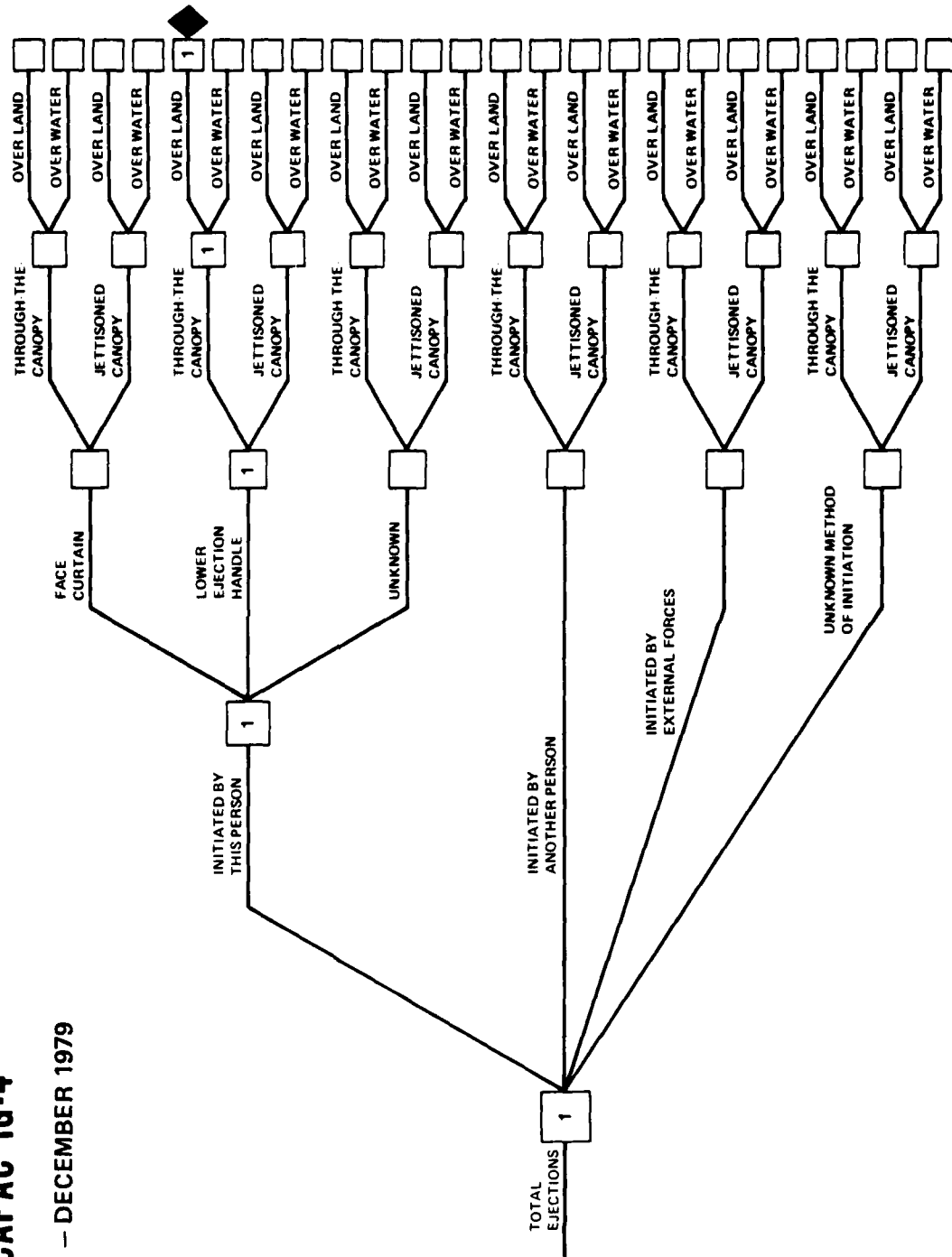


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

A-7/ESCAPAC IG-4

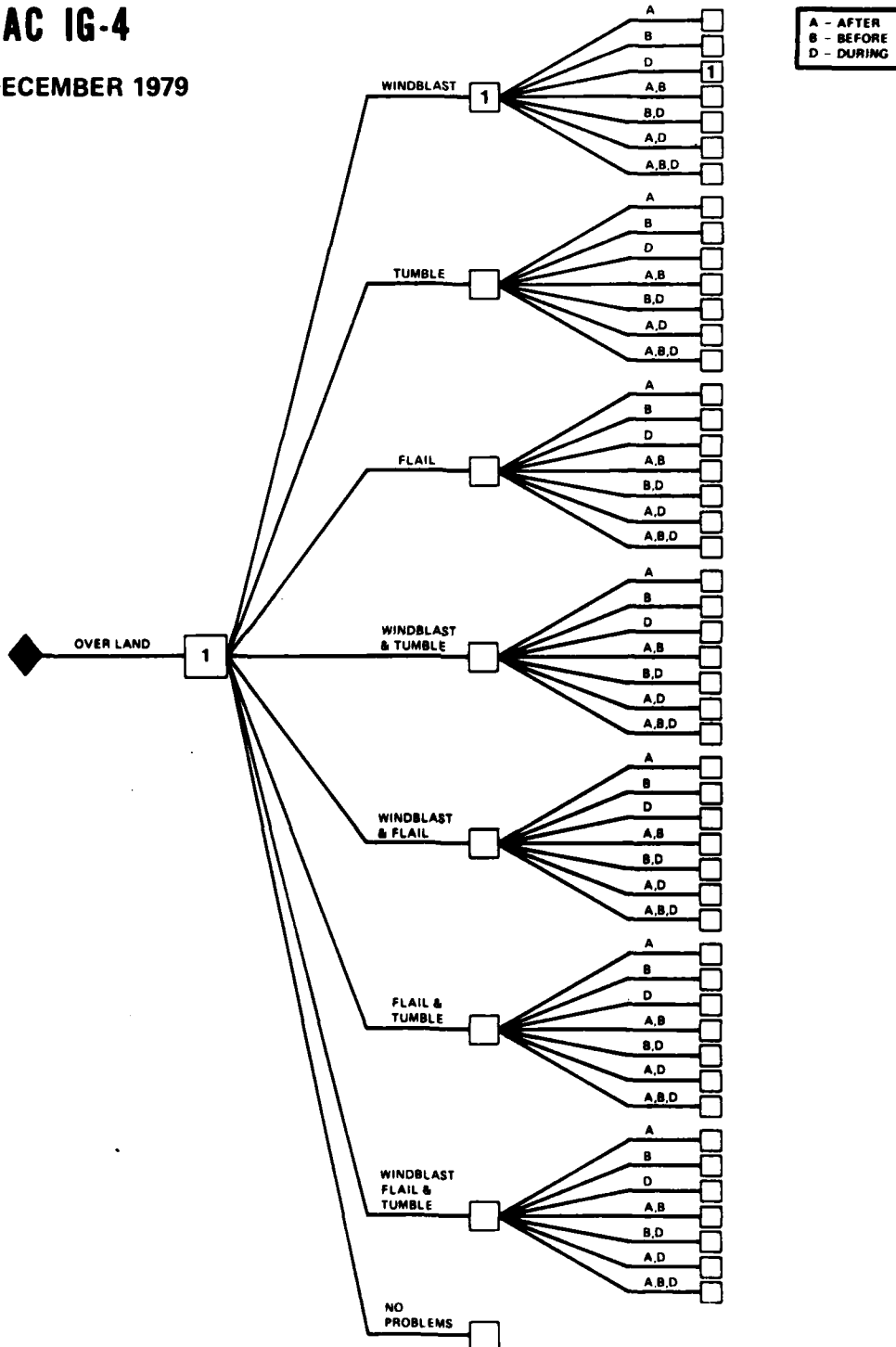
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-7/ESCAPAC IG-4

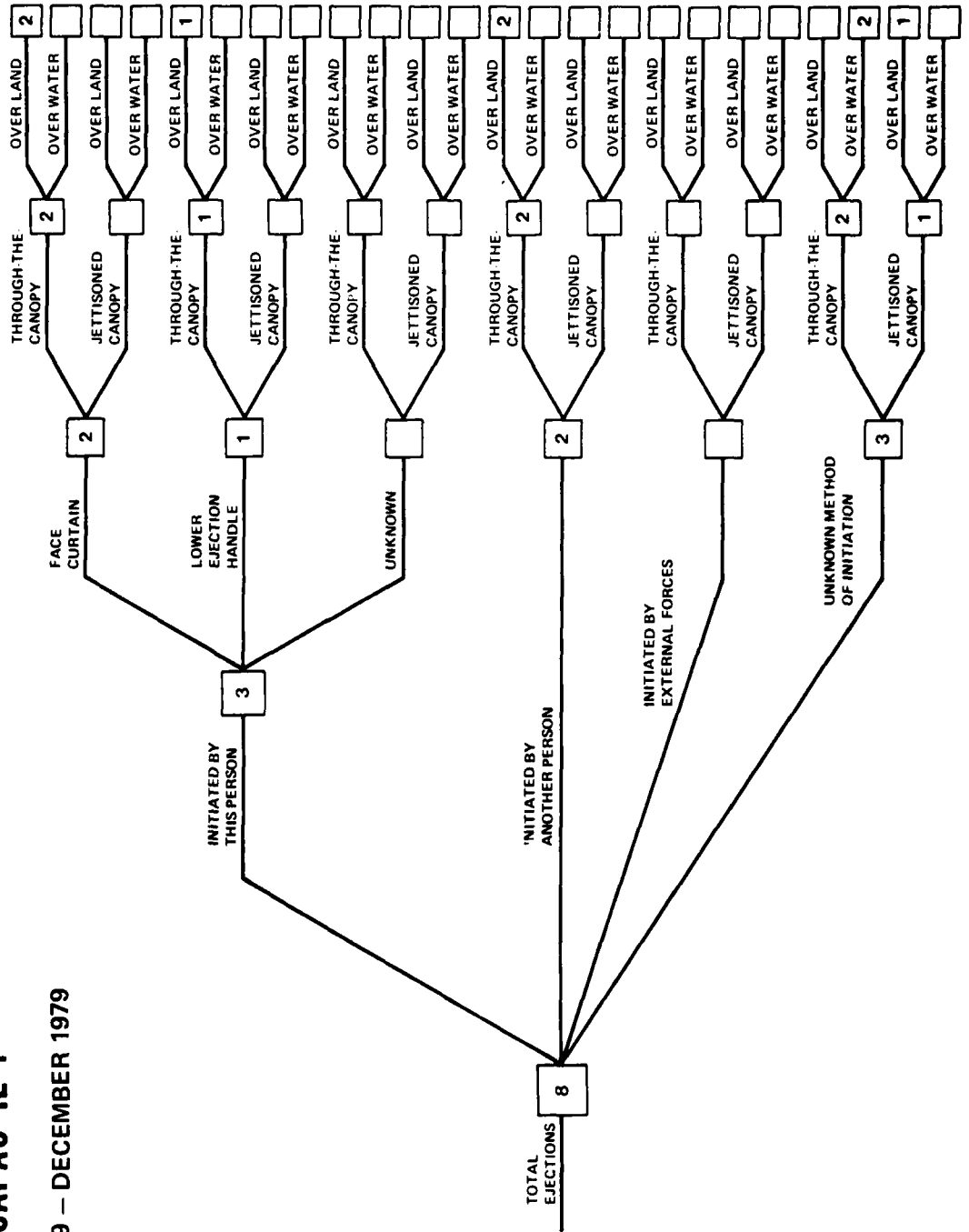
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

S-3/ESCAPAC IE-1

JANUARY 1969 - DECEMBER 1979

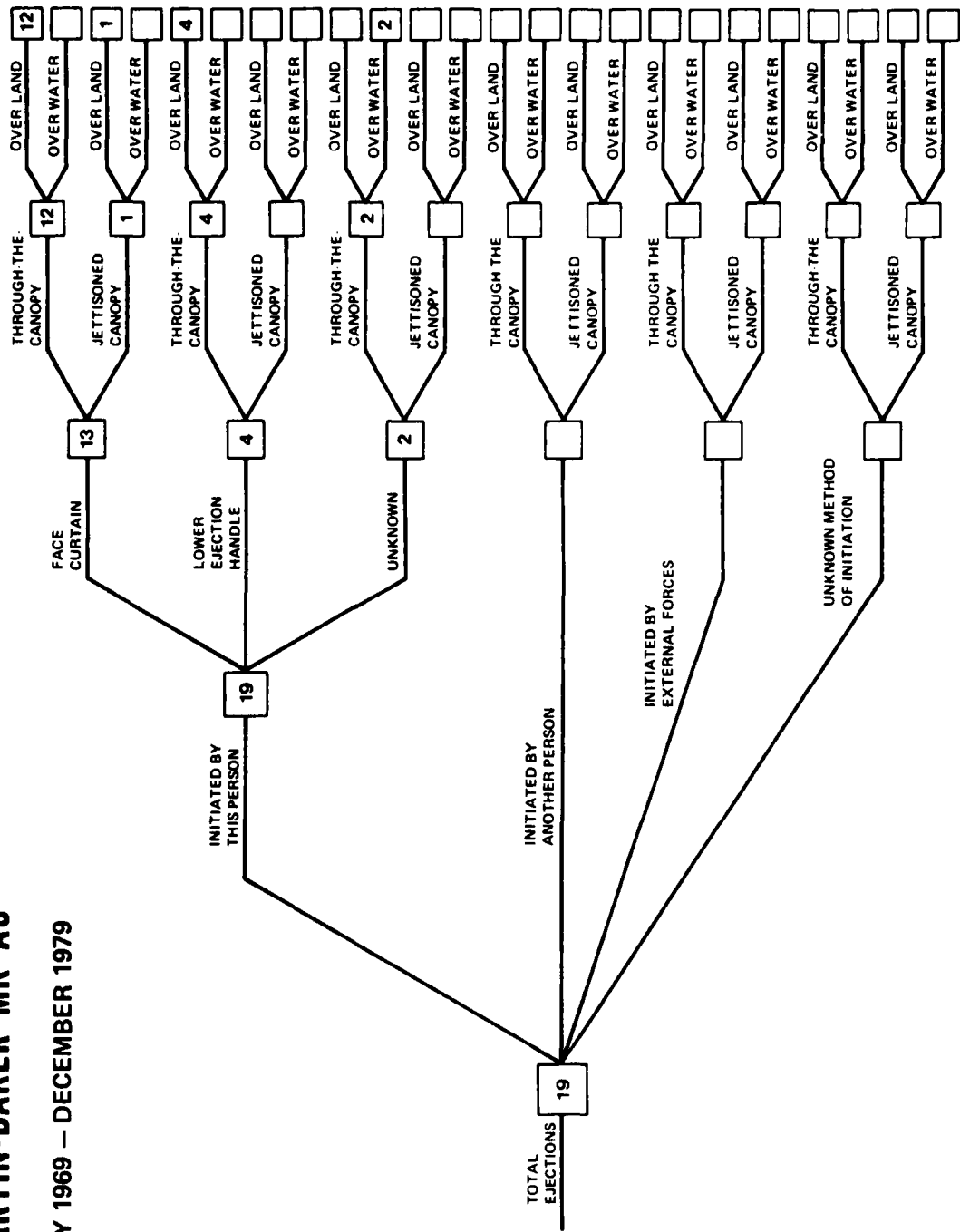


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

F-9/MARTIN-BAKER MK A5

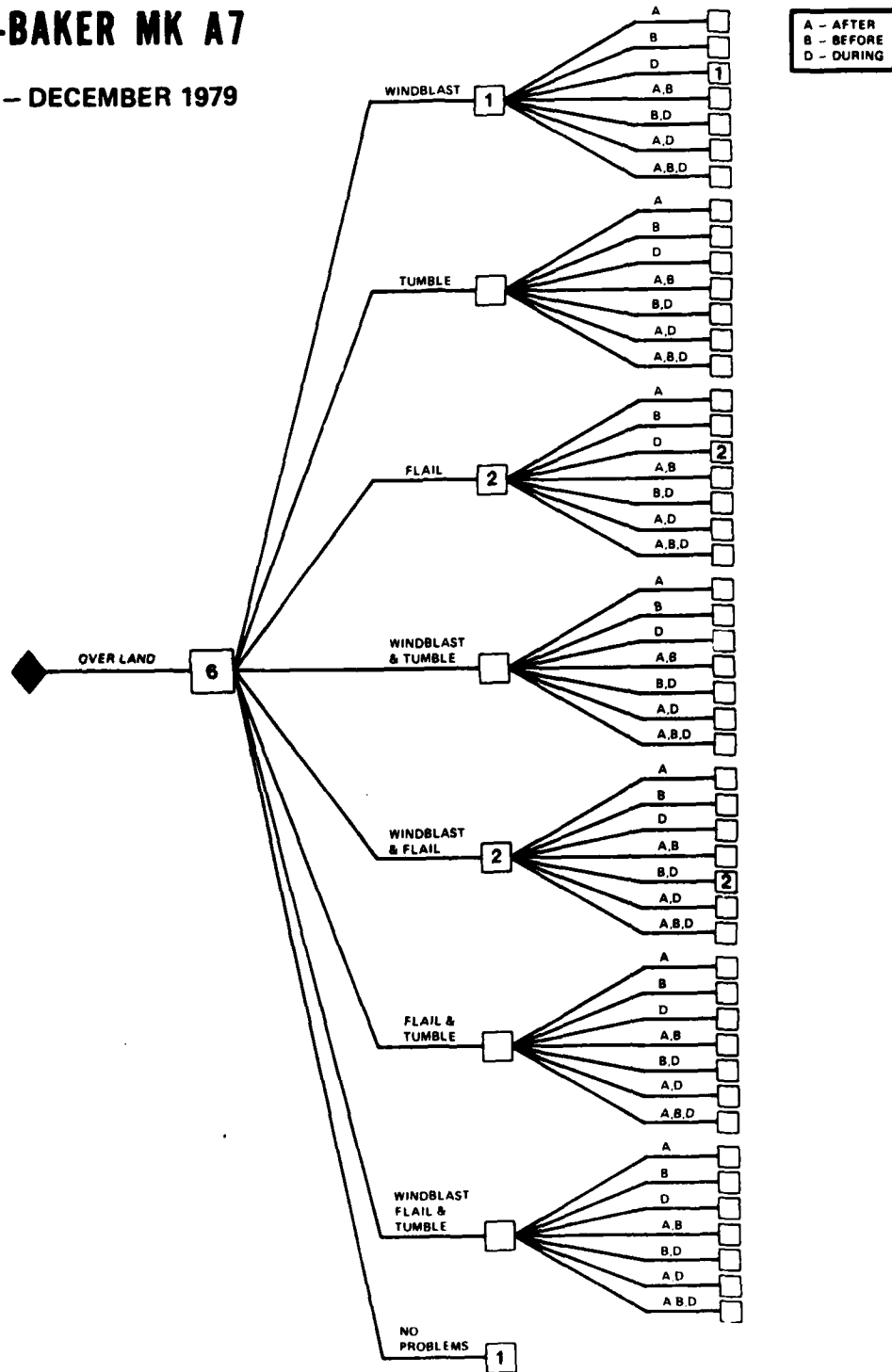
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-9/MARTIN-BAKER MK A7

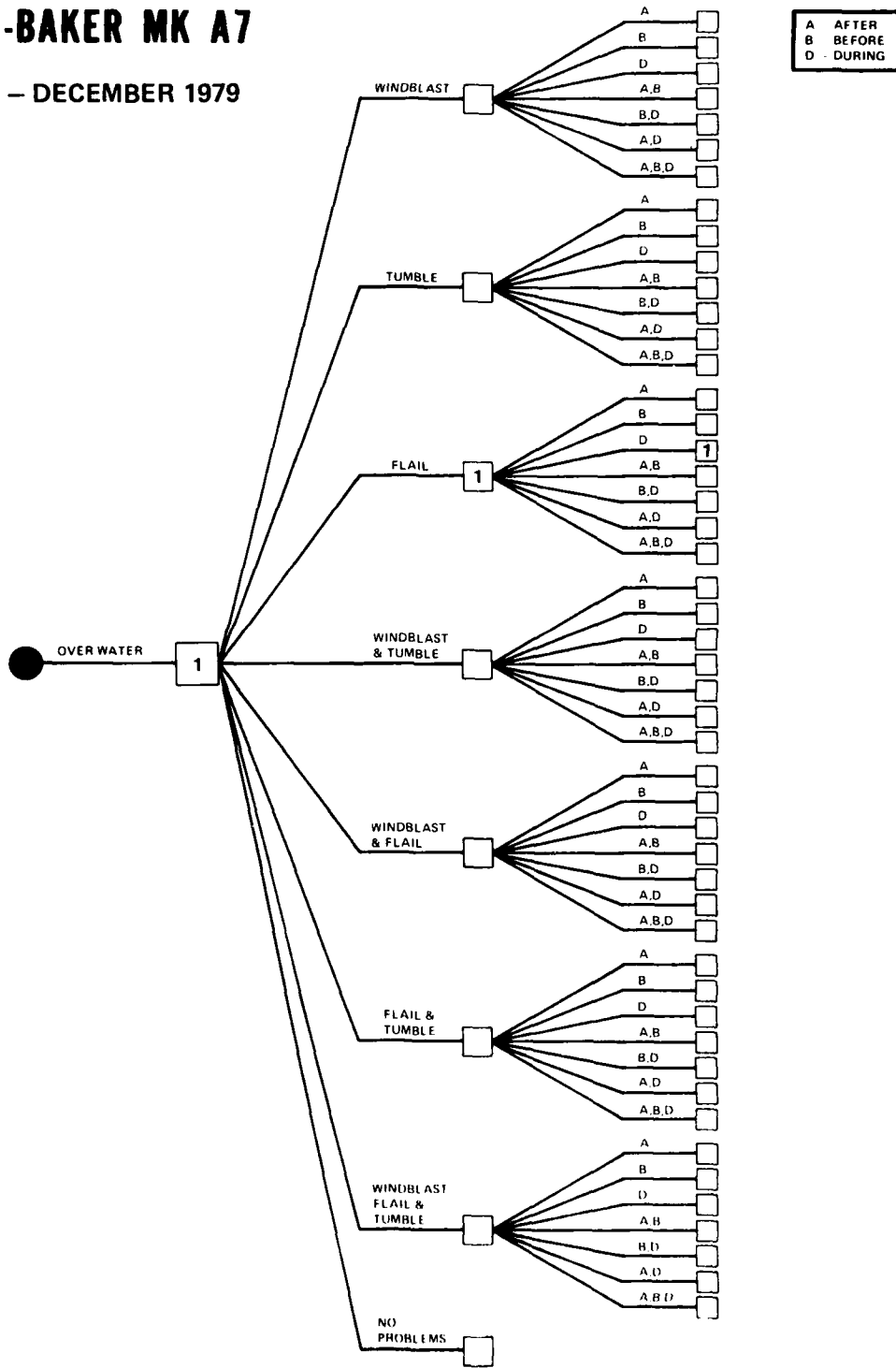
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-9/MARTIN-BAKER MK A7

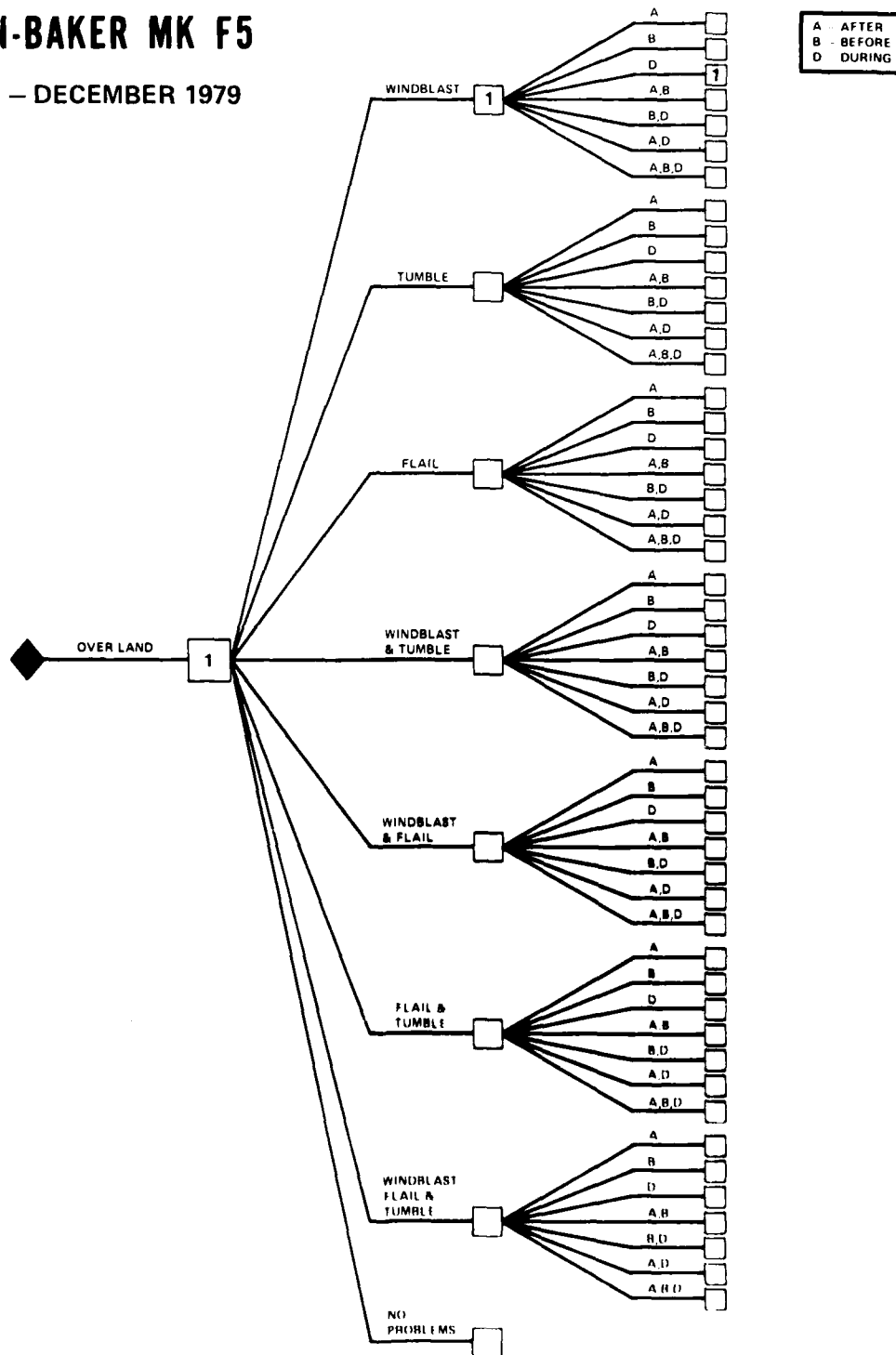
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-8/MARTIN-BAKER MK F5

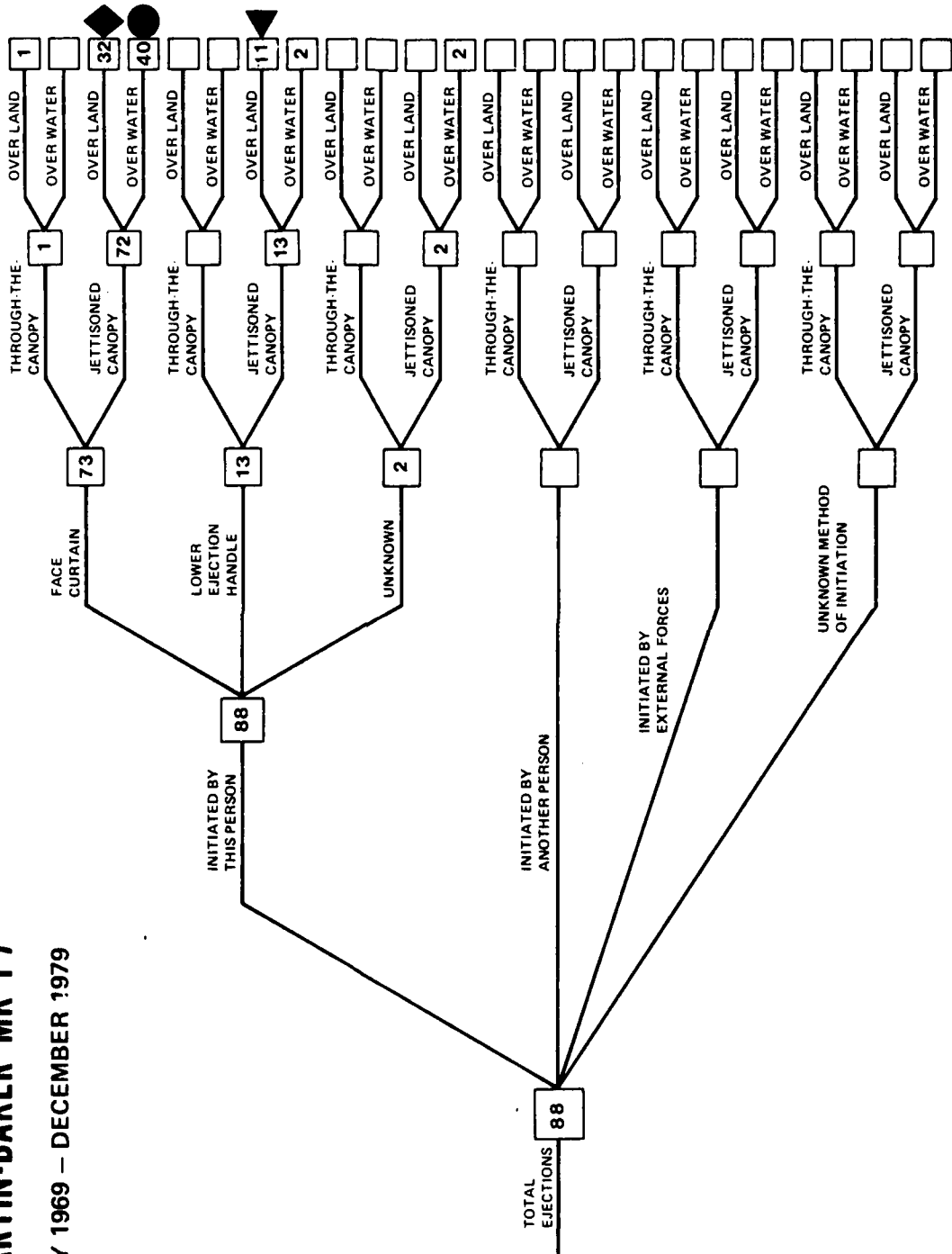
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

F-8/MARTIN-BAKER MK F7

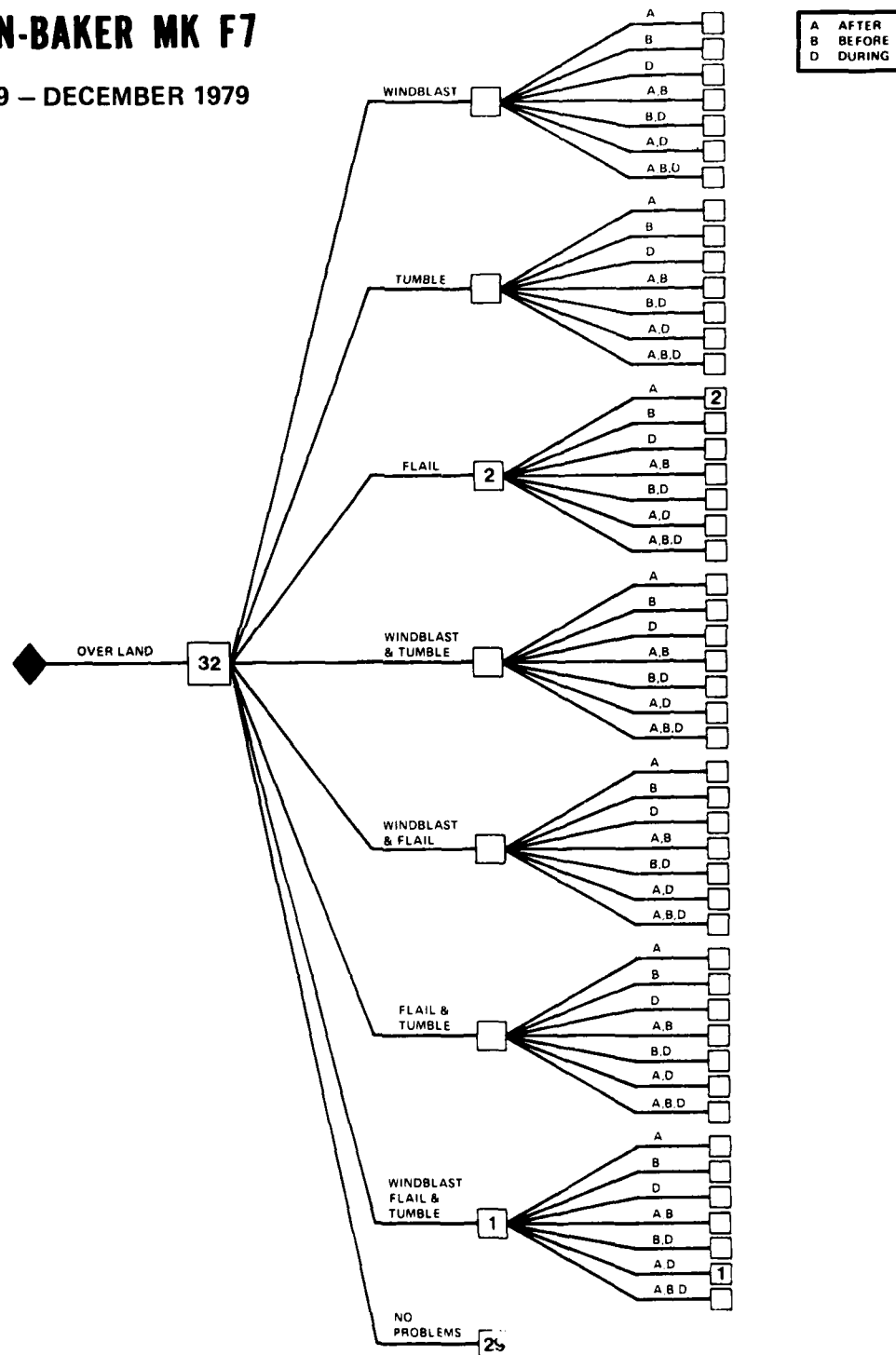
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-8/MARTIN-BAKER MK F7

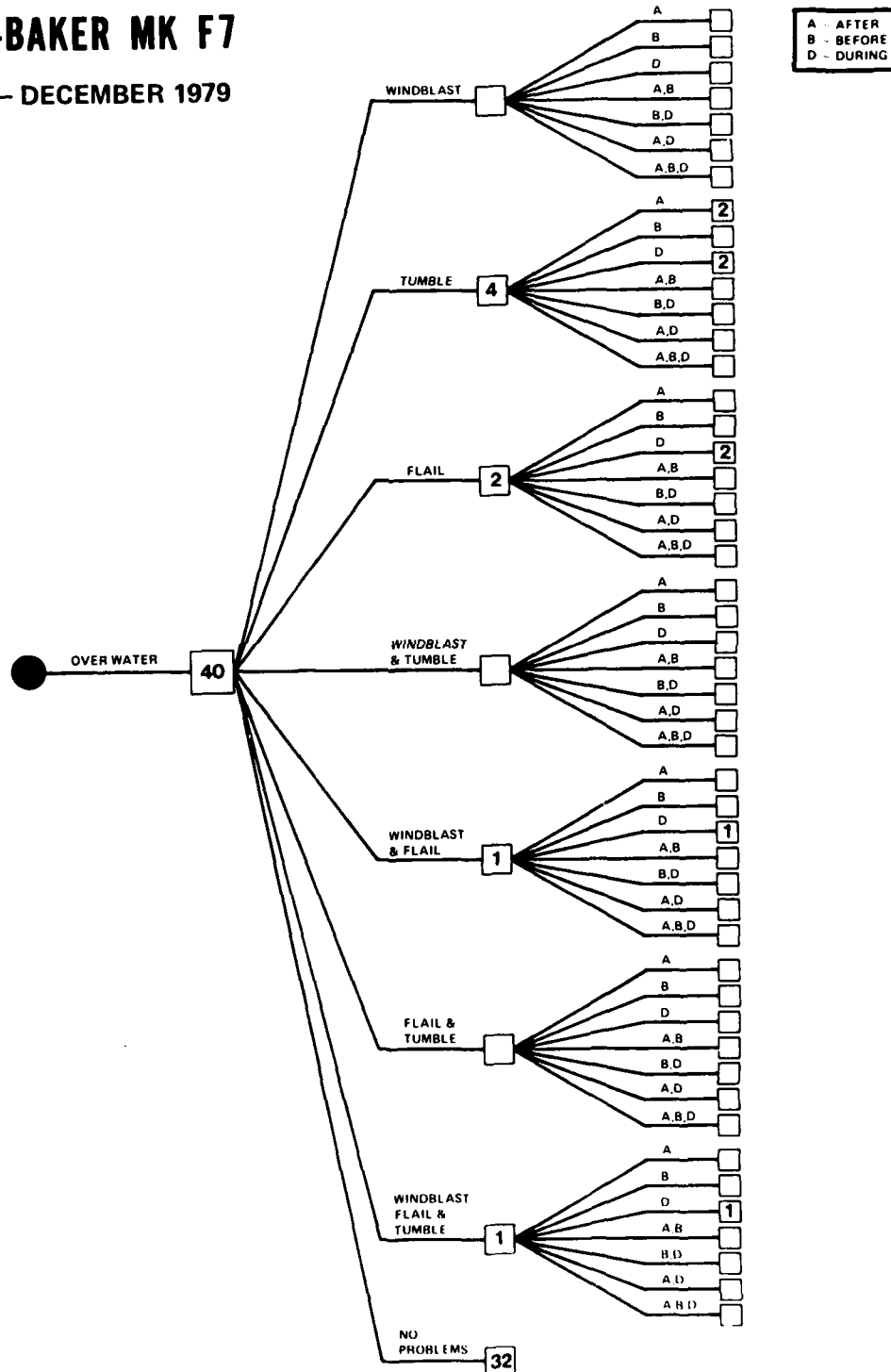
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-8/MARTIN-BAKER MK F7

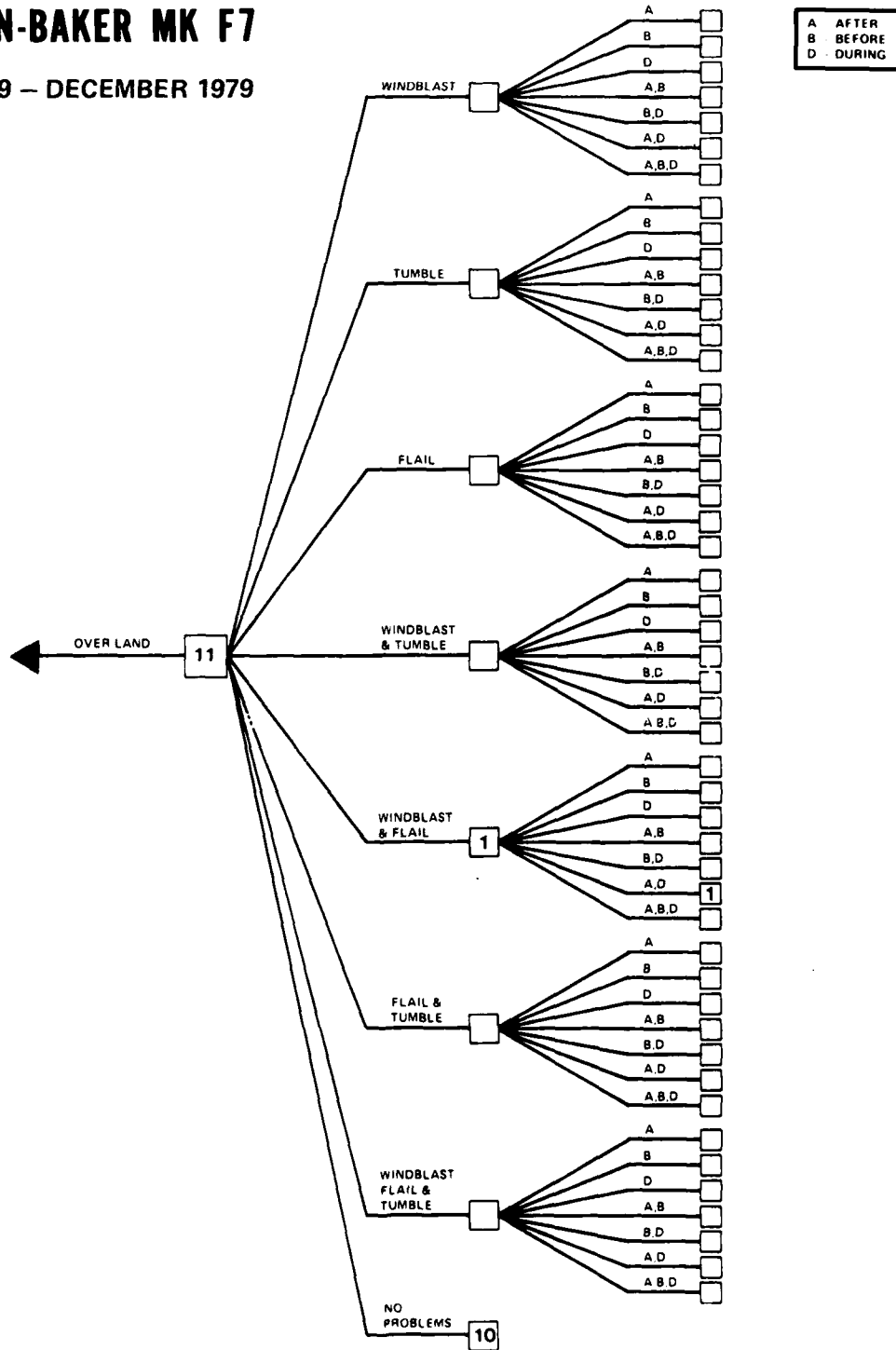
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-8/MARTIN-BAKER MK F7

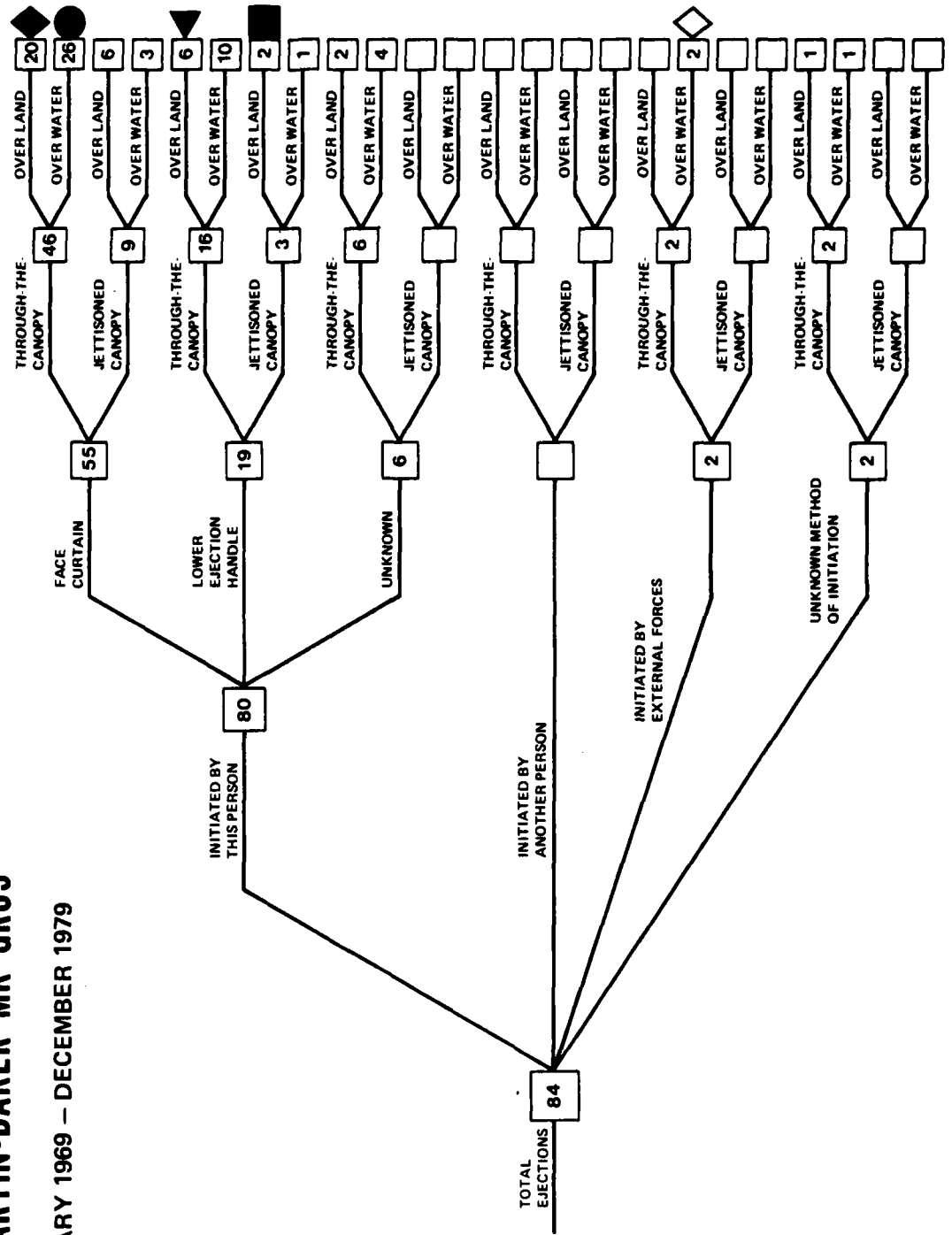
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

A-6/MARTIN-BAKER MK GRU5

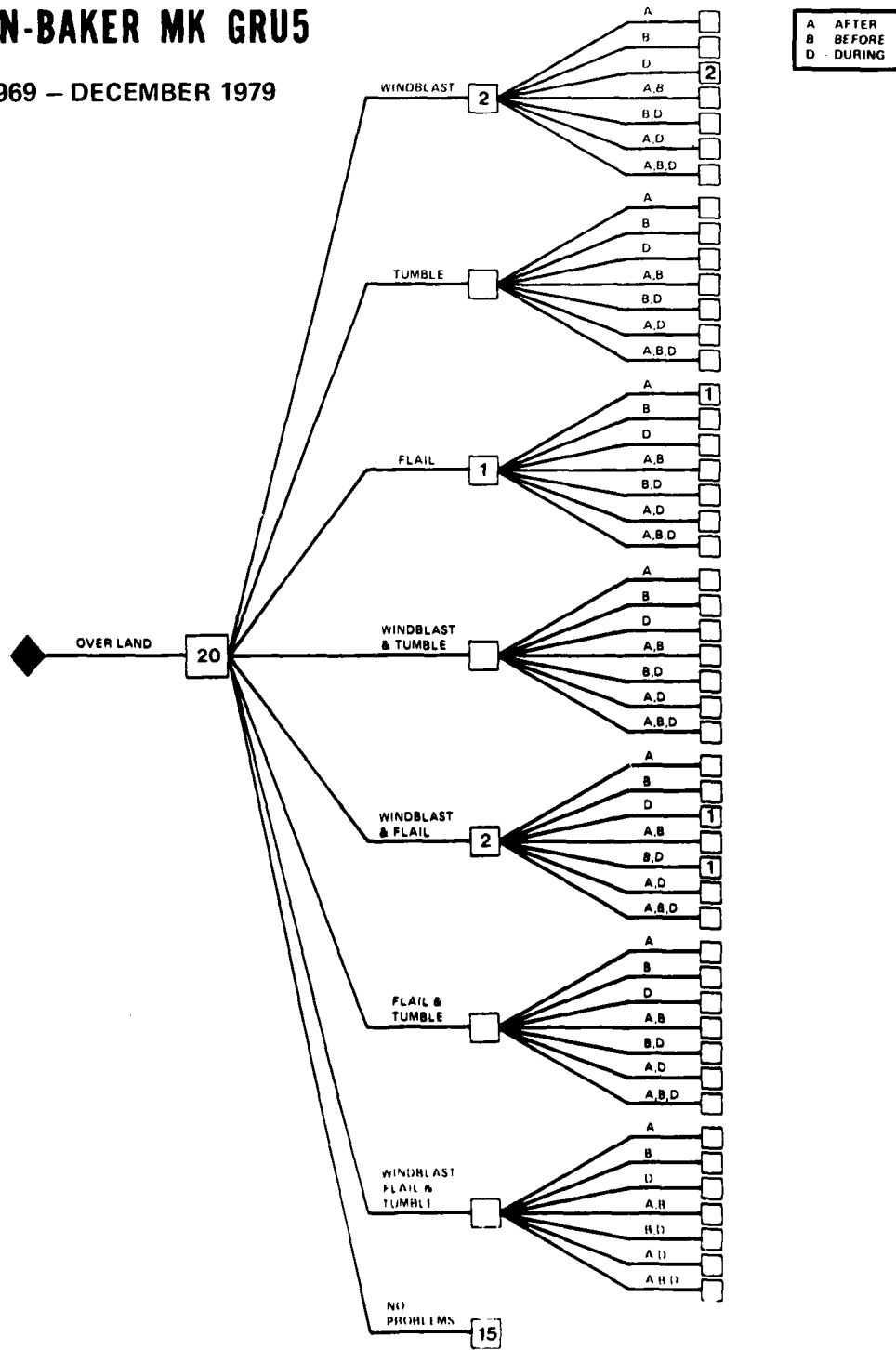
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU5

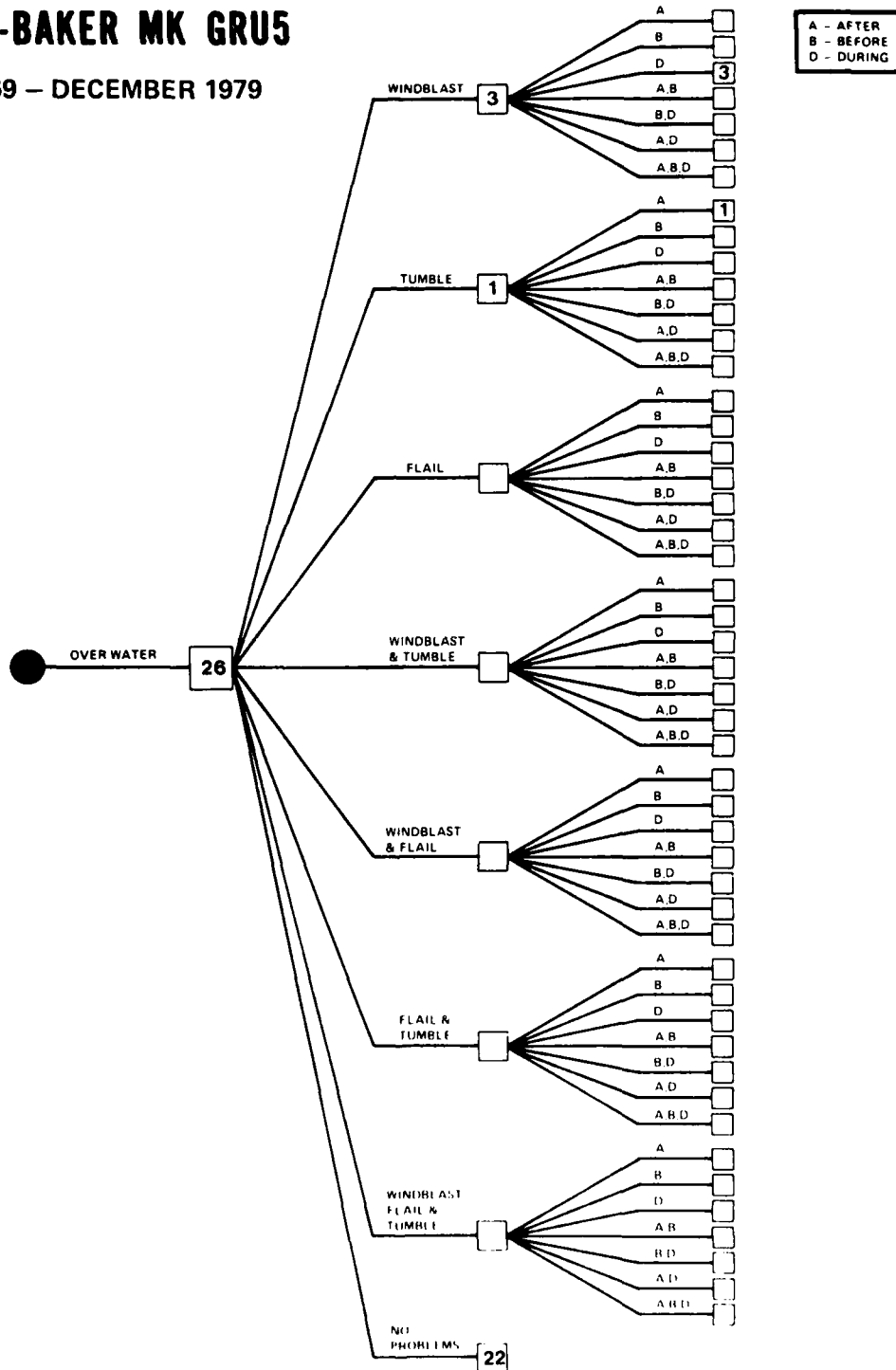
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU5

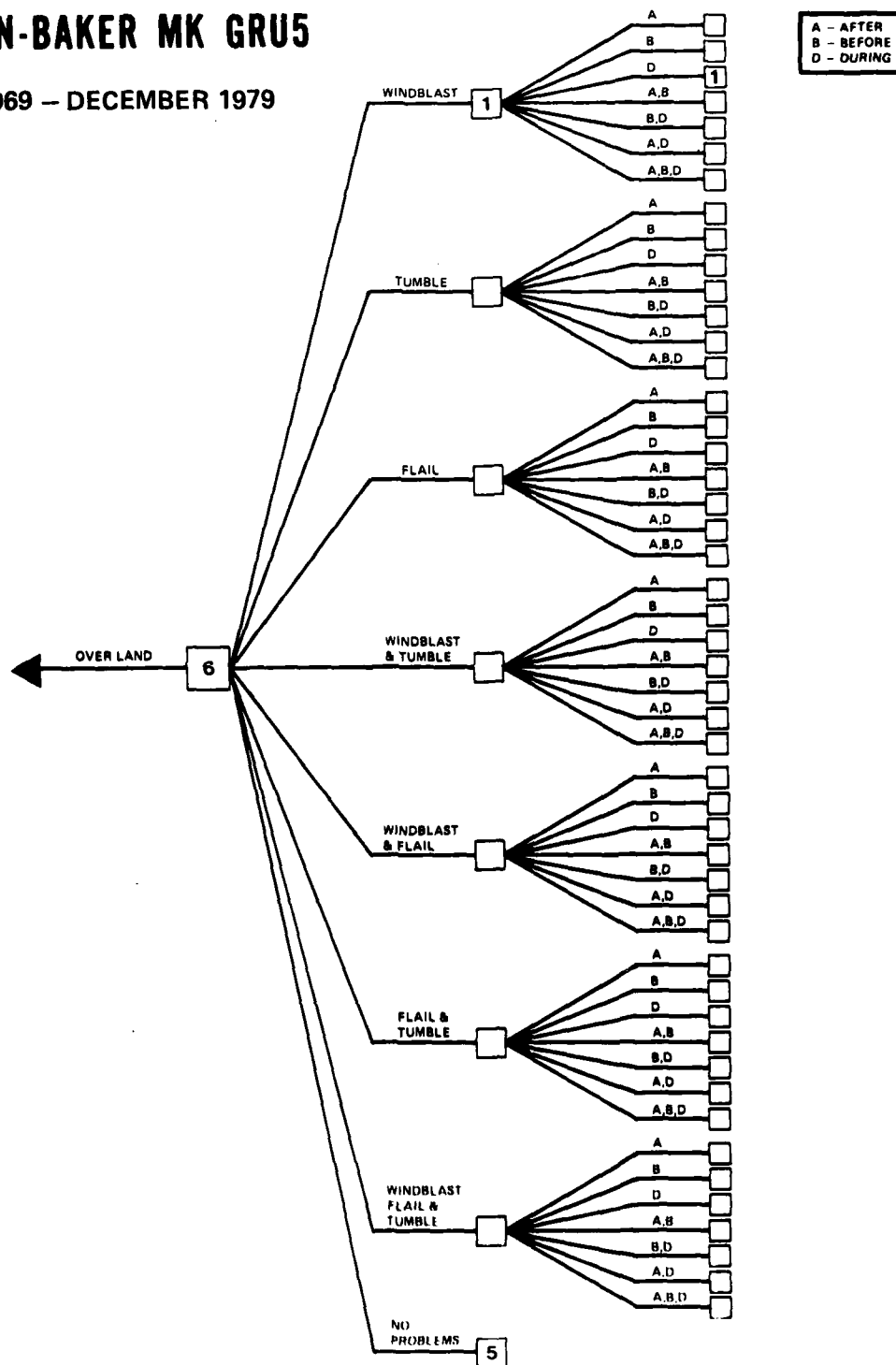
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU5

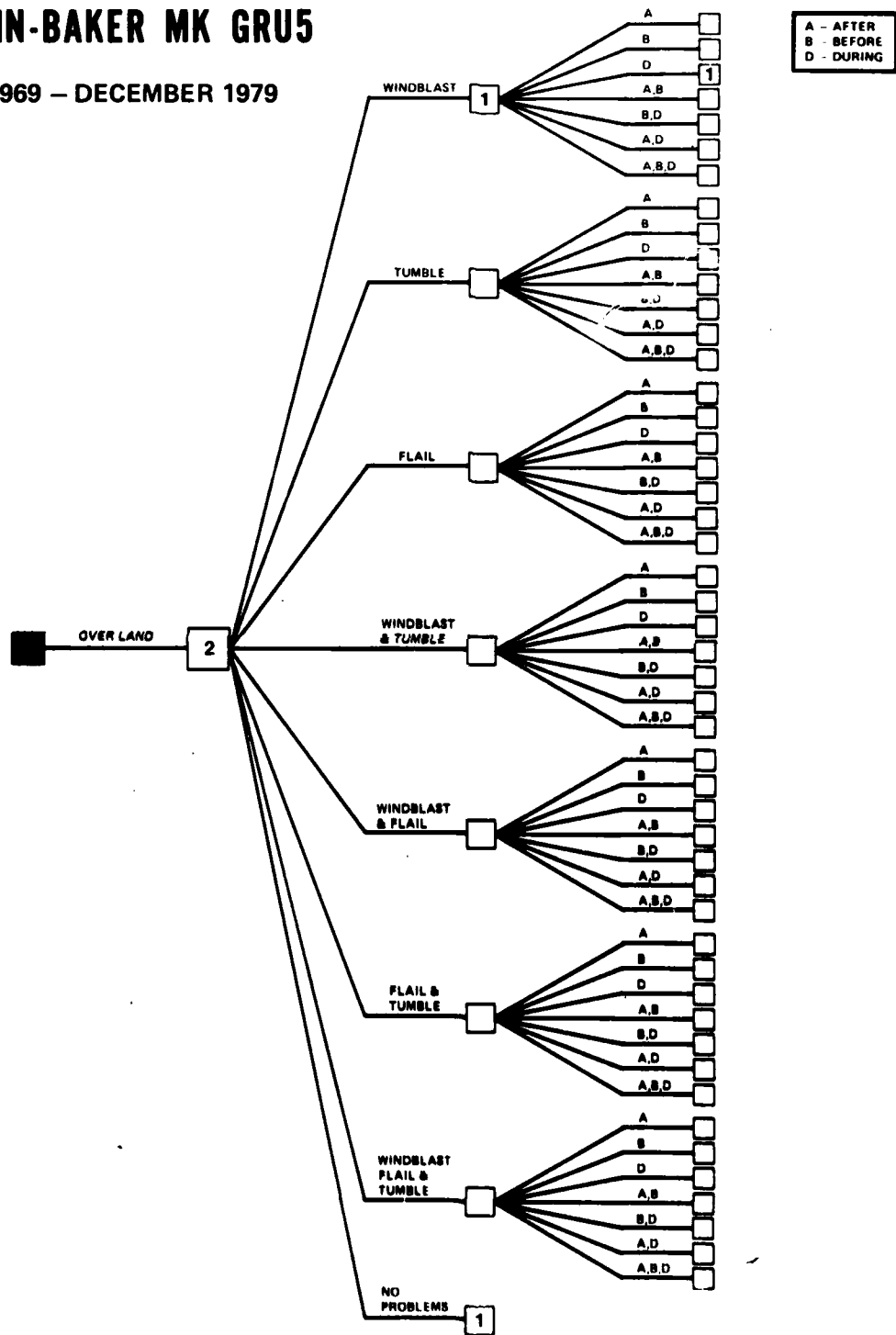
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU5

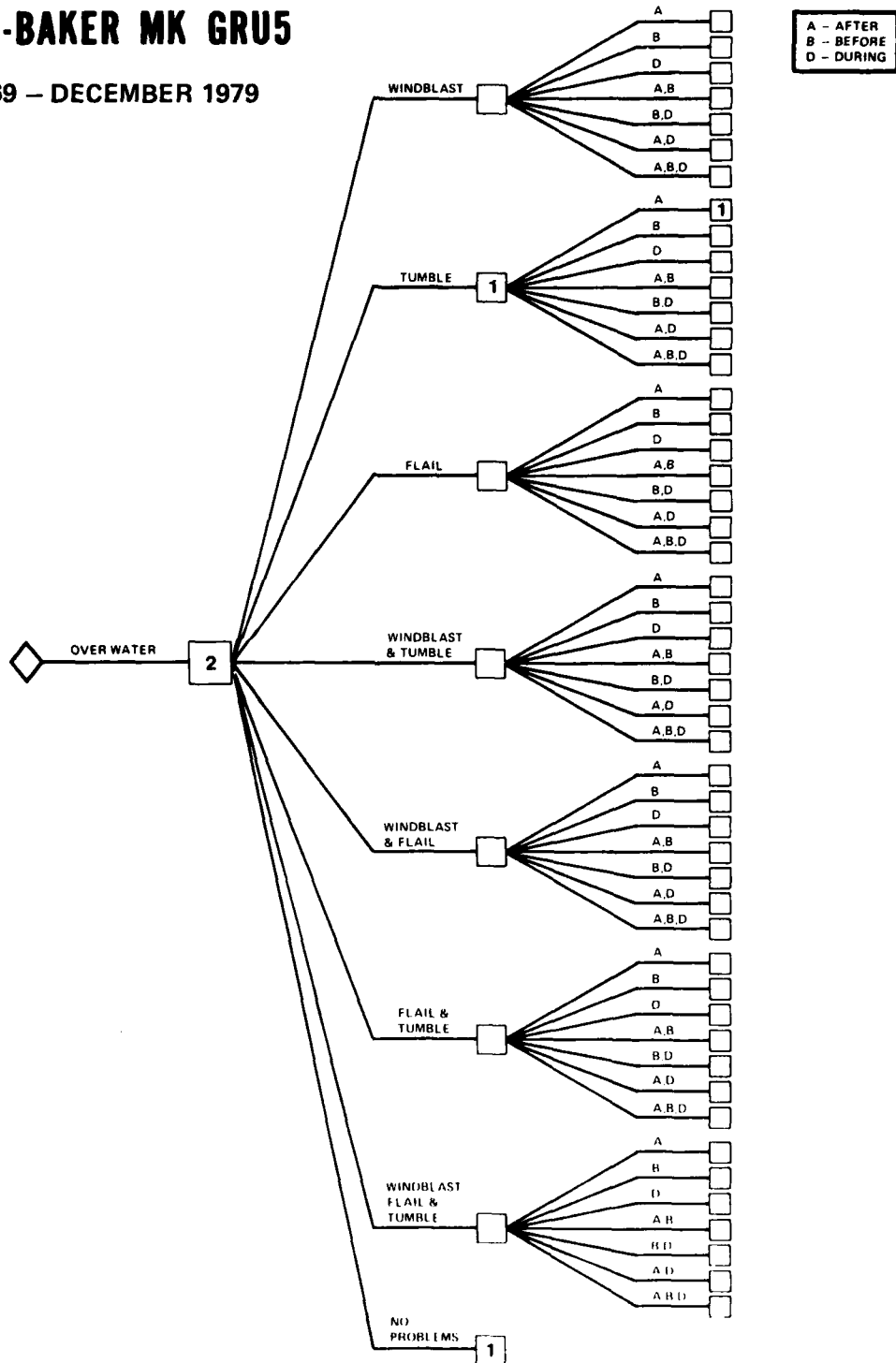
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

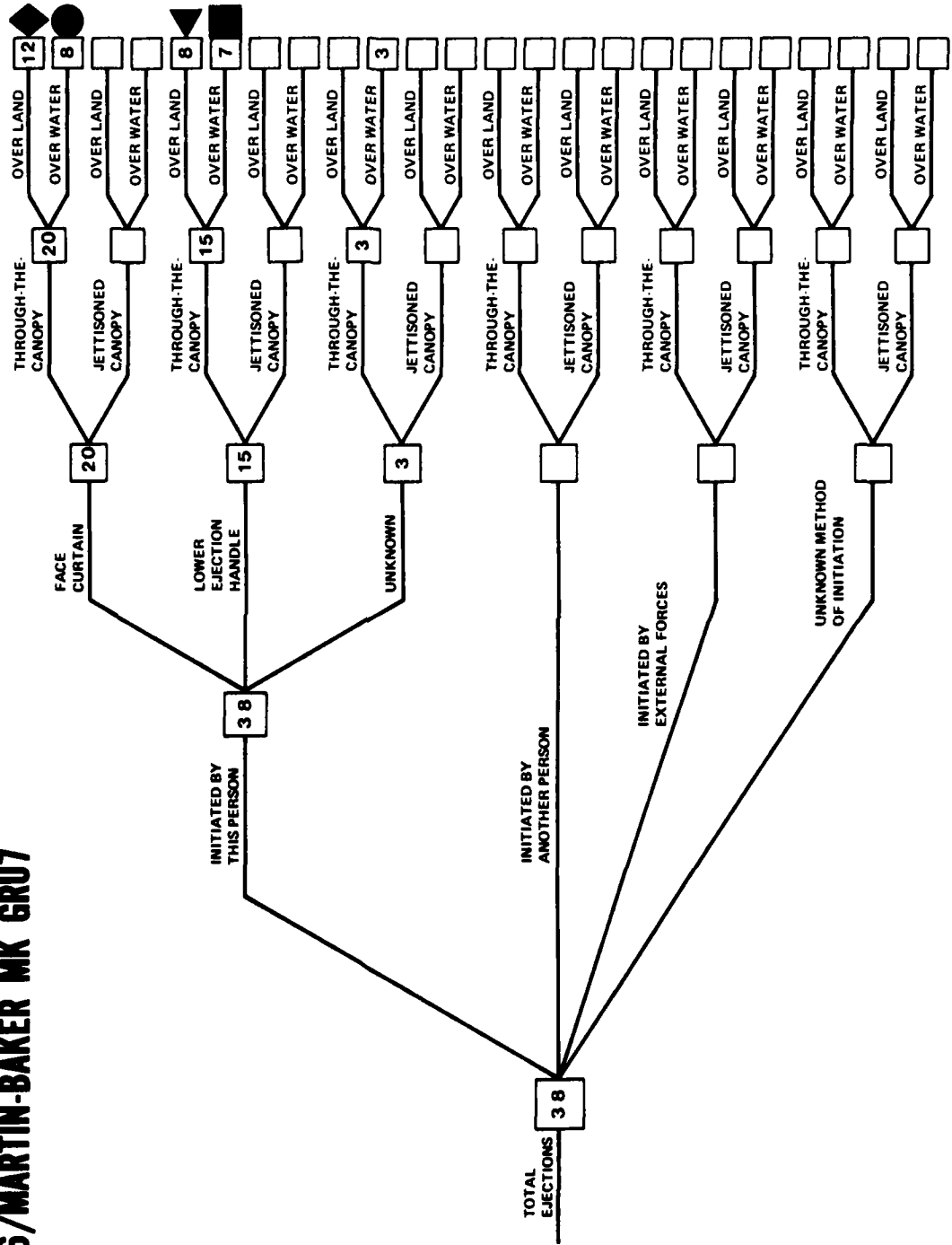
A-6/MARTIN-BAKER MK GRU5

JANUARY 1969 - DECEMBER 1979



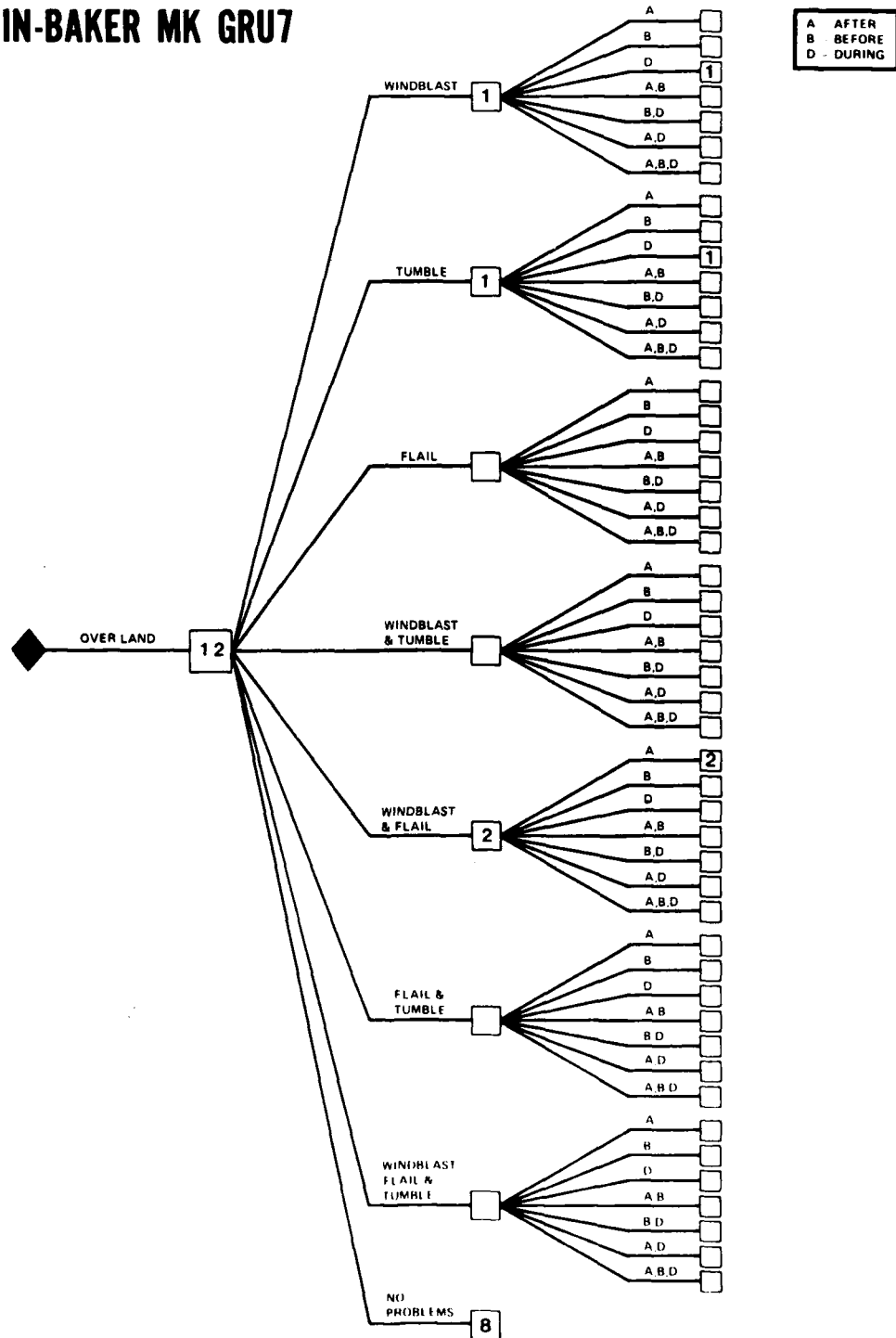
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

A-6/MARTIN-BAKER MK GRU7



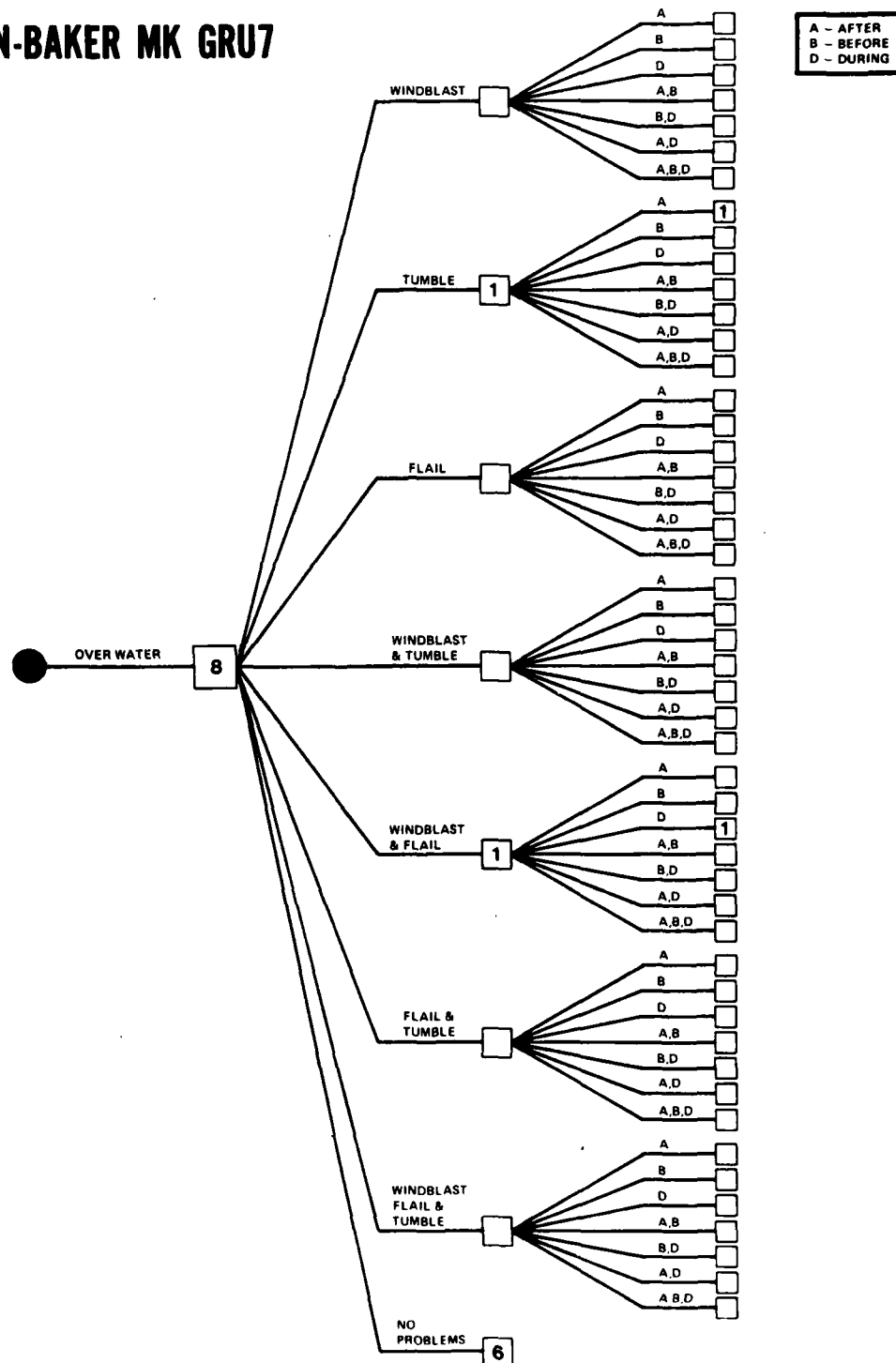
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU7



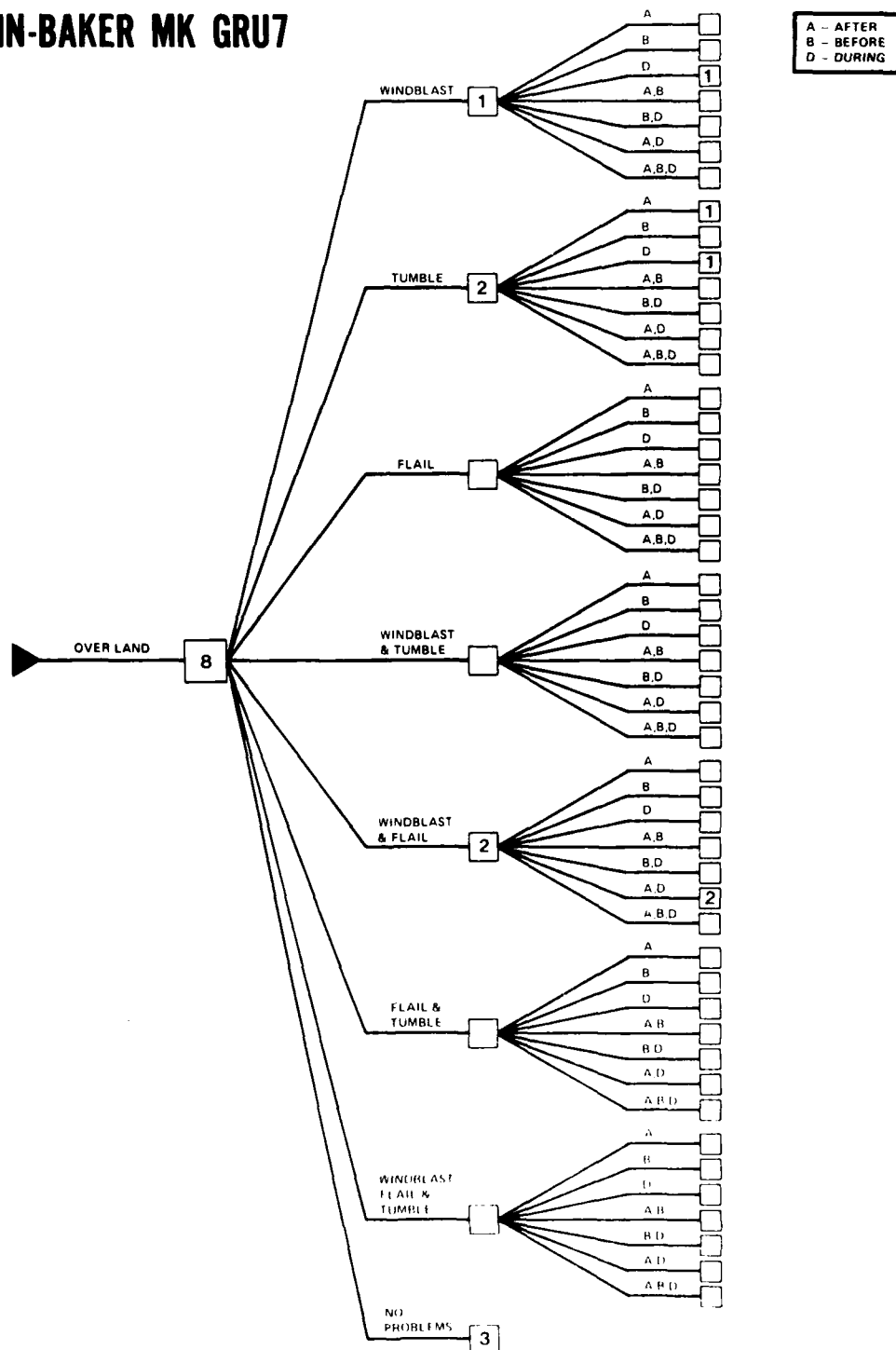
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU7



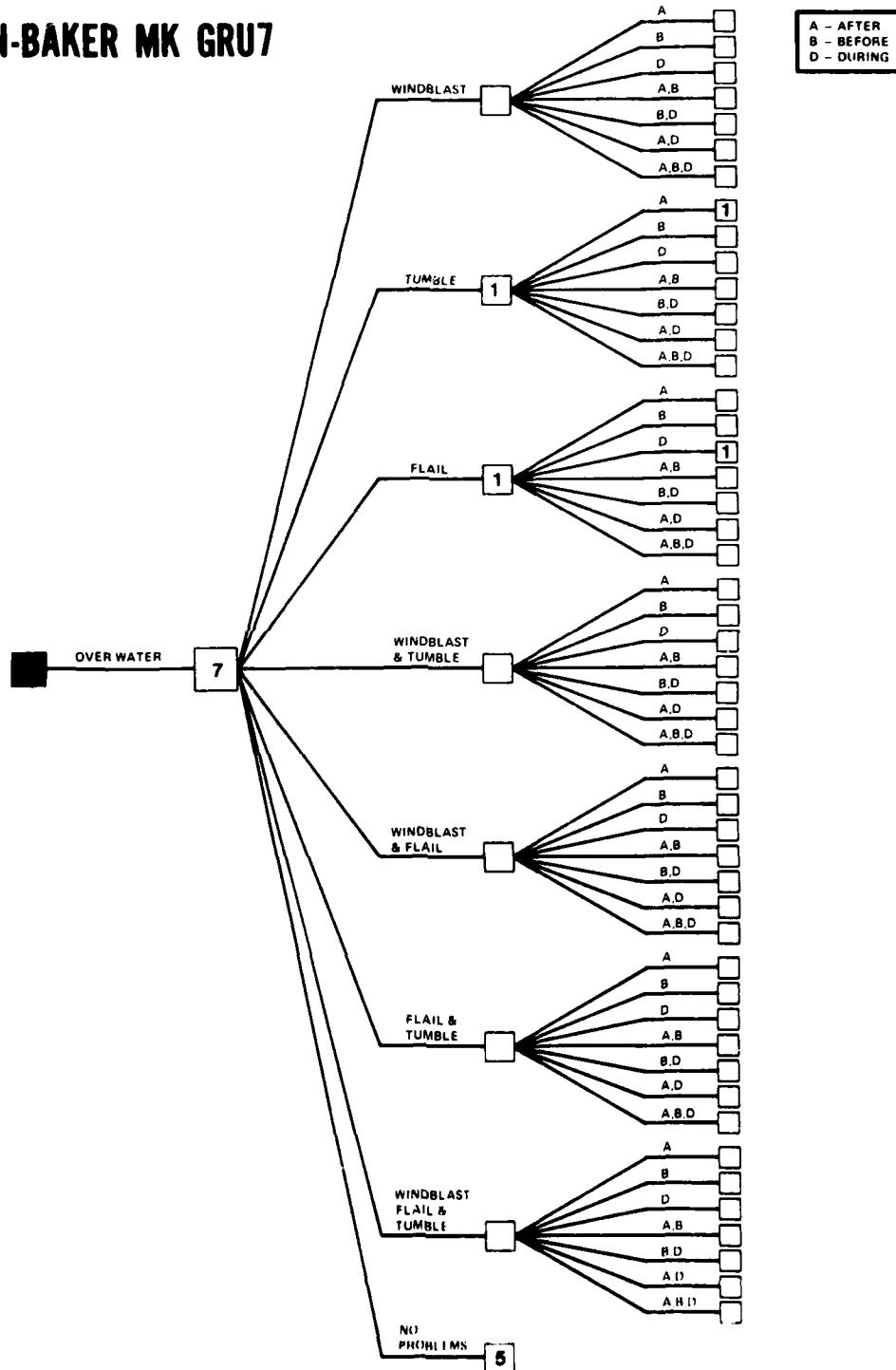
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU7



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

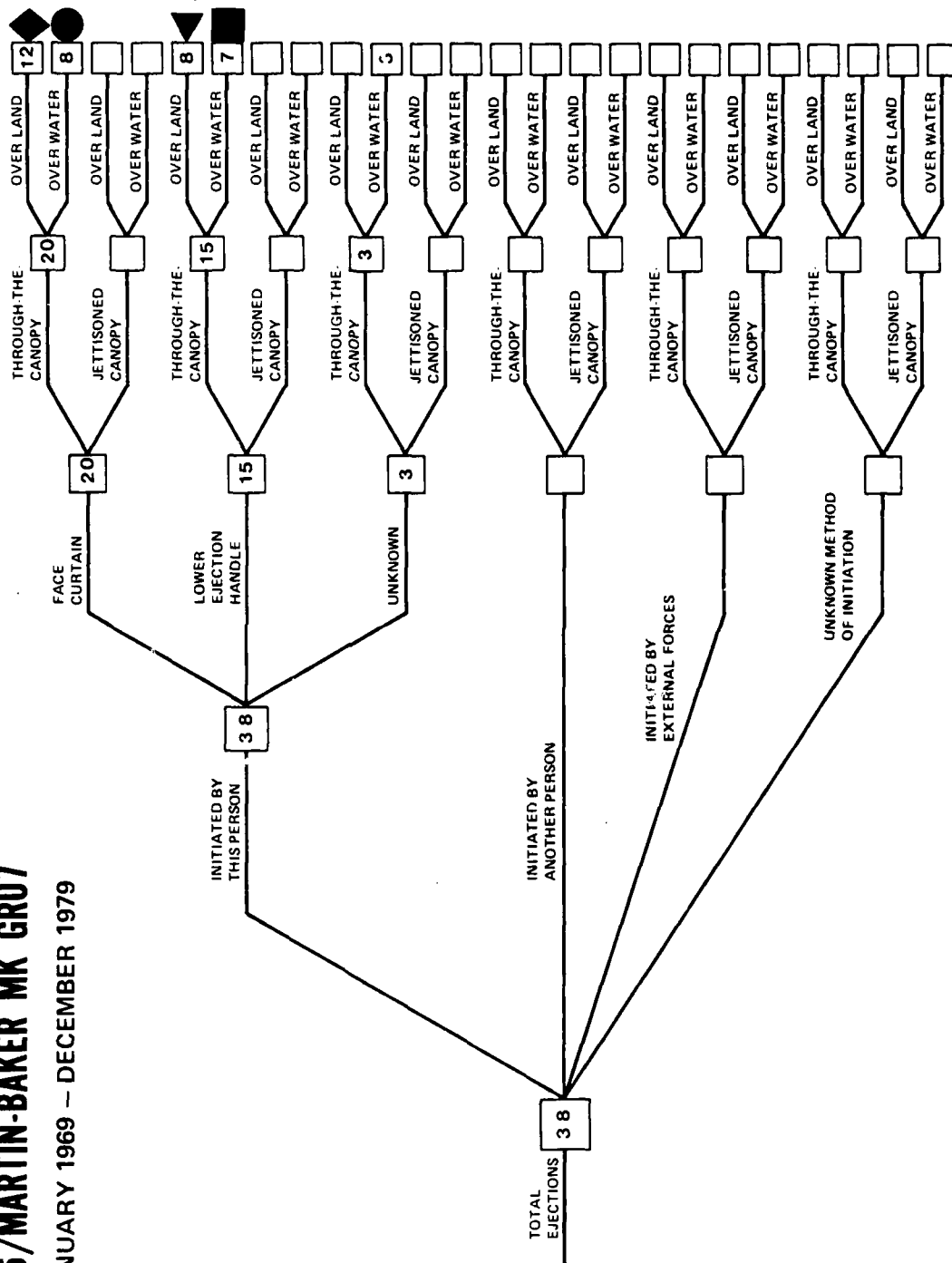
A-6/MARTIN-BAKER MK GRU7



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

A-6/MARTIN-BAKER MK GRU7

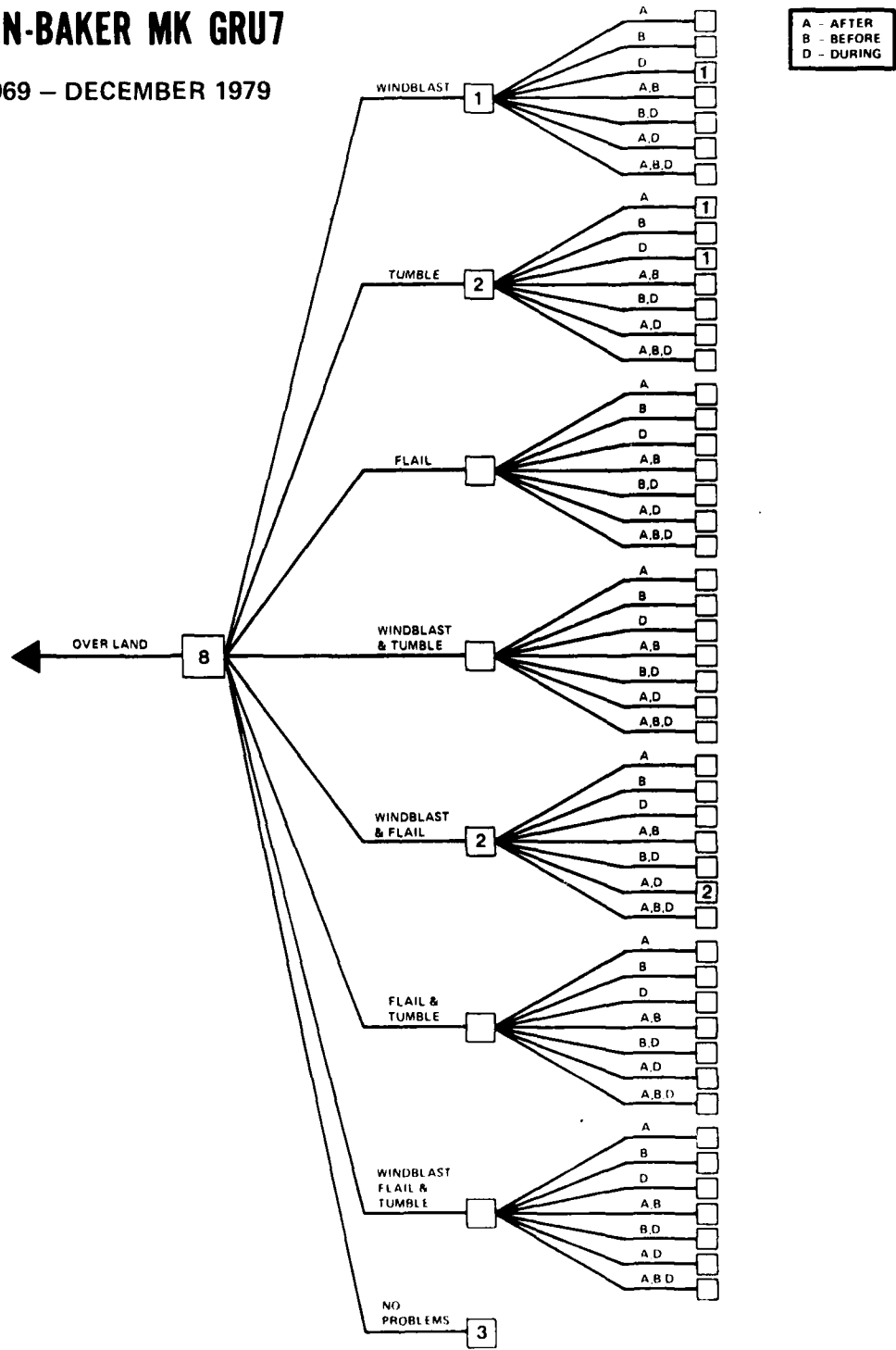
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

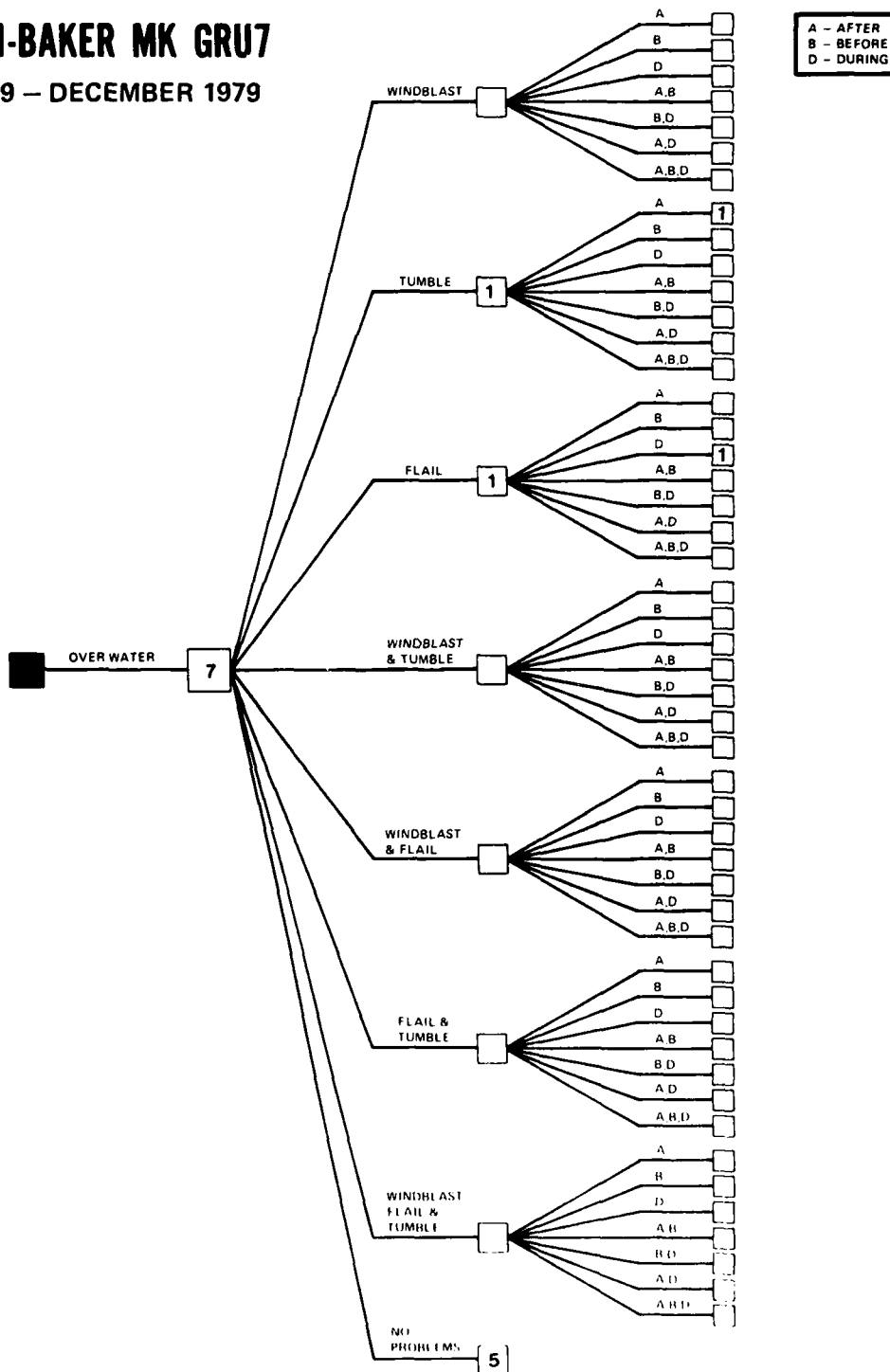
A-6/MARTIN-BAKER MK GRU7

JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

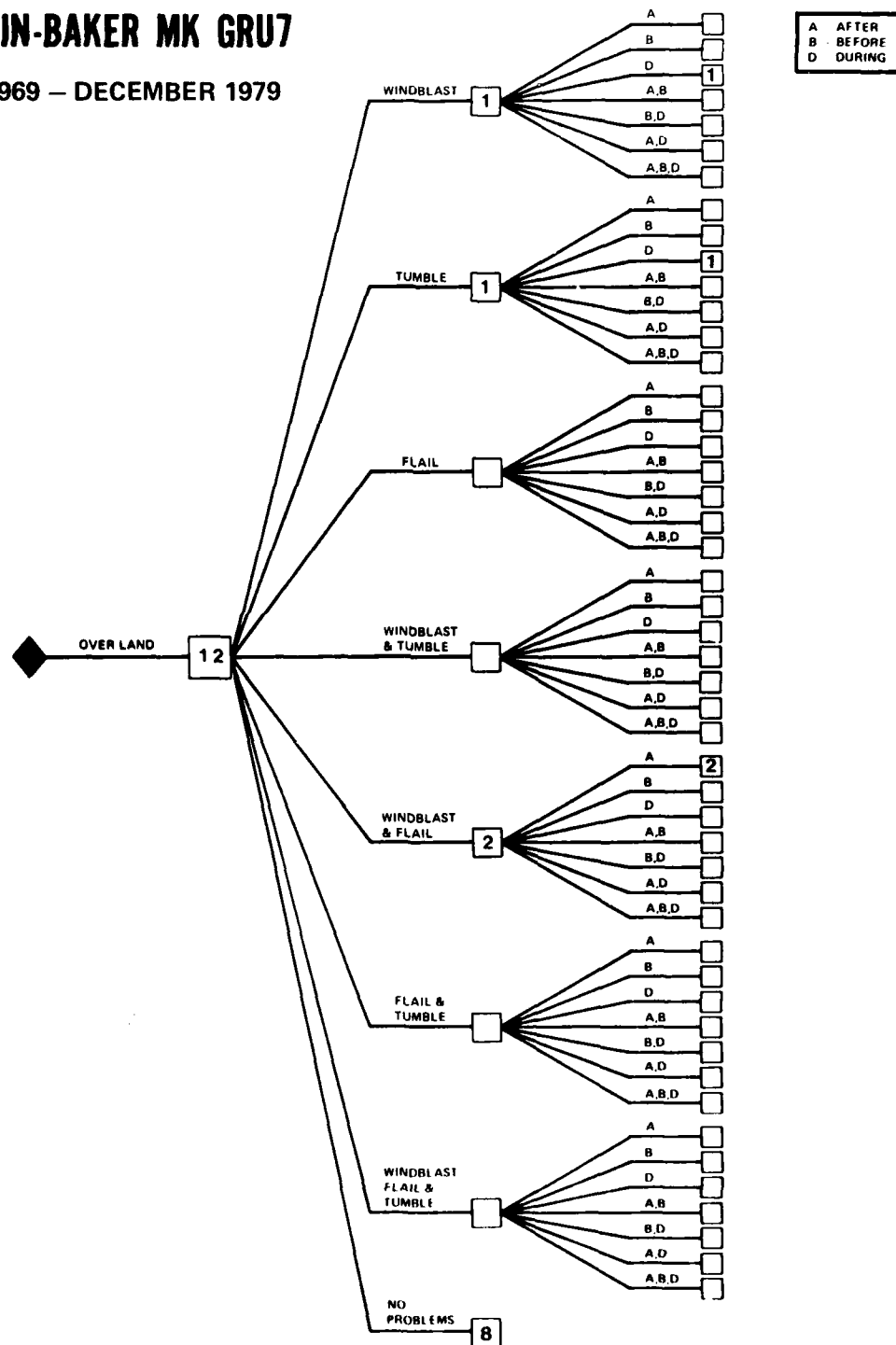
A-6/MARTIN-BAKER MK GRU7
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU7

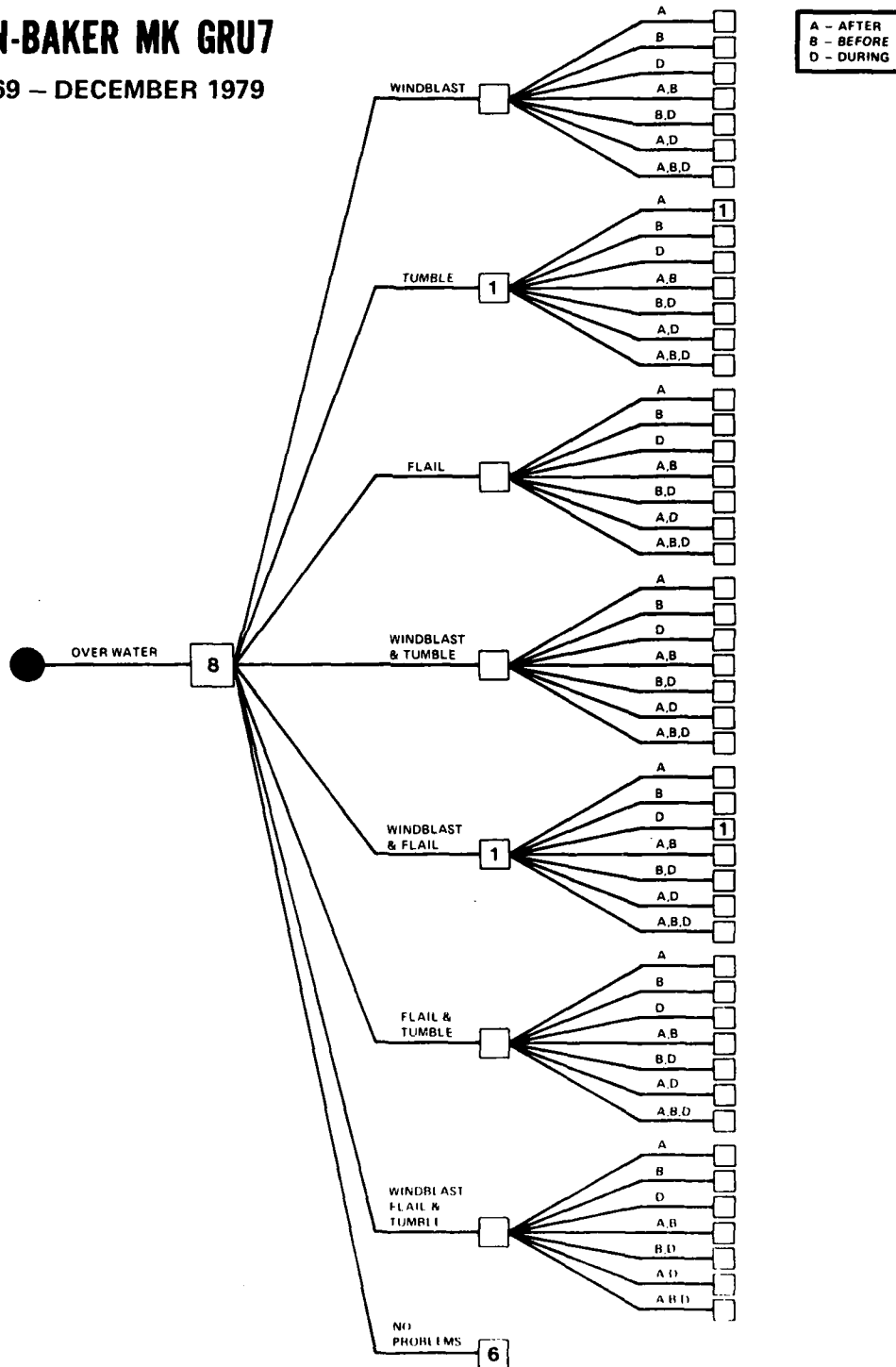
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-6/MARTIN-BAKER MK GRU7

JANUARY 1969 - DECEMBER 1979

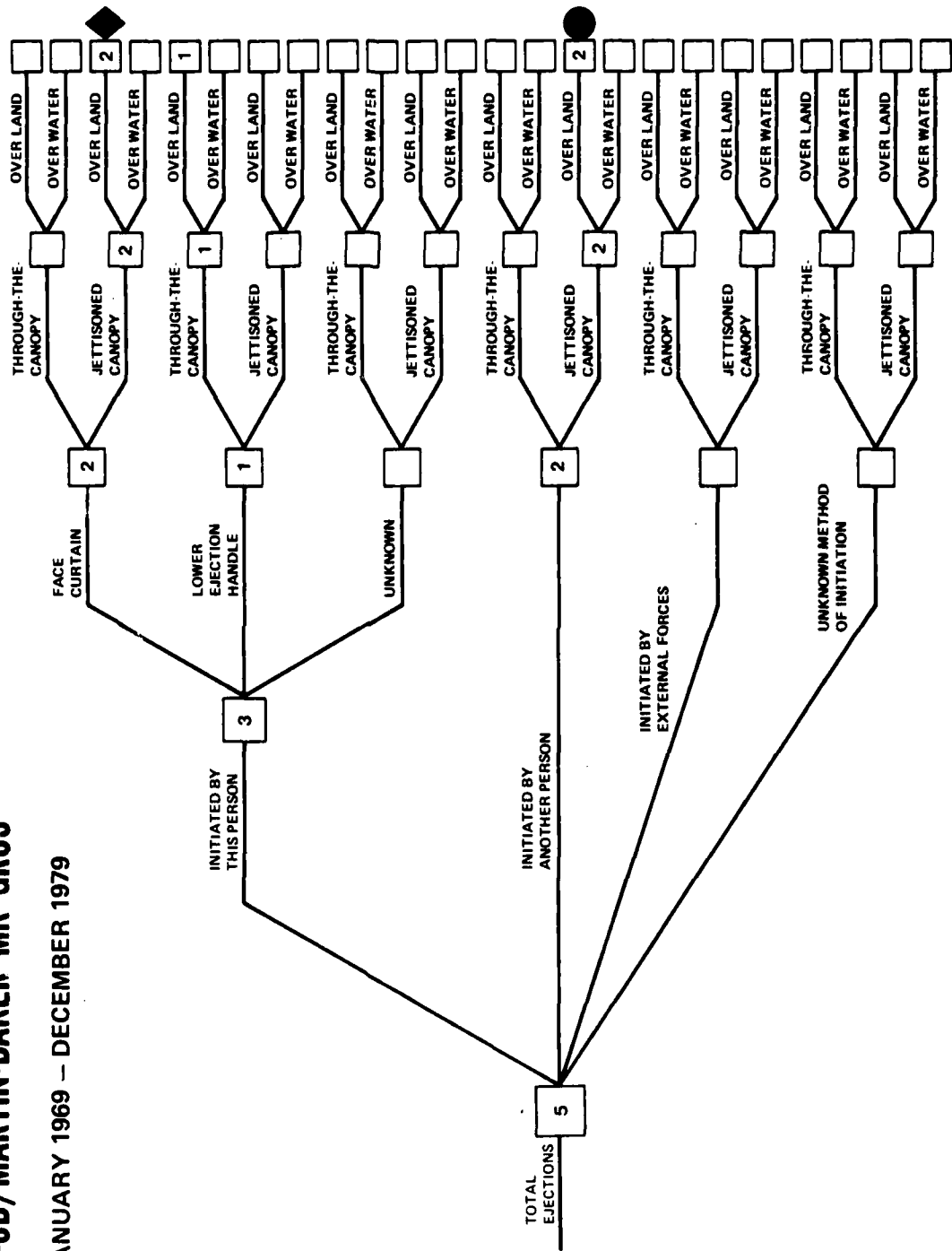


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

EA-6B/MARTIN-BAKER MK GRU5

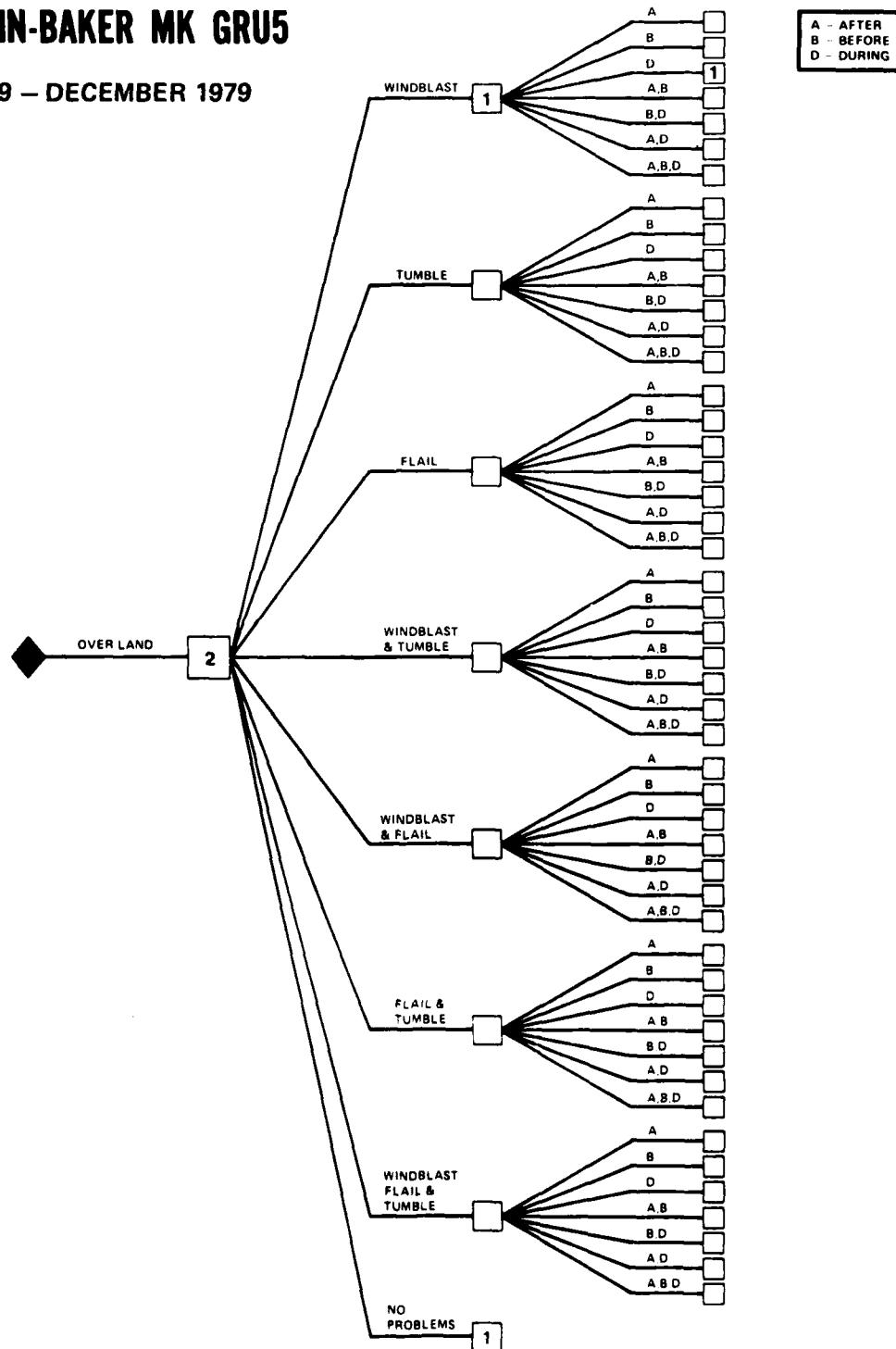
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

EA-6B/MARTIN-BAKER MK GRU5

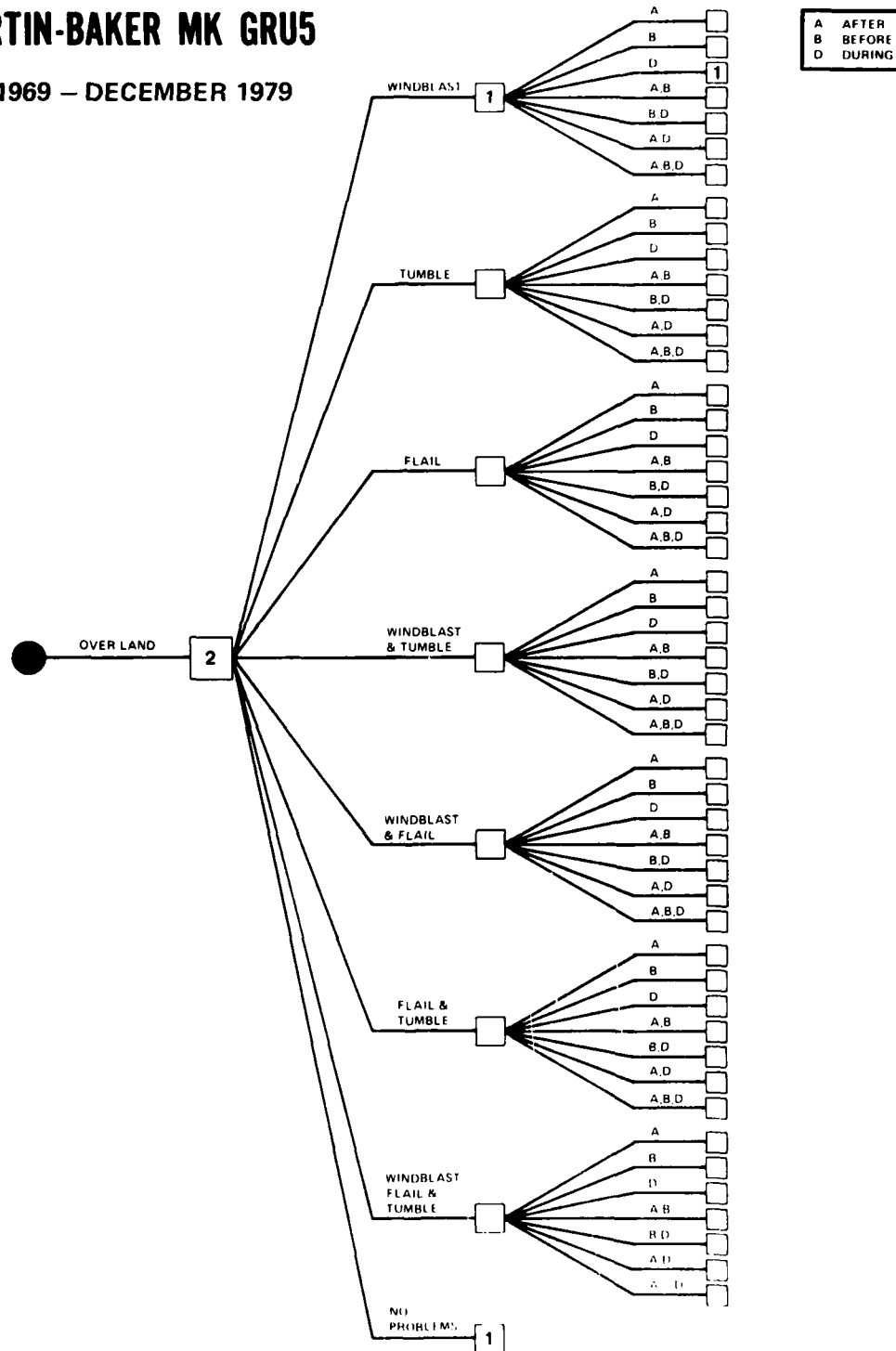
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

EA-6B/MARTIN-BAKER MK GRU5

JANUARY 1969 – DECEMBER 1979

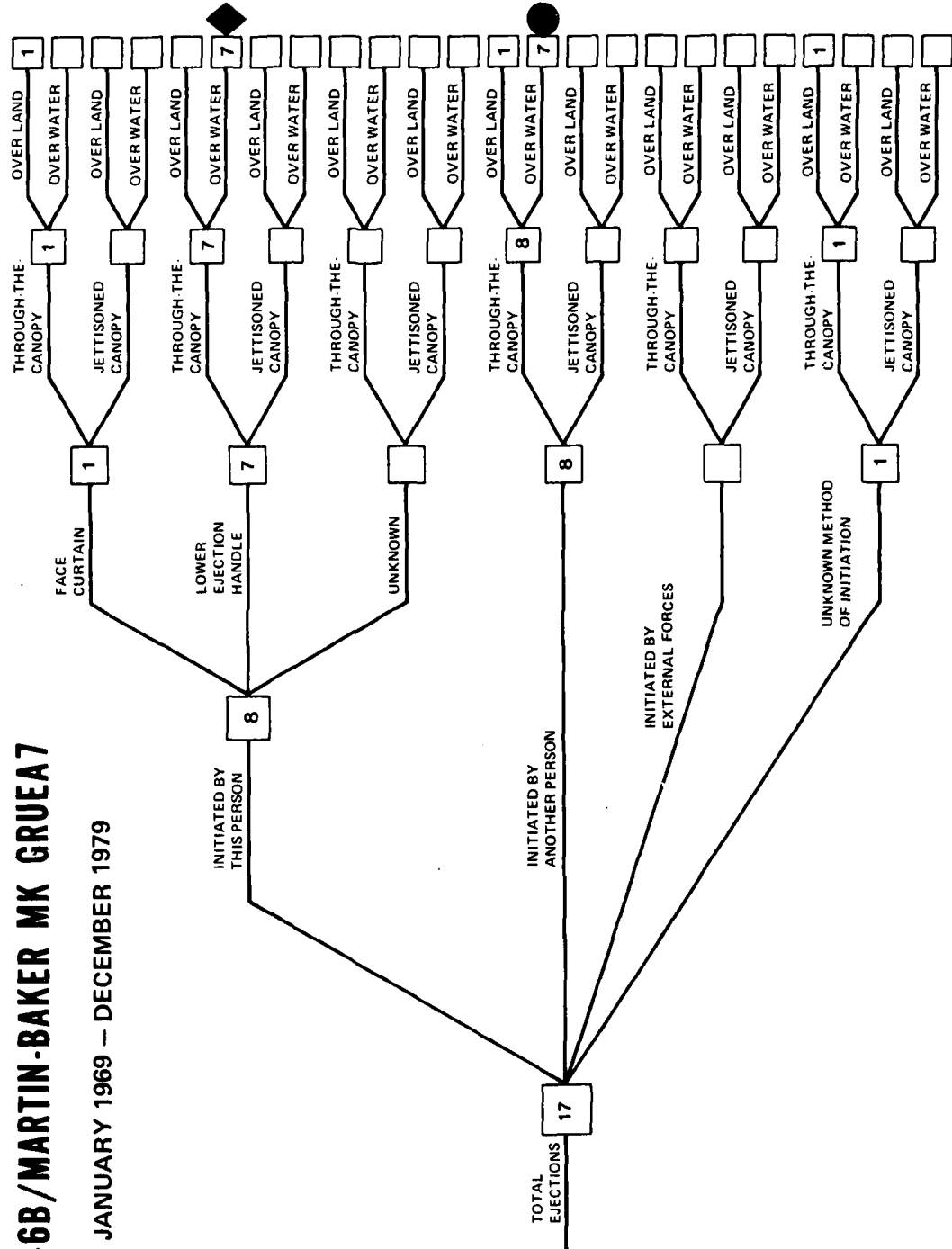


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

EA-6B/MARTIN-BAKER MK GRUEA7

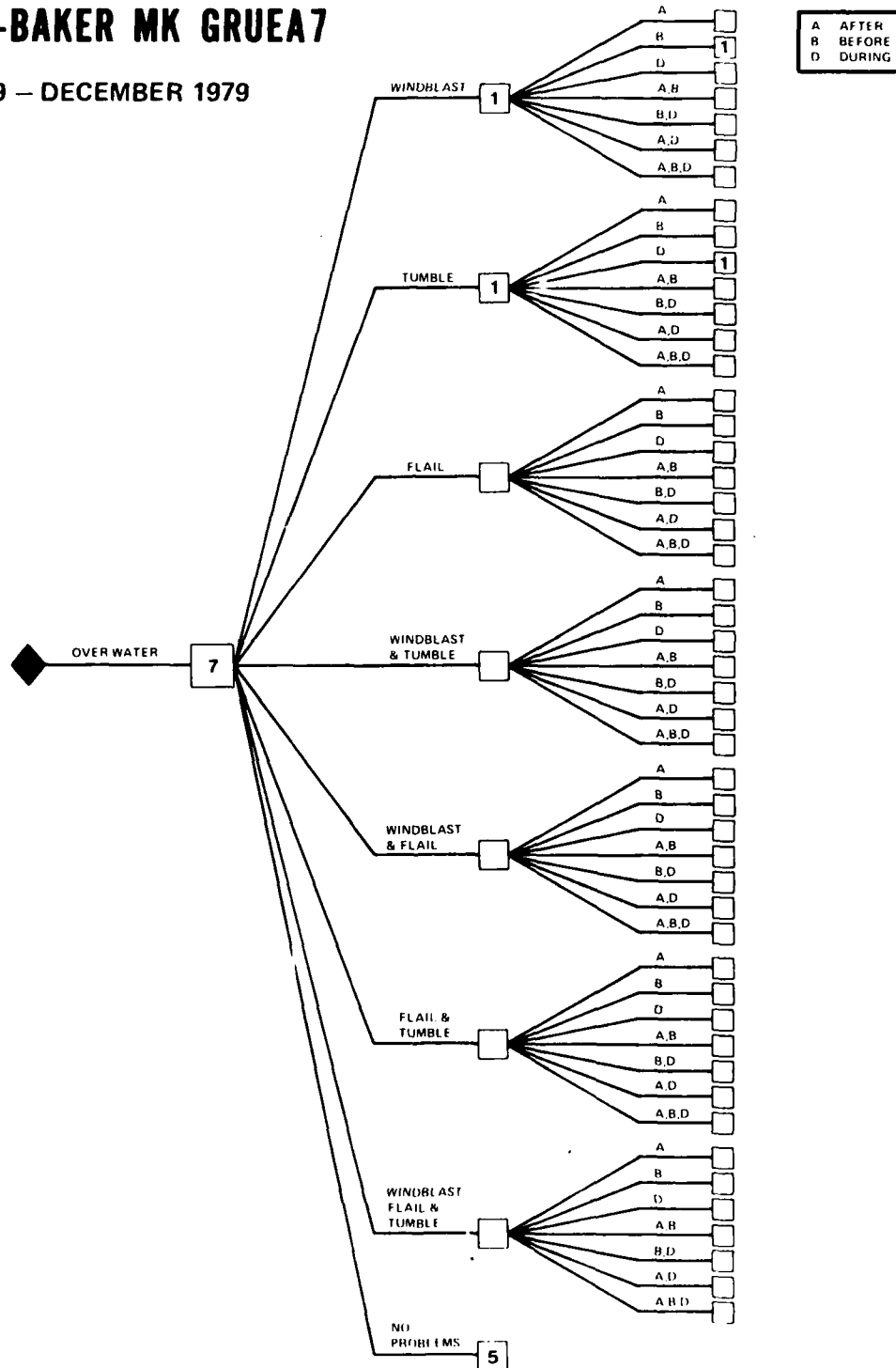
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

EA-6B/MARTIN-BAKER MK GRUEA7

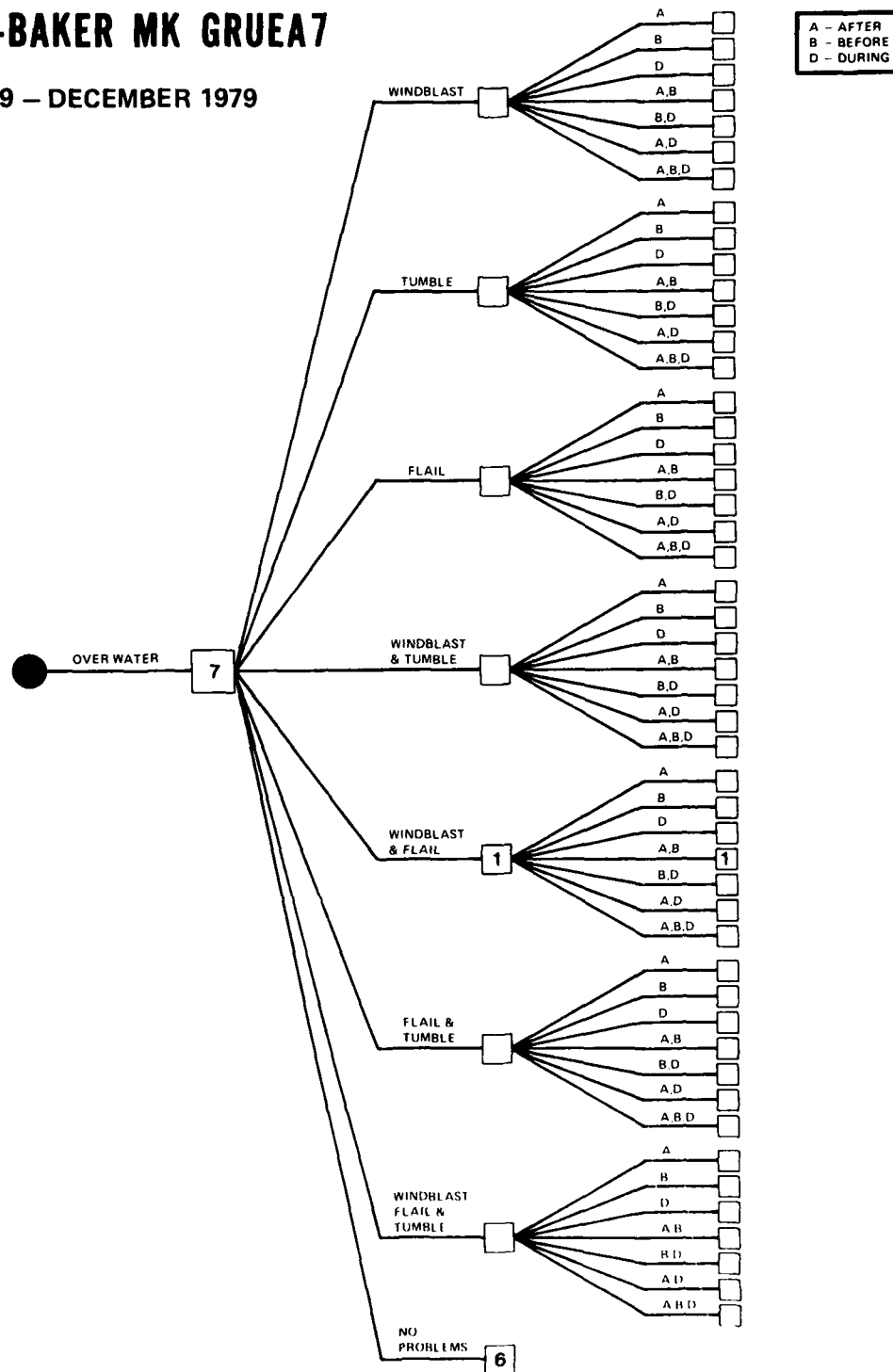
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

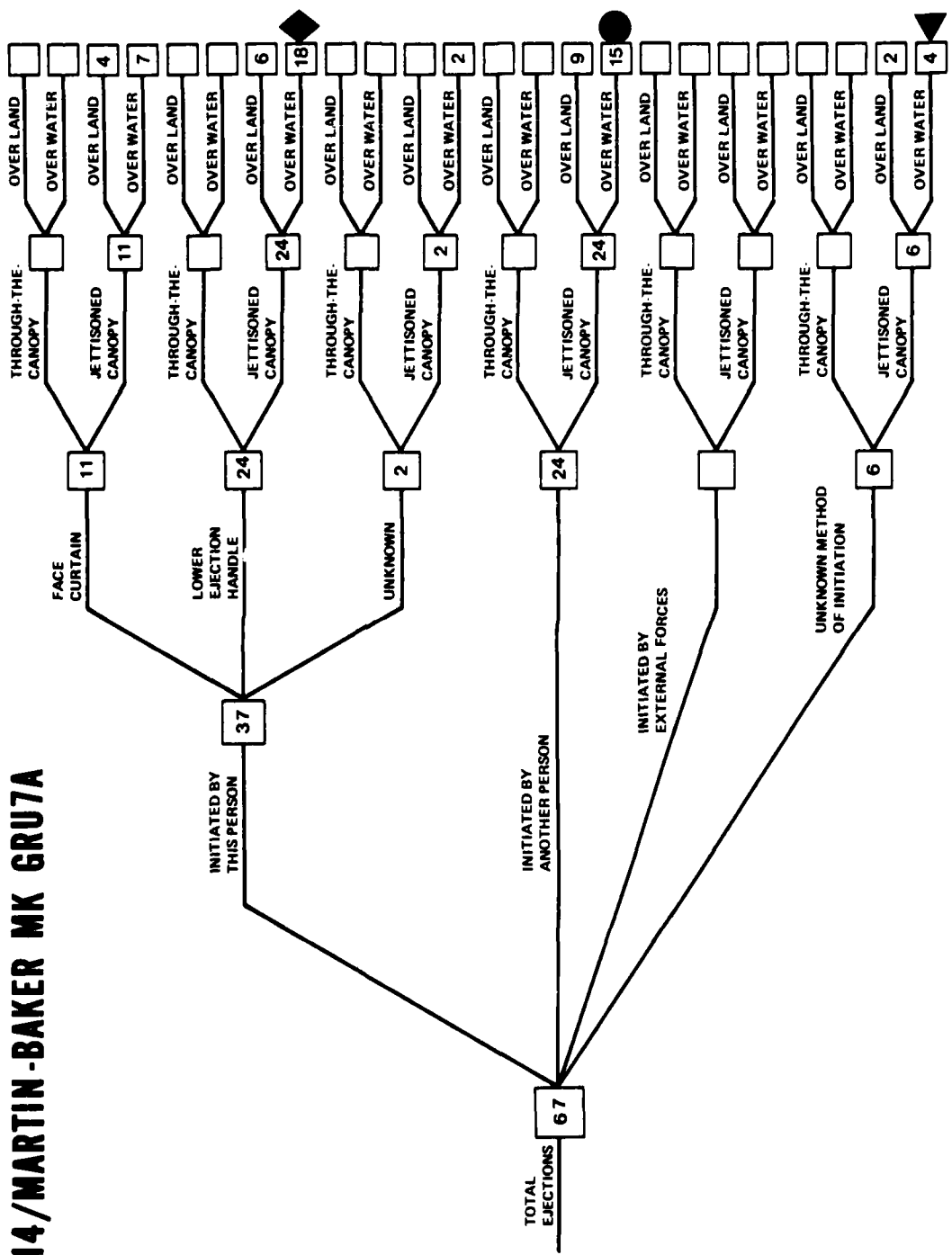
EA-6B/MARTIN-BAKER MK GRUEA7

JANUARY 1969 – DECEMBER 1979



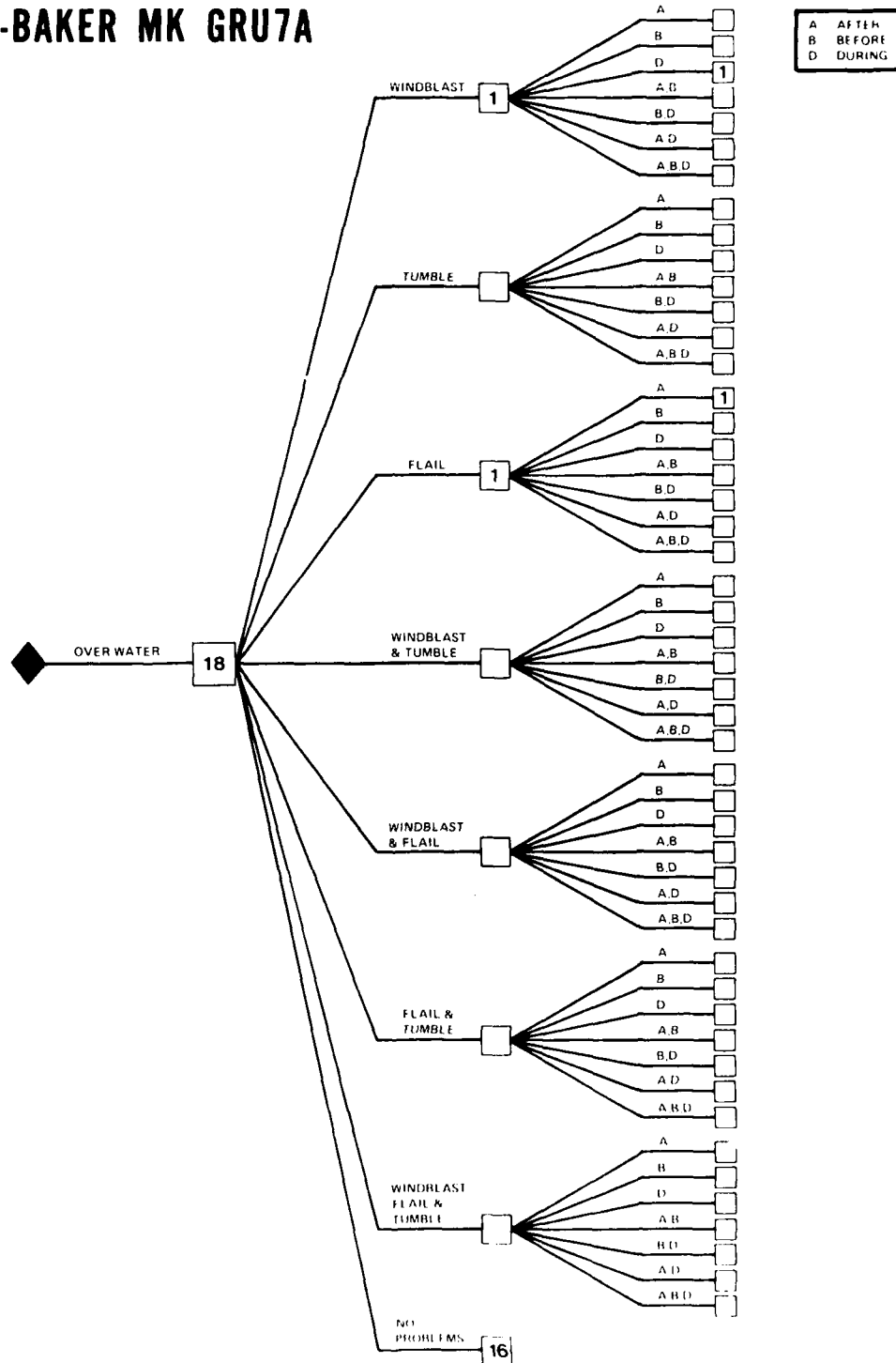
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

F-14/MARTIN-BAKER MK GRU7A



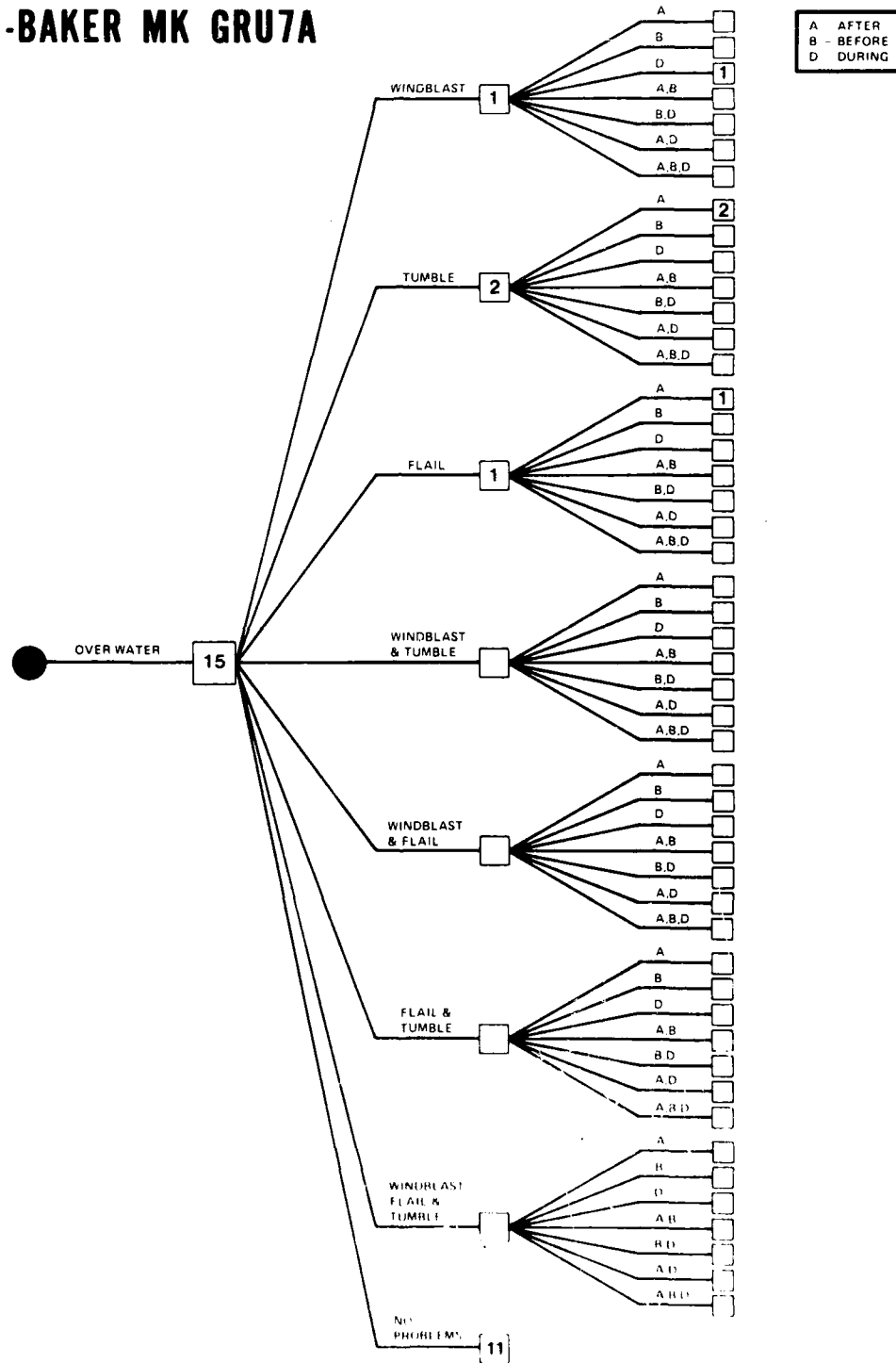
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

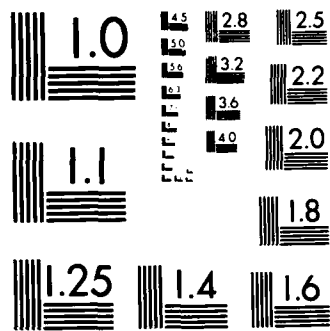
F-14/MARTIN-BAKER MK GRU7A



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-14/MARTIN-BAKER MK GRU7A

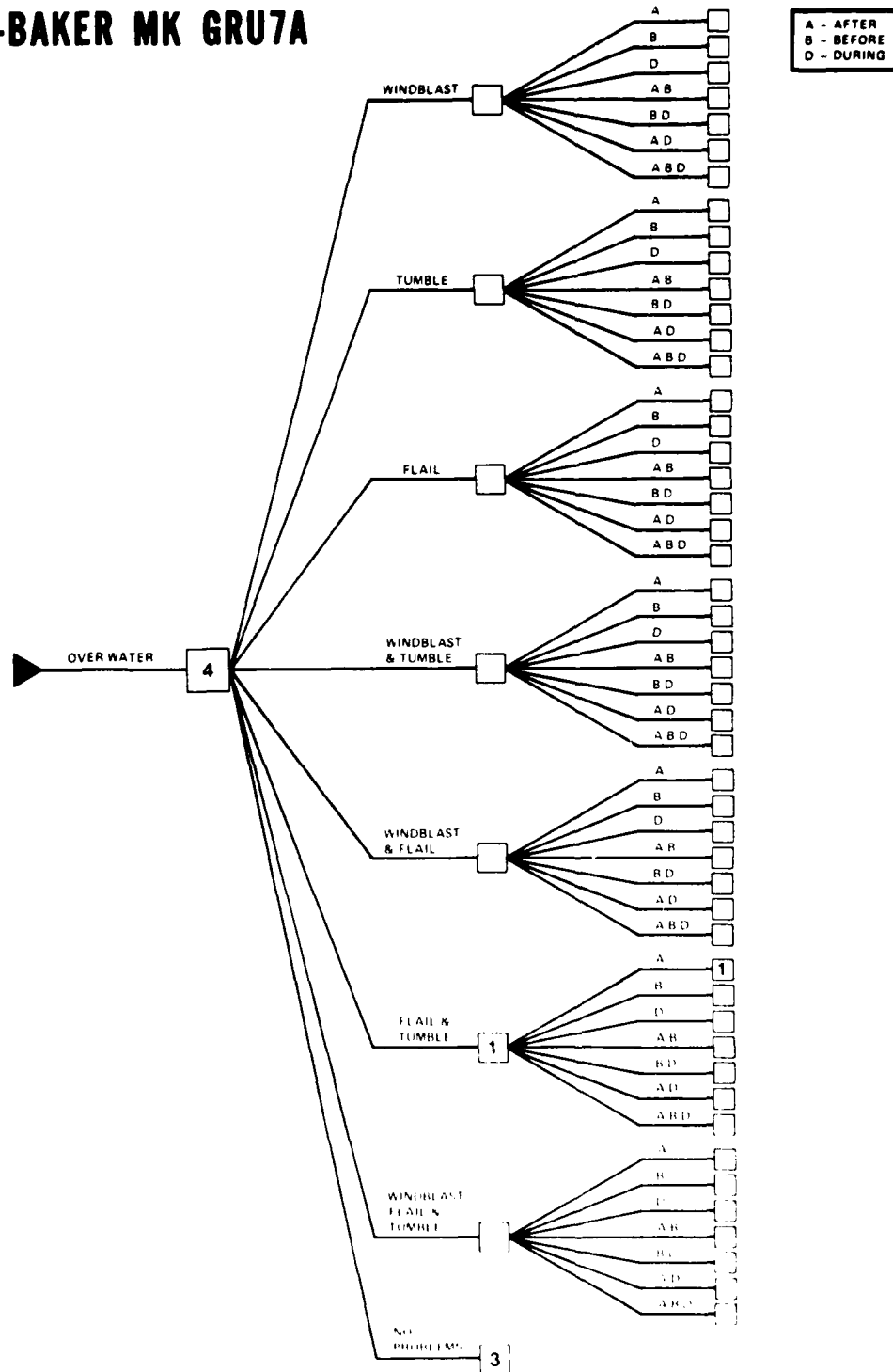




MICROCOPY RESOLUTION TEST CHART
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DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-14/MARTIN-BAKER MK GRU7A

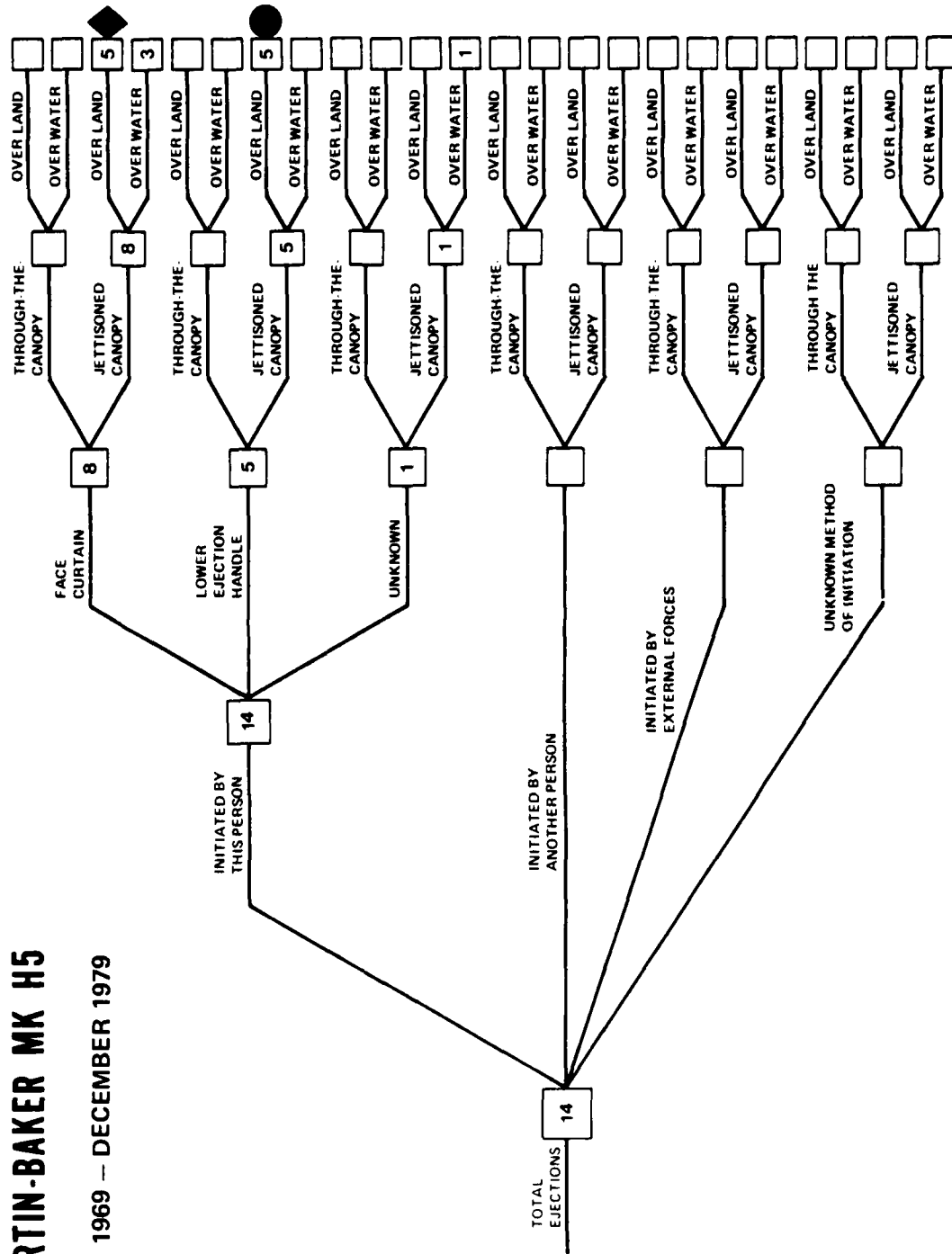


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

F-4/MARTIN-BAKER MK H5

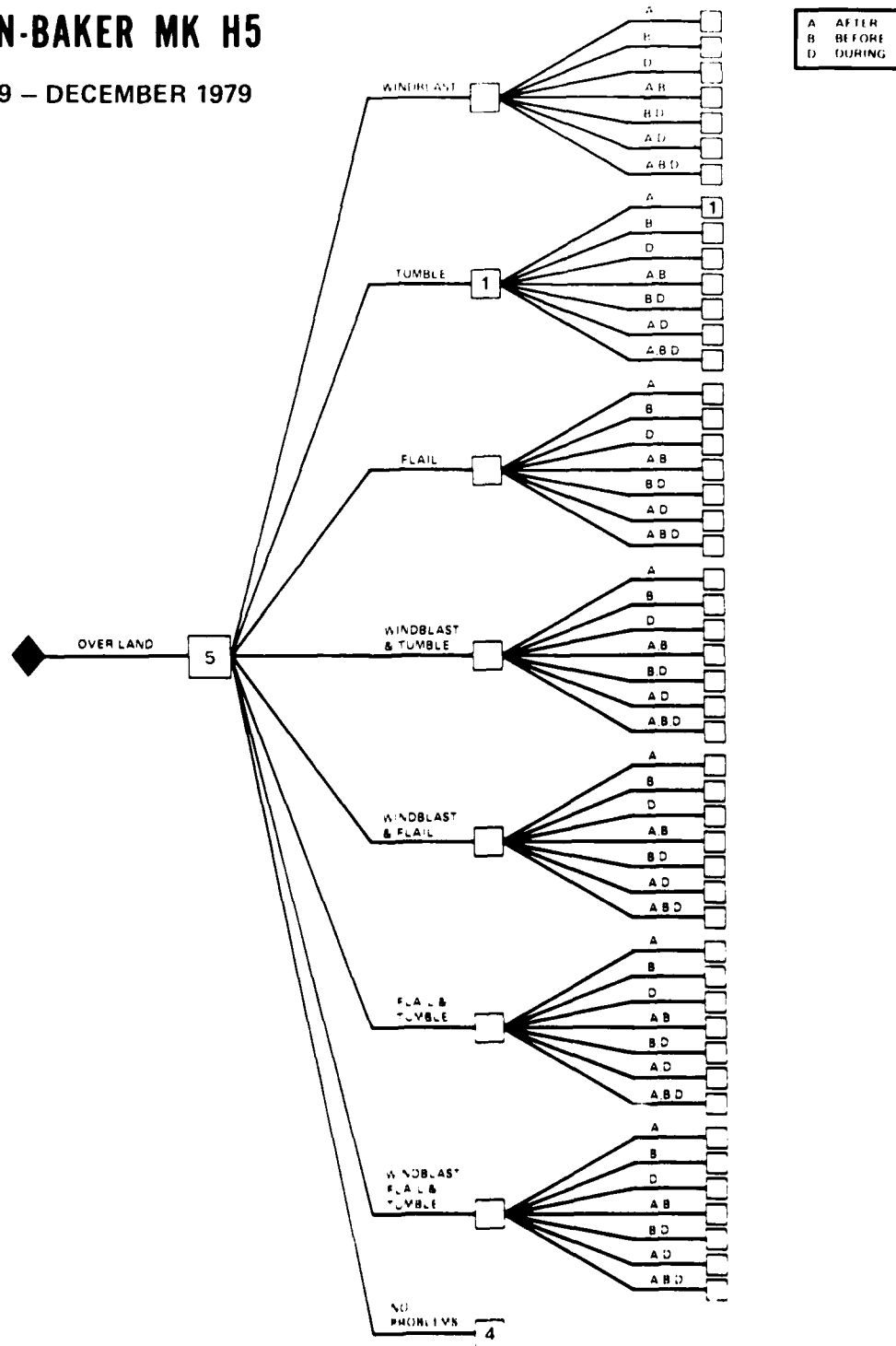
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H5

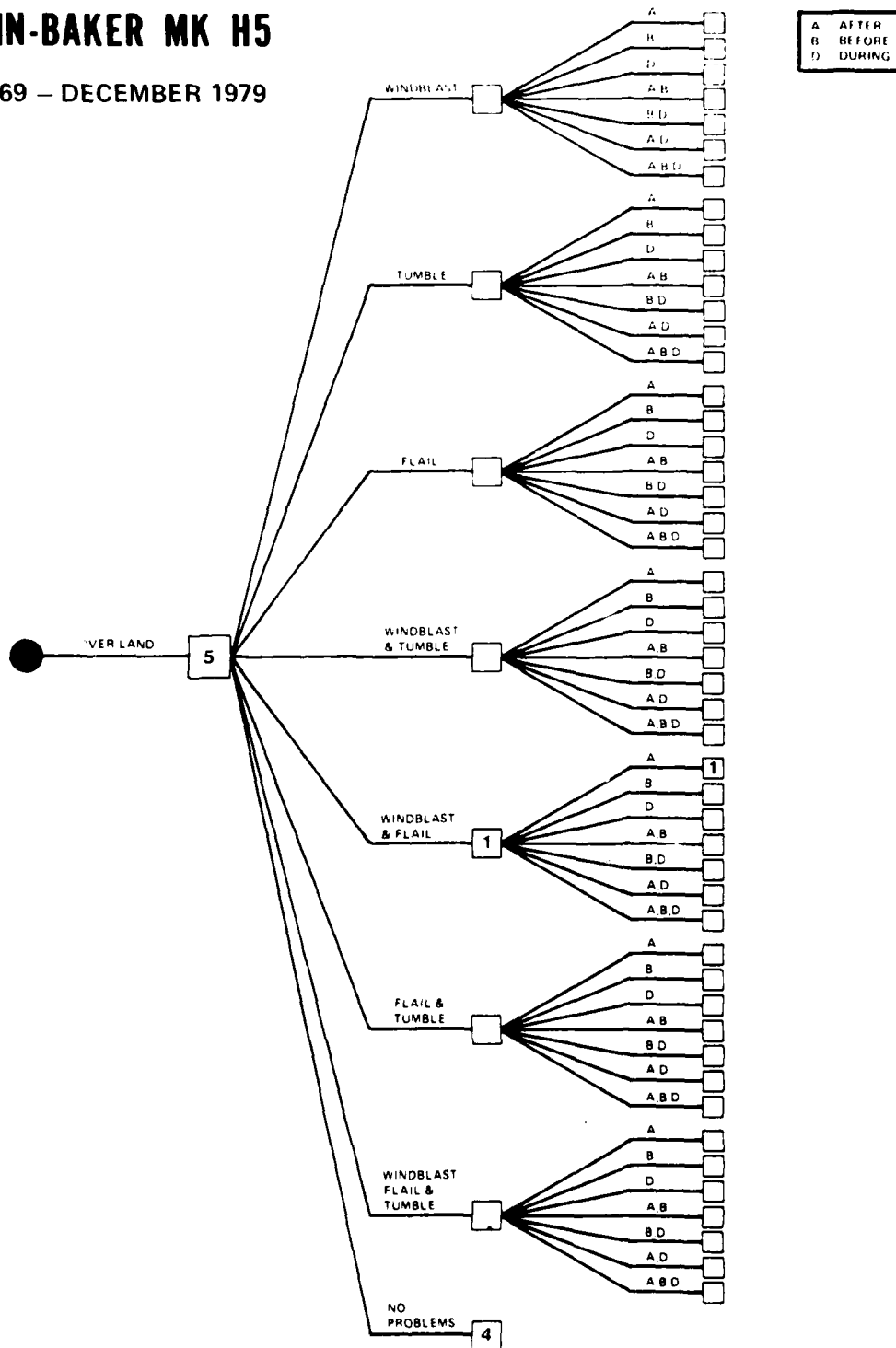
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H5

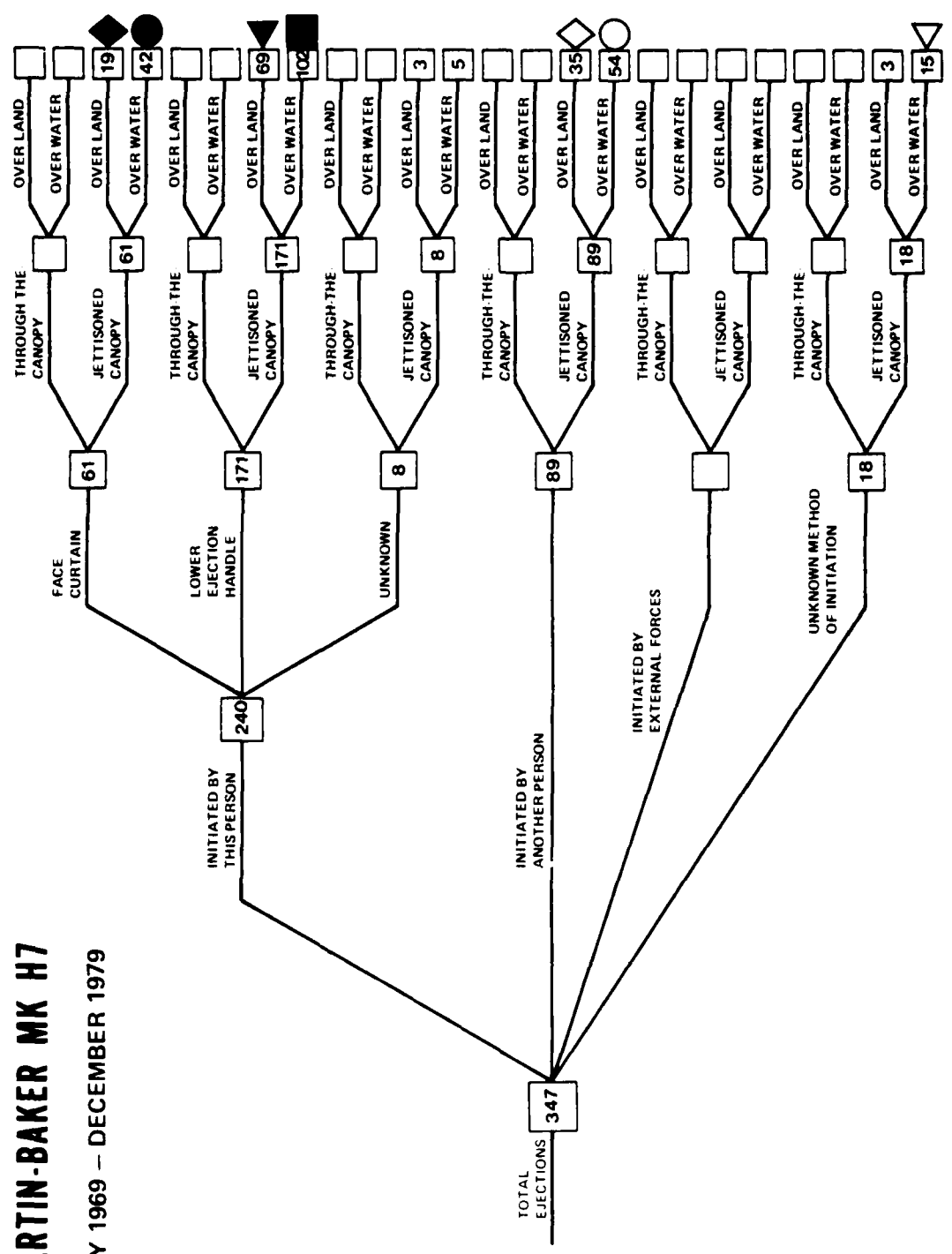
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

F-4/MARTIN-BAKER MK H7

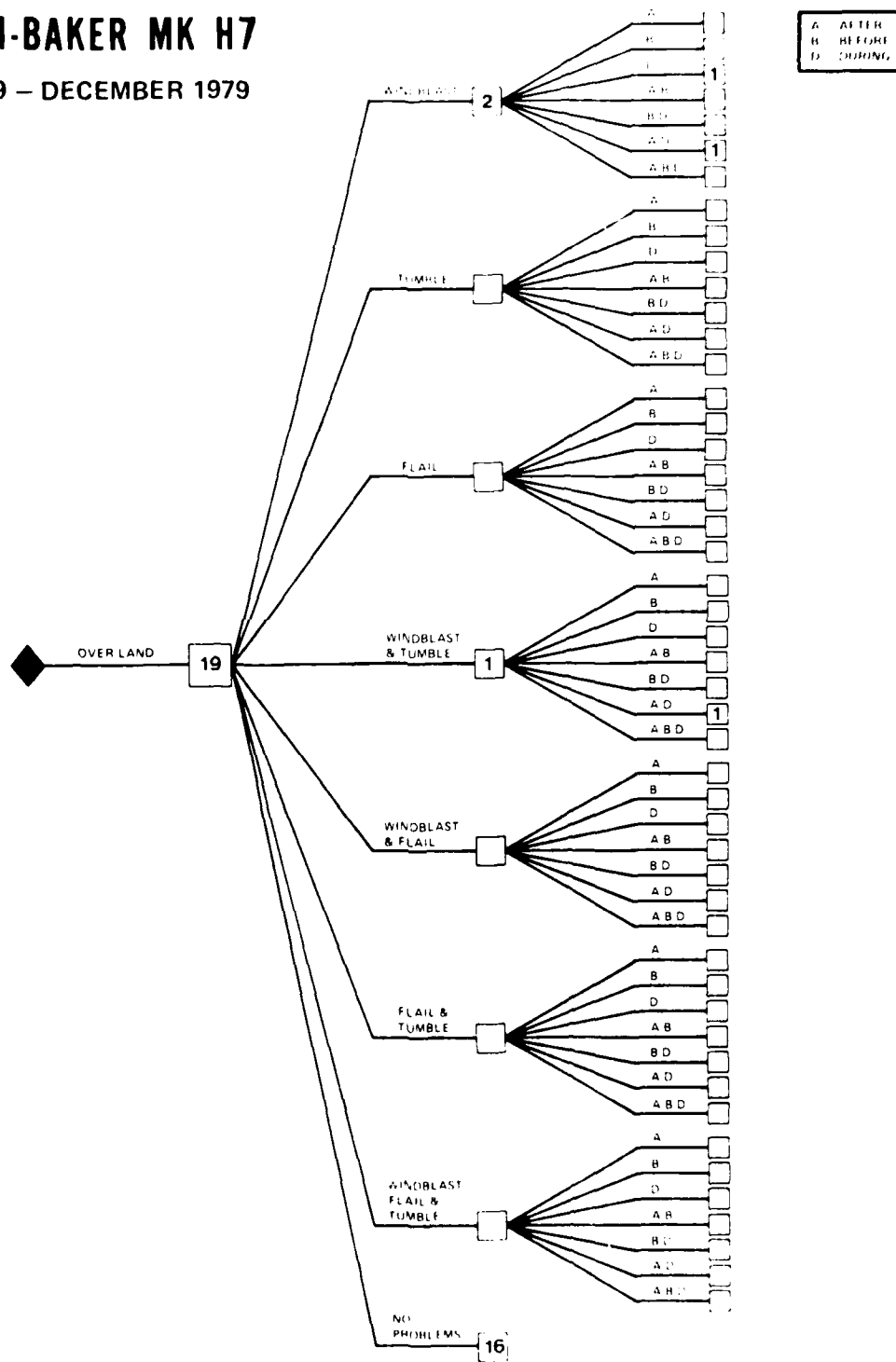
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H7

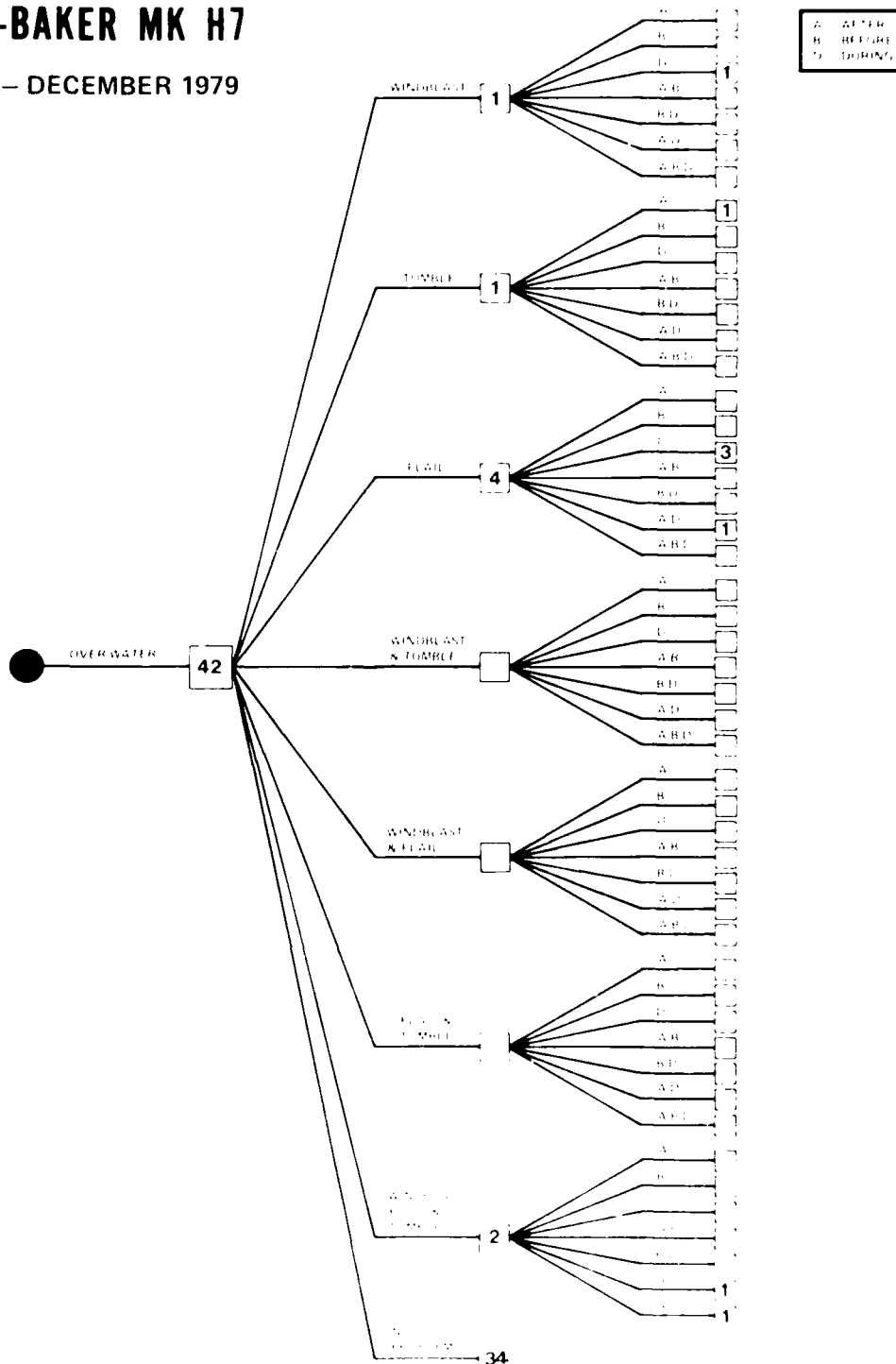
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H7

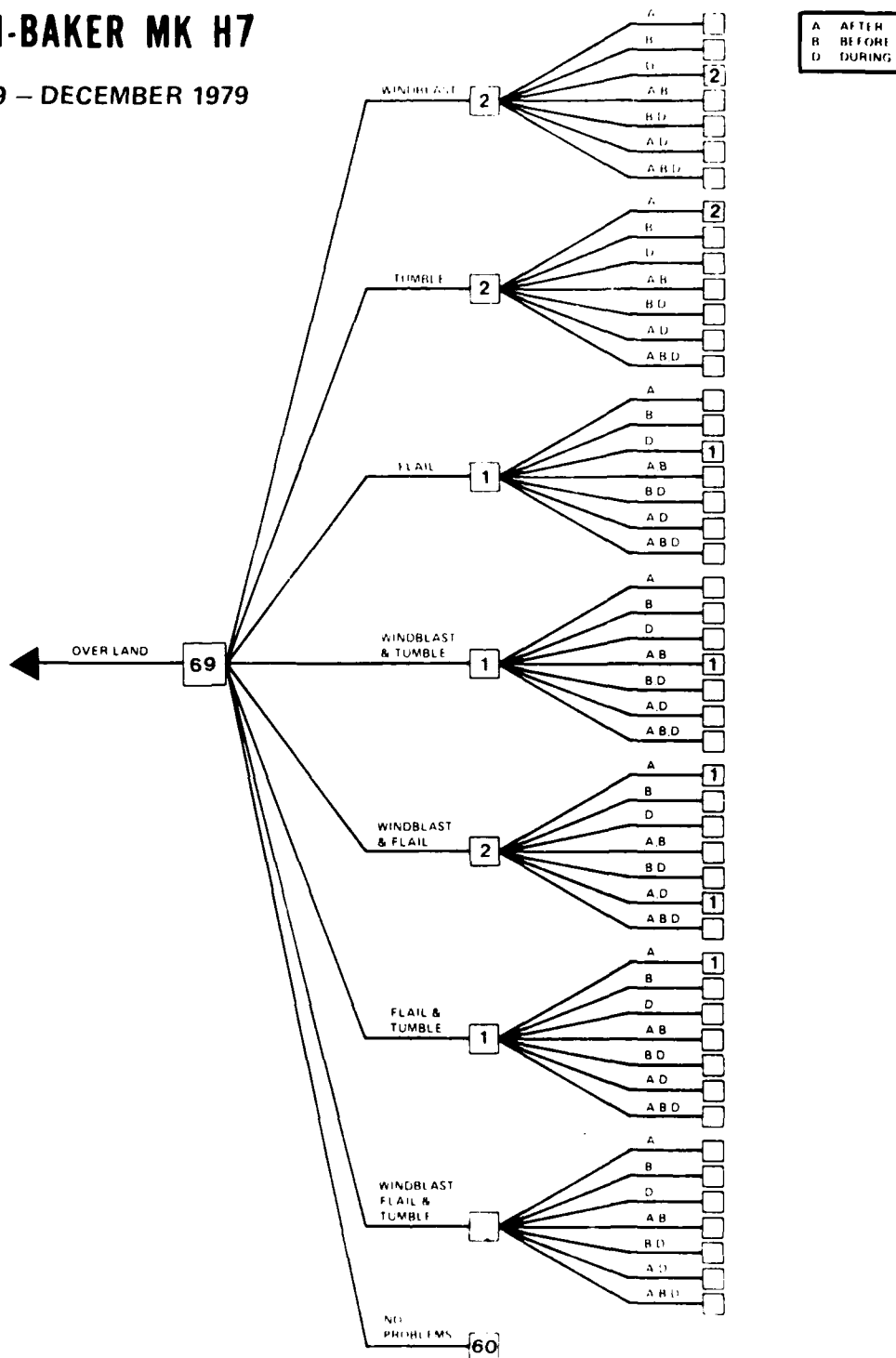
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H7

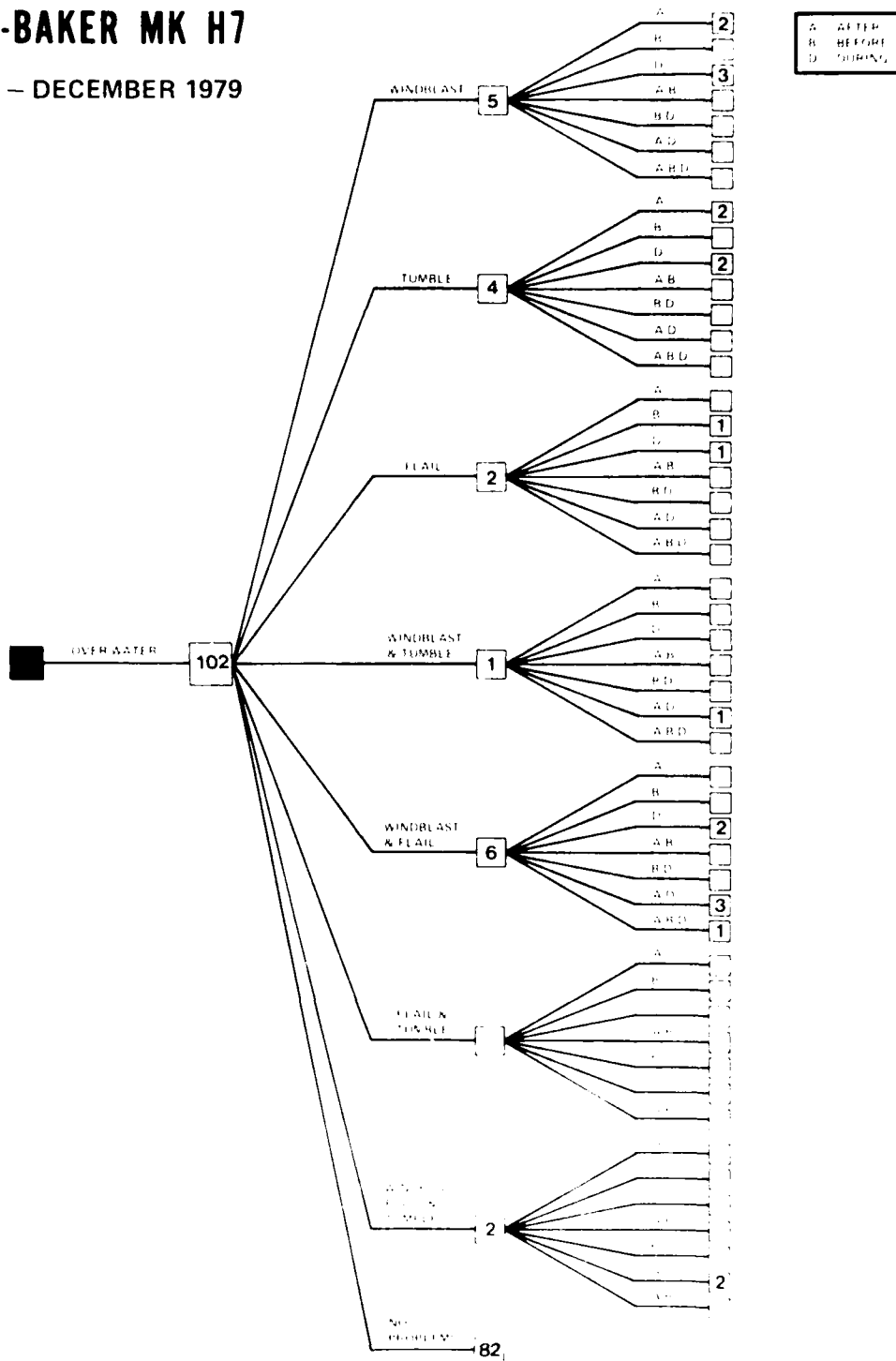
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H7

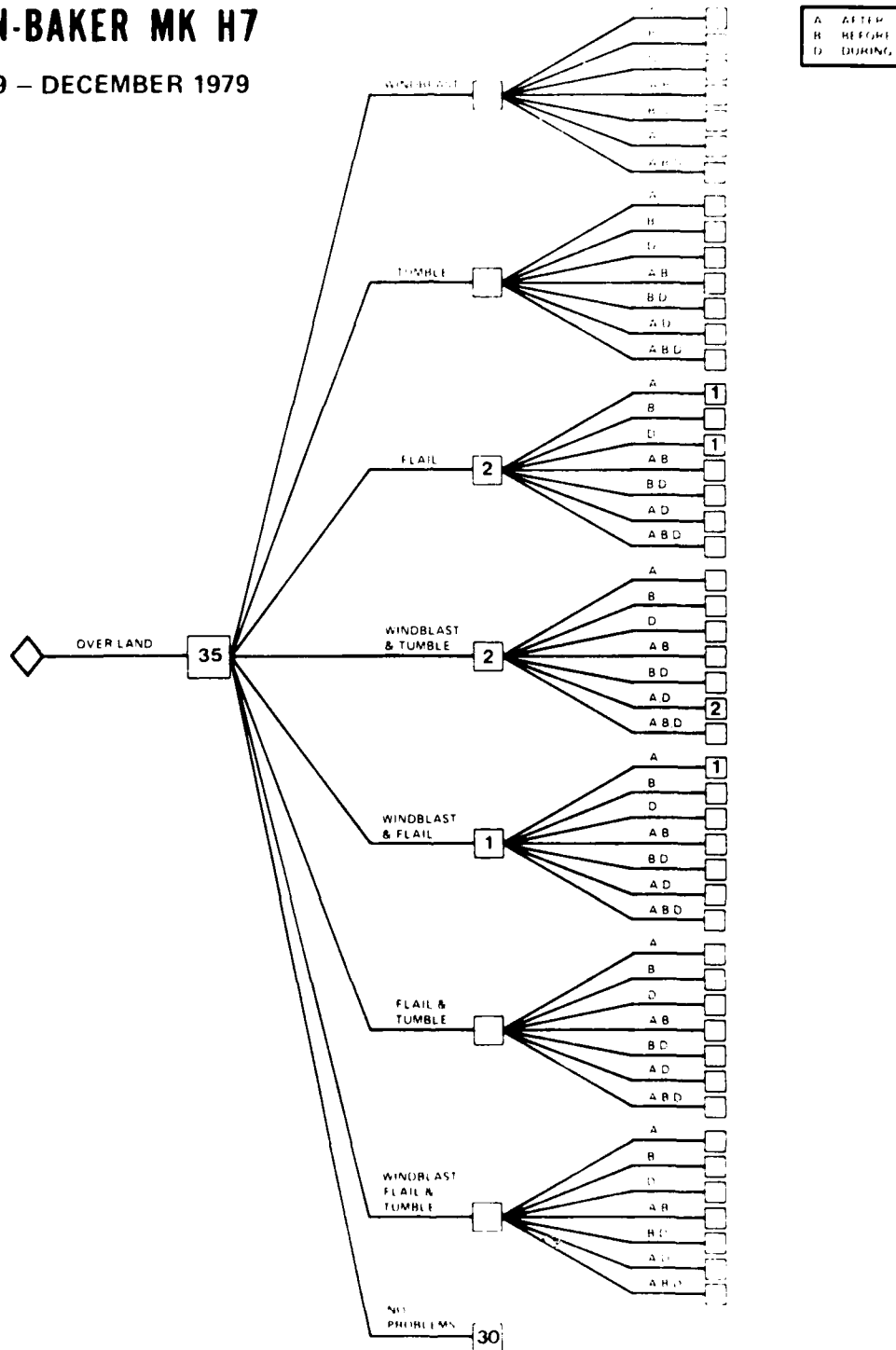
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H7

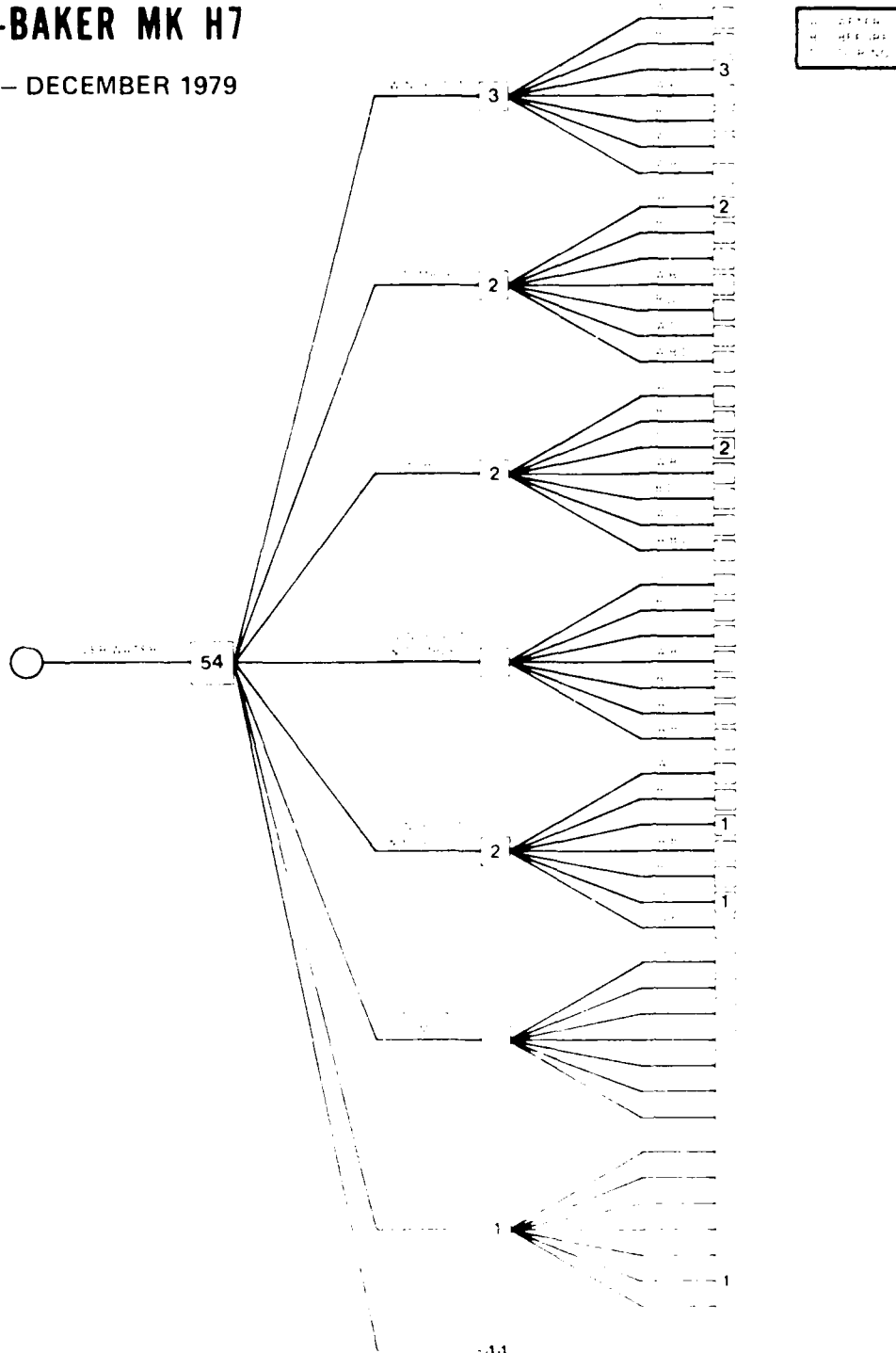
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H7

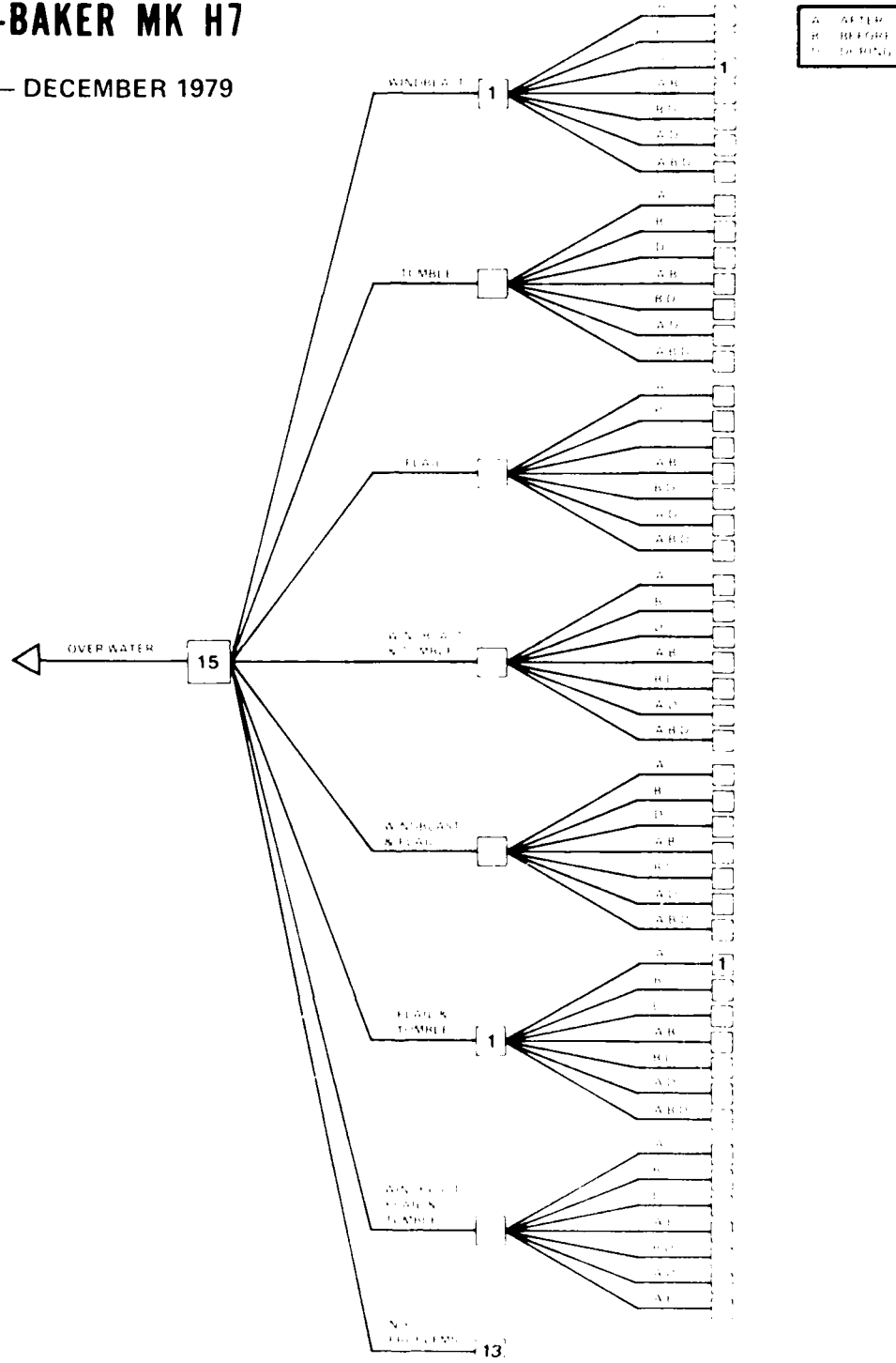
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-4/MARTIN-BAKER MK H7

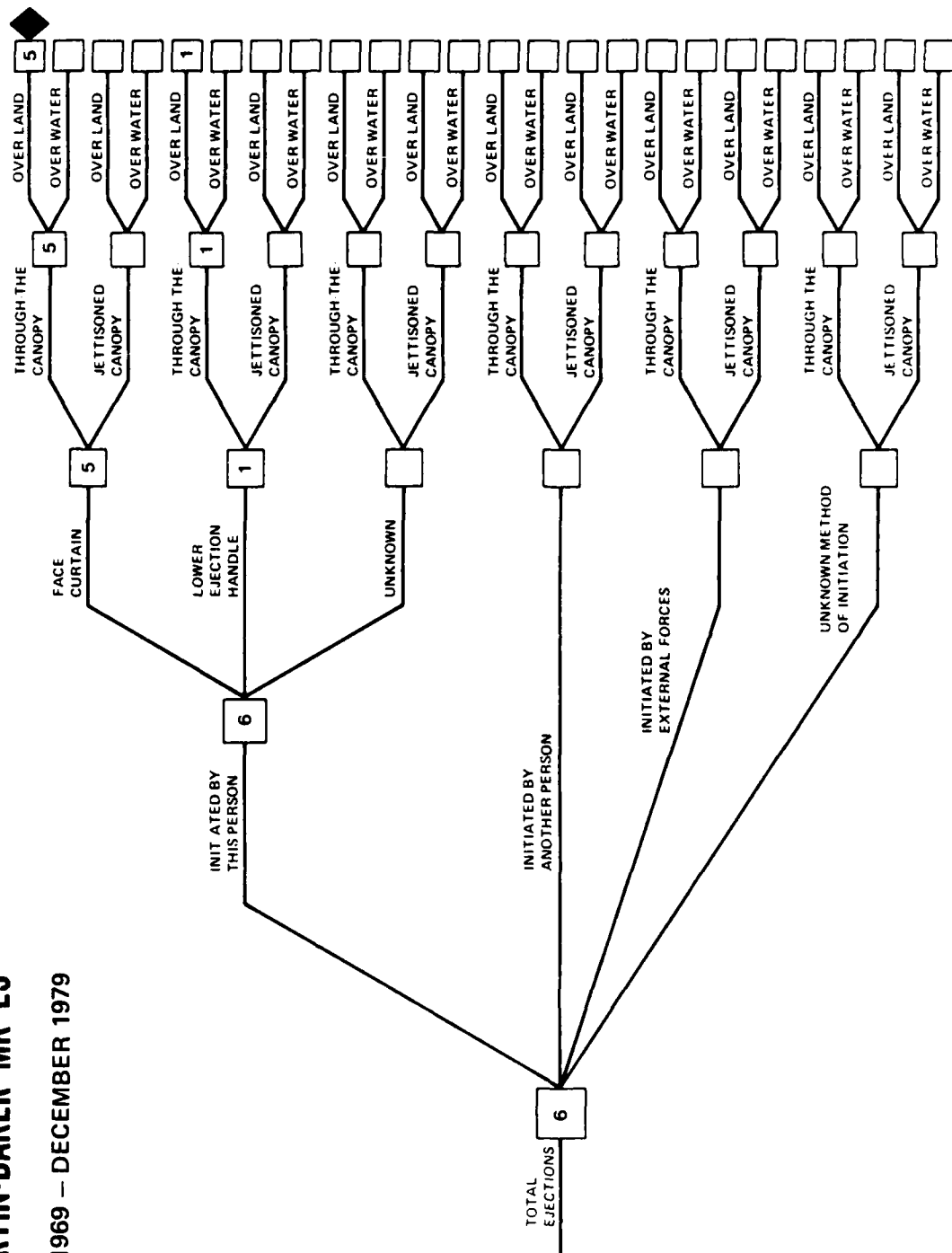
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

T-1/ MARTIN-BAKER MK L5

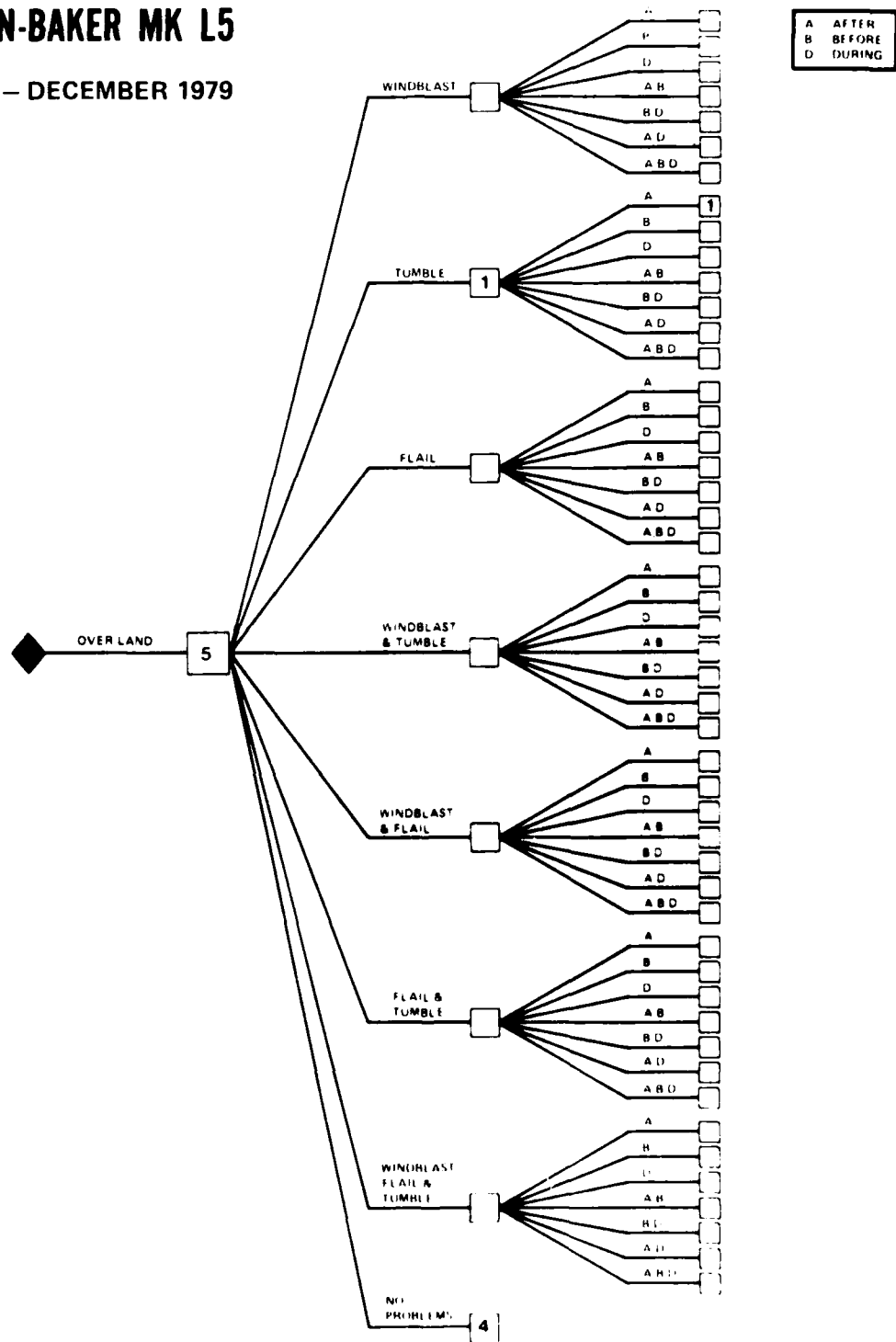
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

T-1 / MARTIN-BAKER MK L5

JANUARY 1969 - DECEMBER 1979

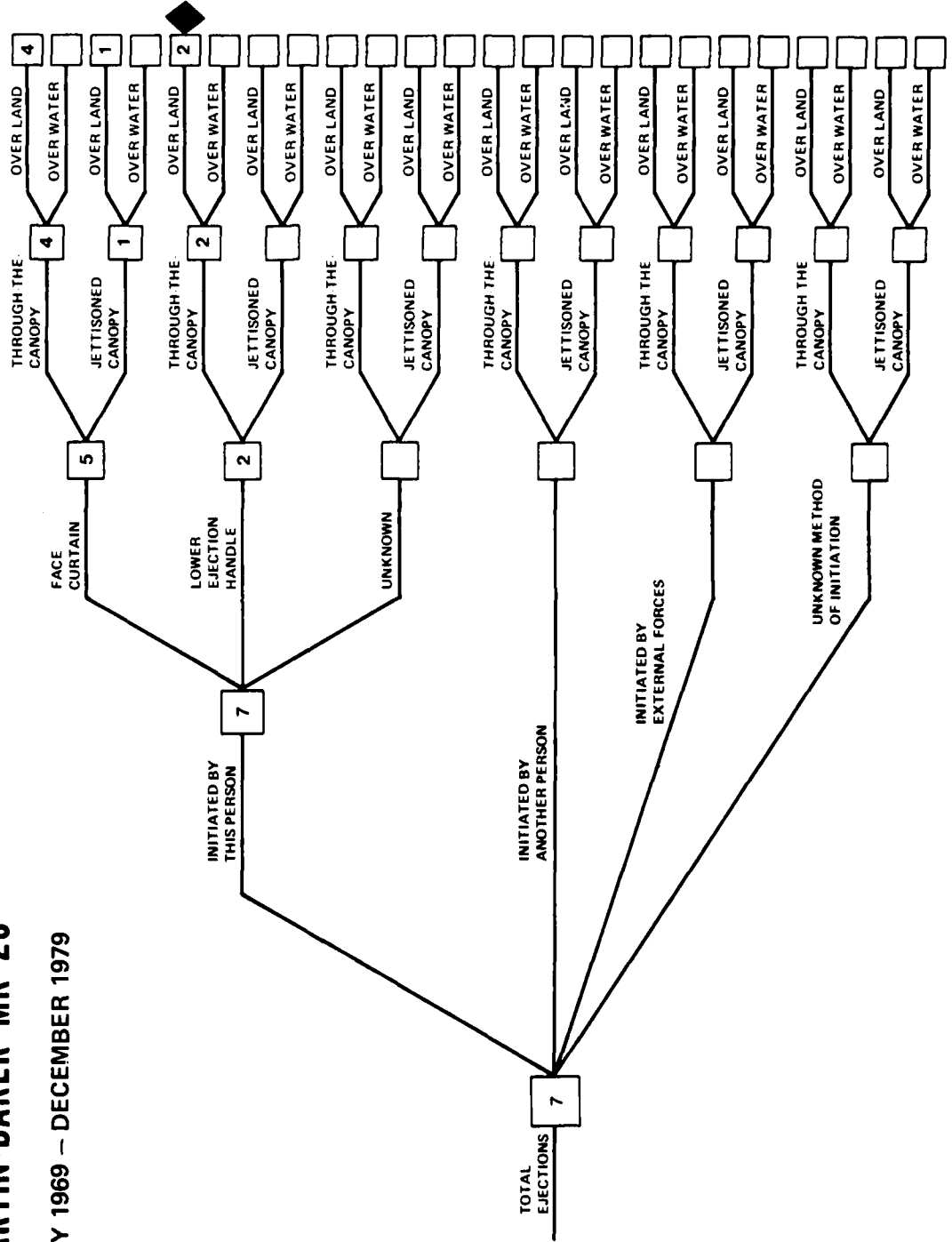


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

F-9/MARTIN-BAKER MK Z5

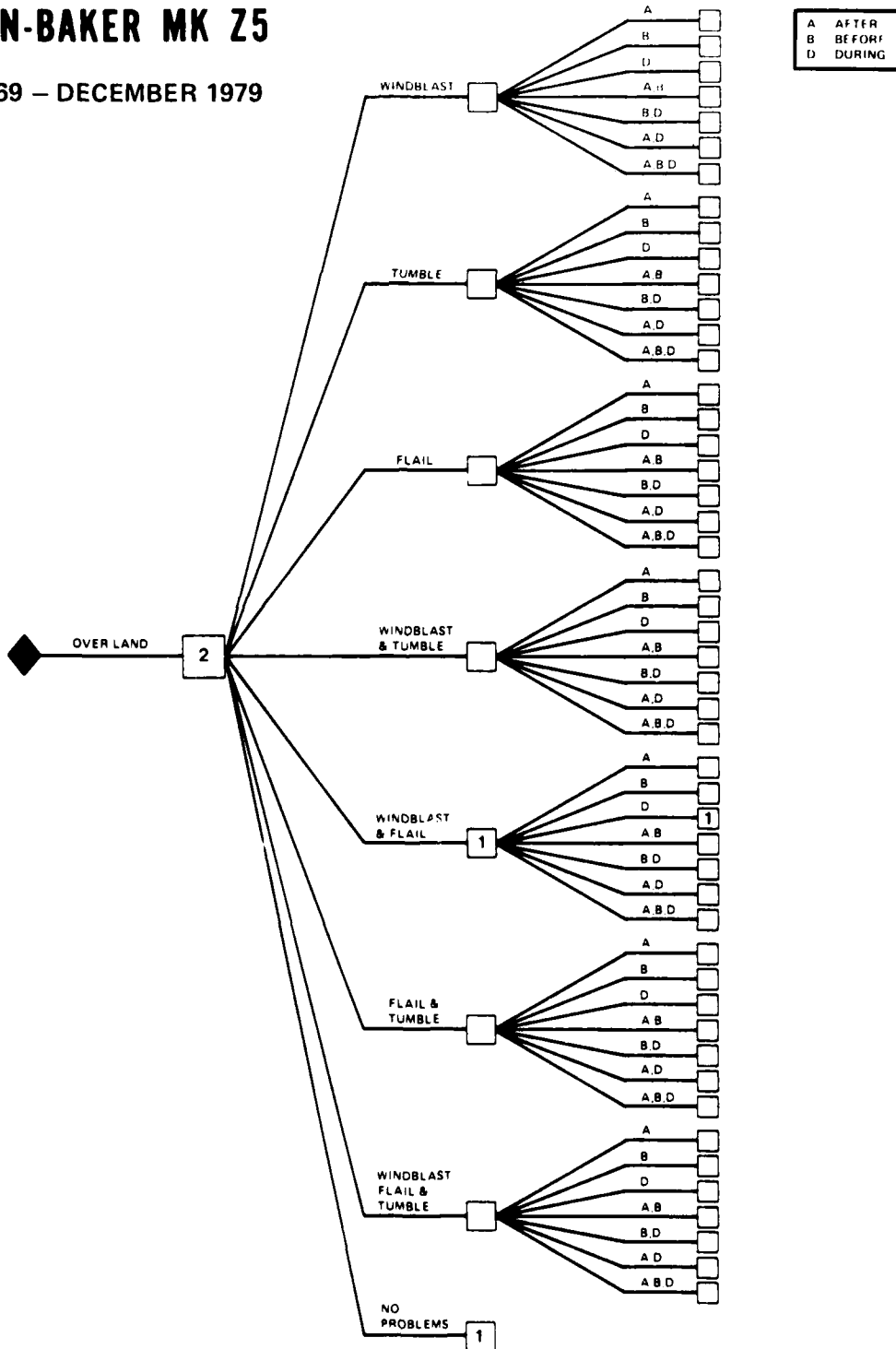
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-9/MARTIN-BAKER MK Z5

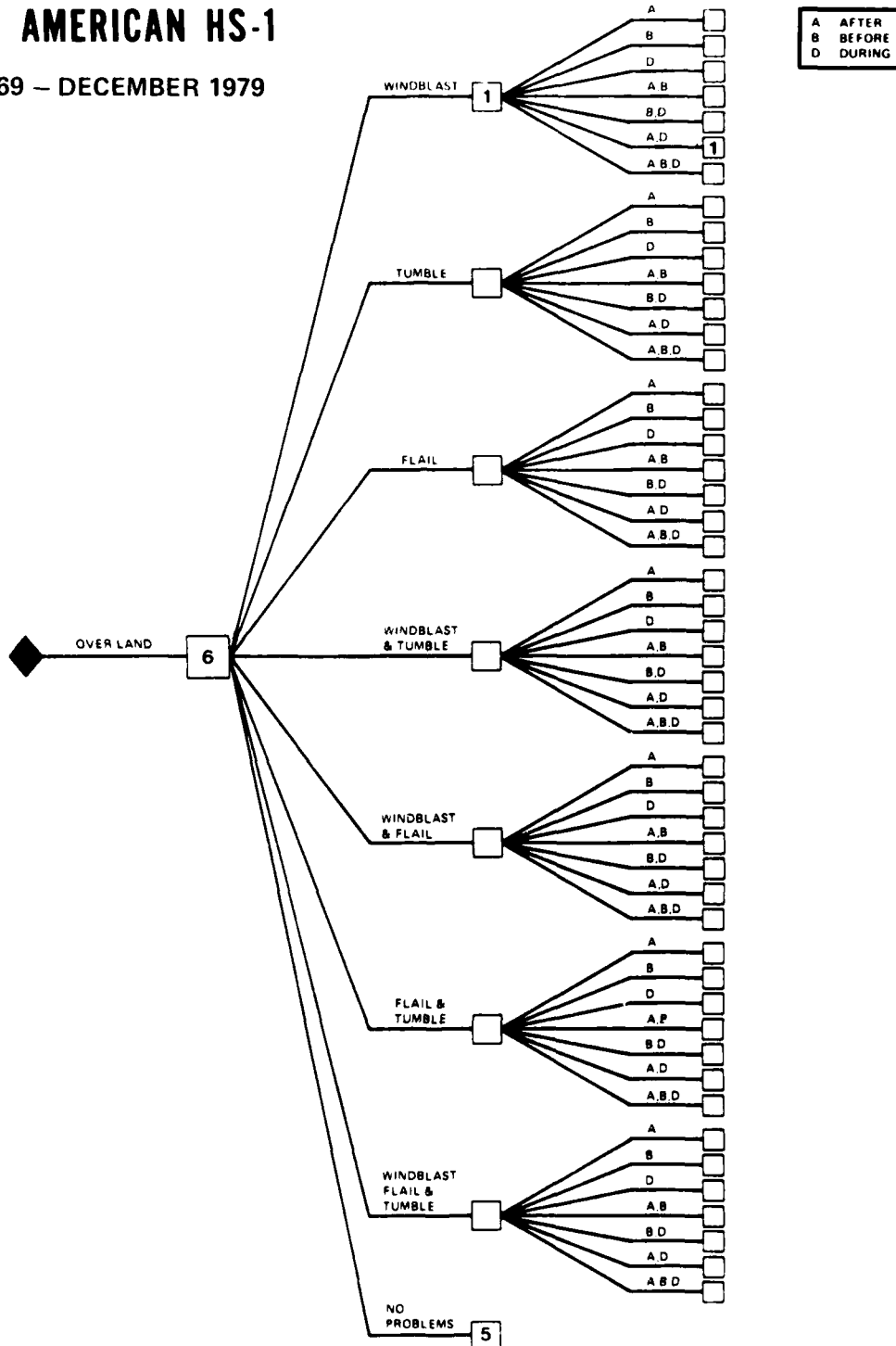
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-5/NORTH AMERICAN HS-1

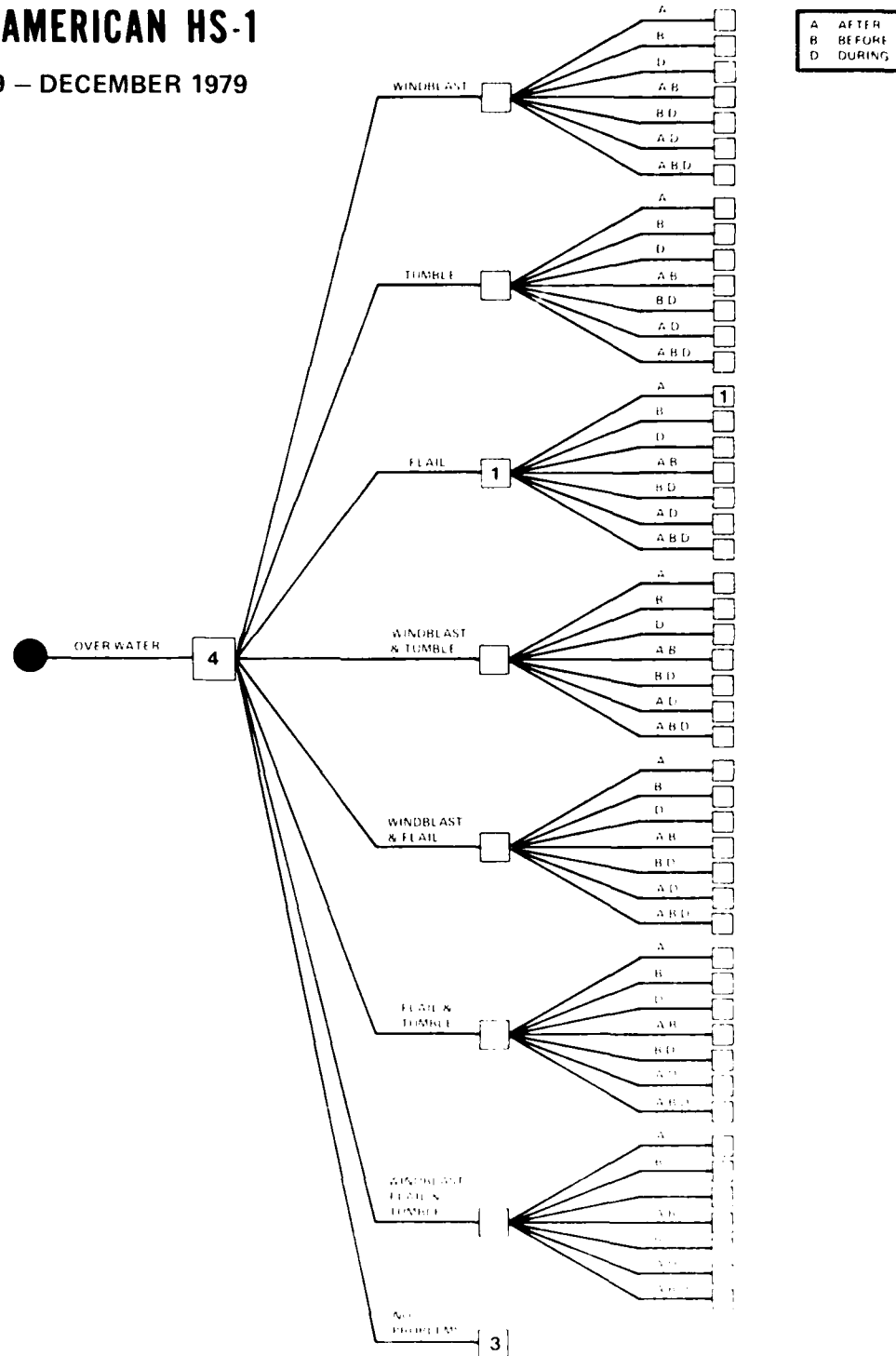
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-5/NORTH AMERICAN HS-1

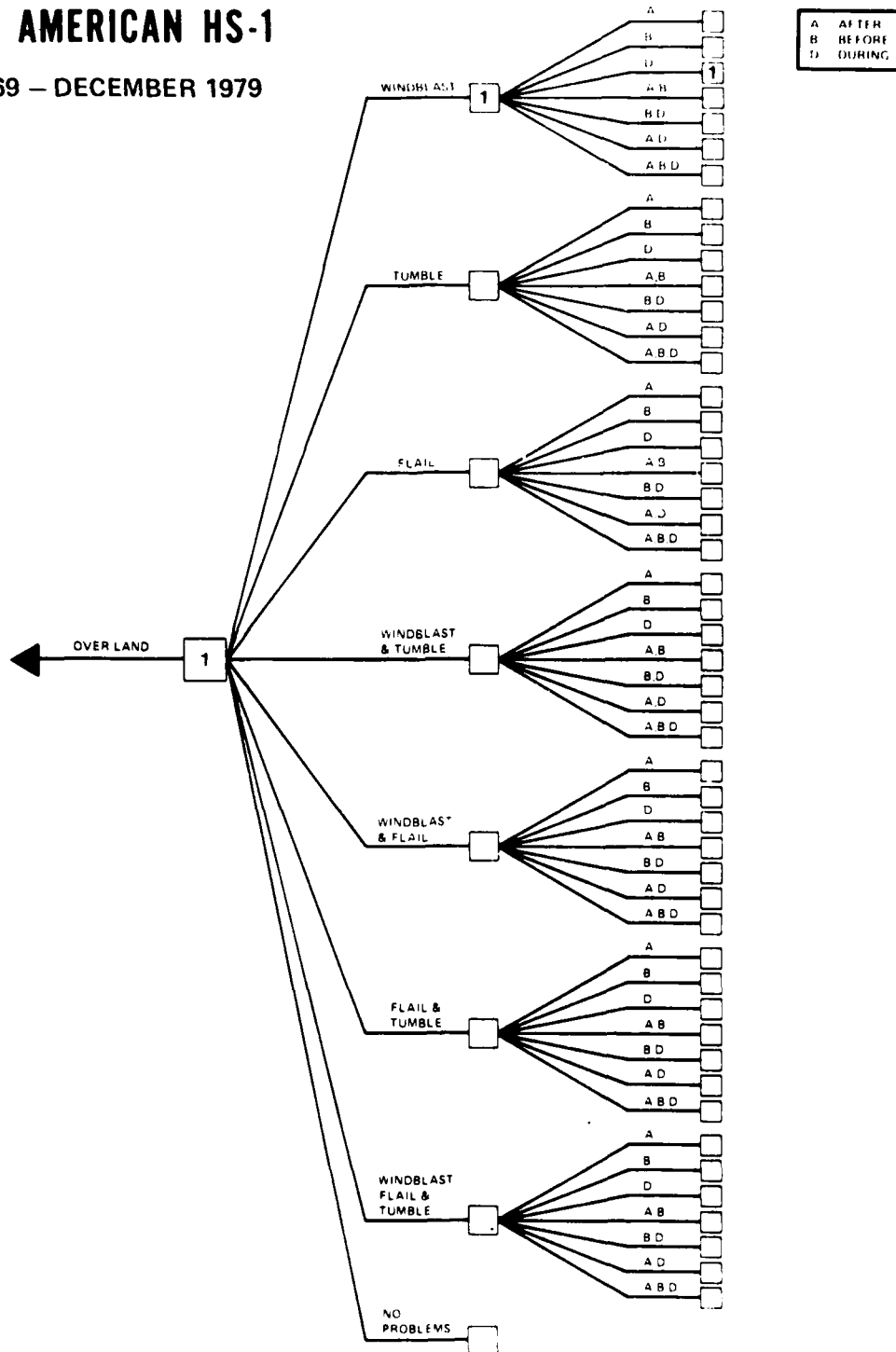
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-5/NORTH AMERICAN HS-1

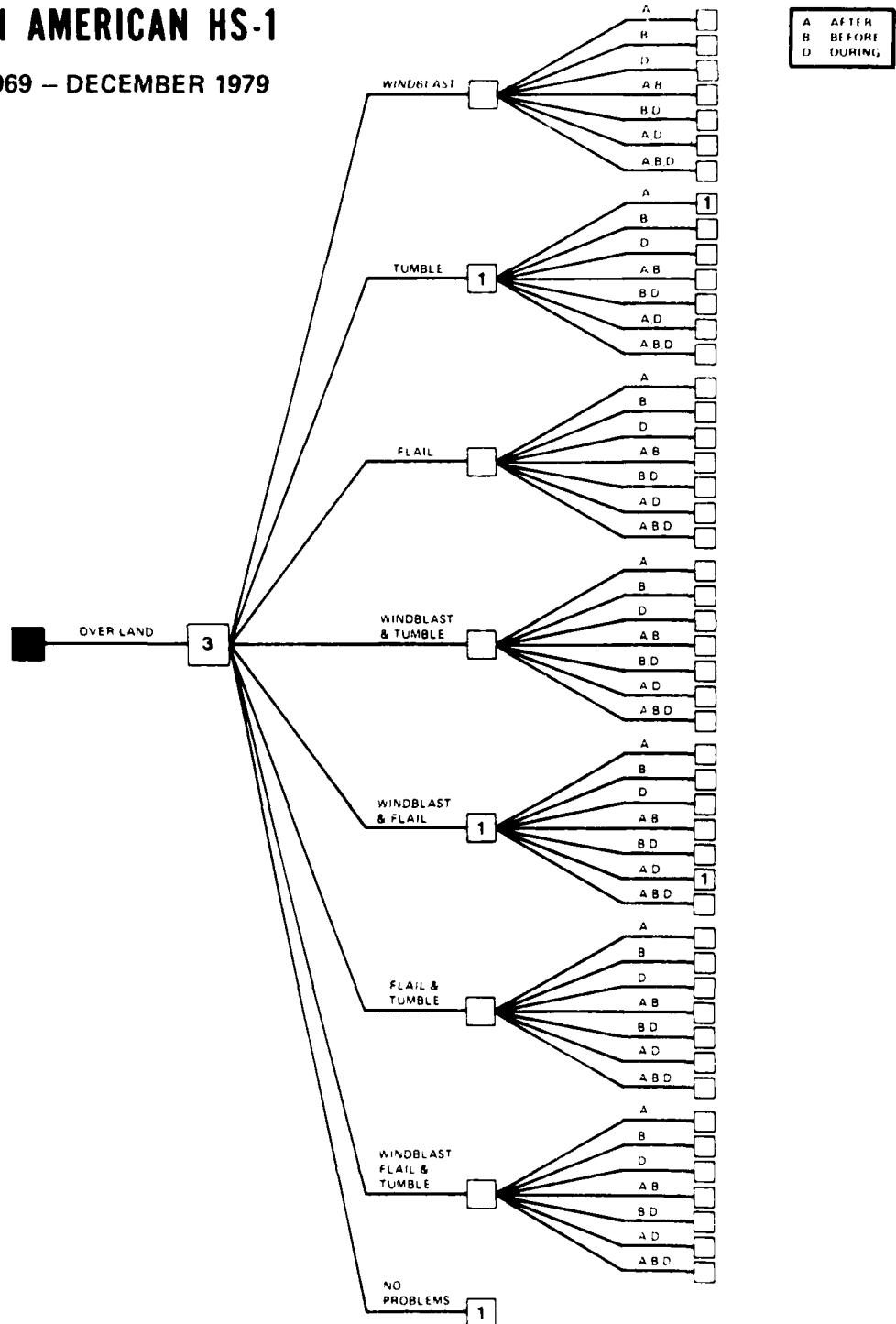
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-5/NORTH AMERICAN HS-1

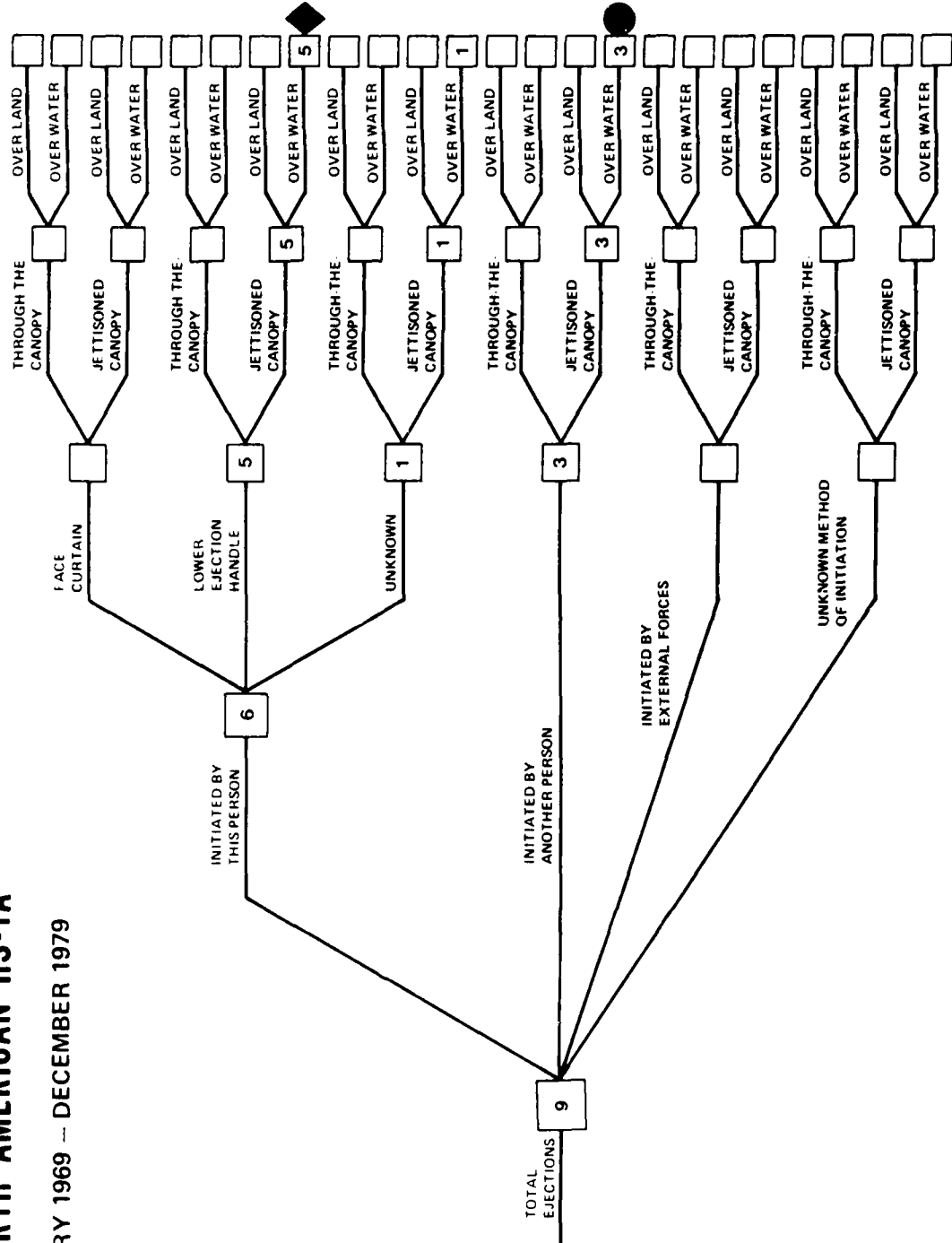
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

A-5/NORTH AMERICAN HS-1A

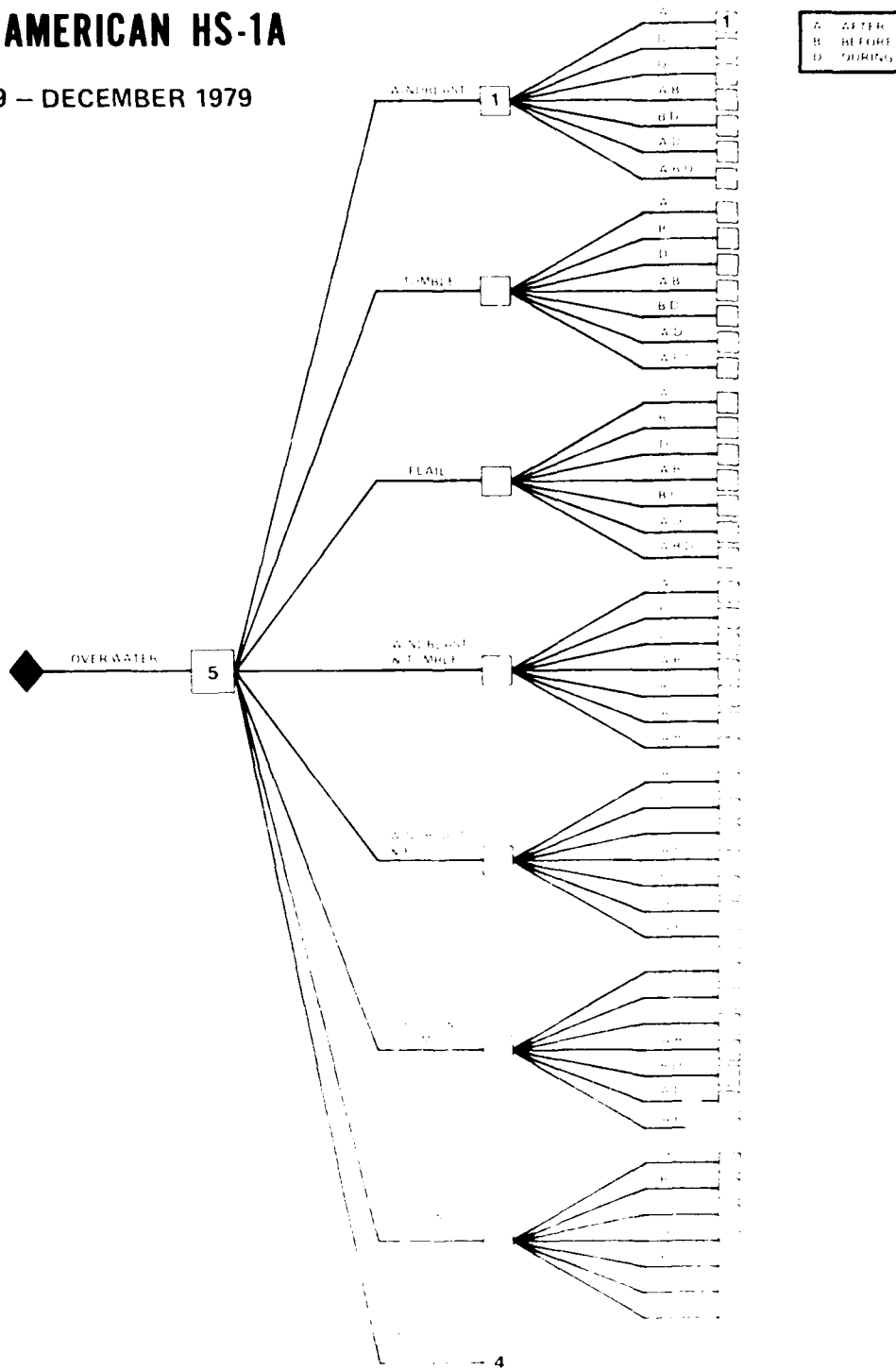
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-5/NORTH AMERICAN HS-1A

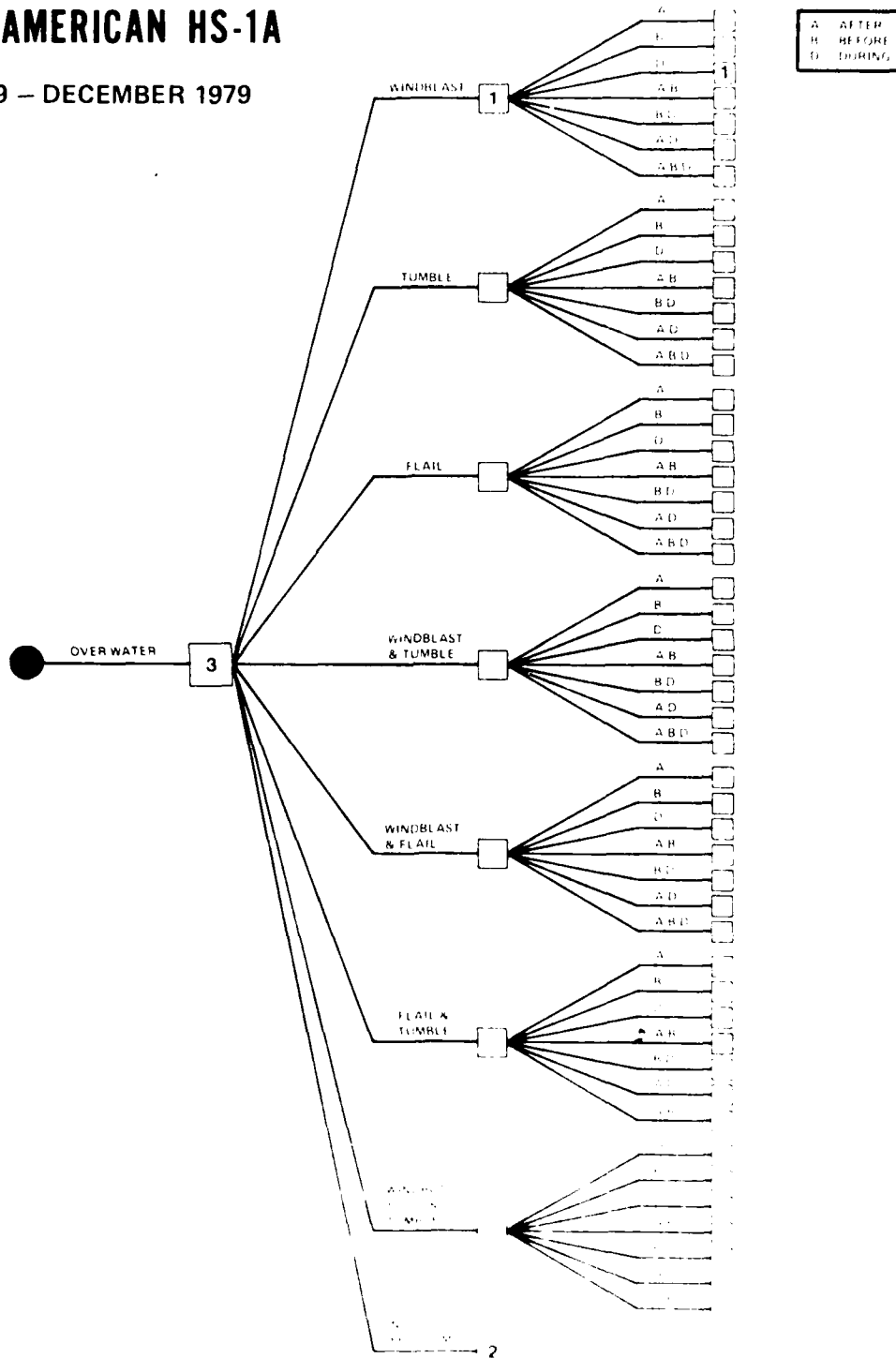
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

A-5/NORTH AMERICAN HS-1A

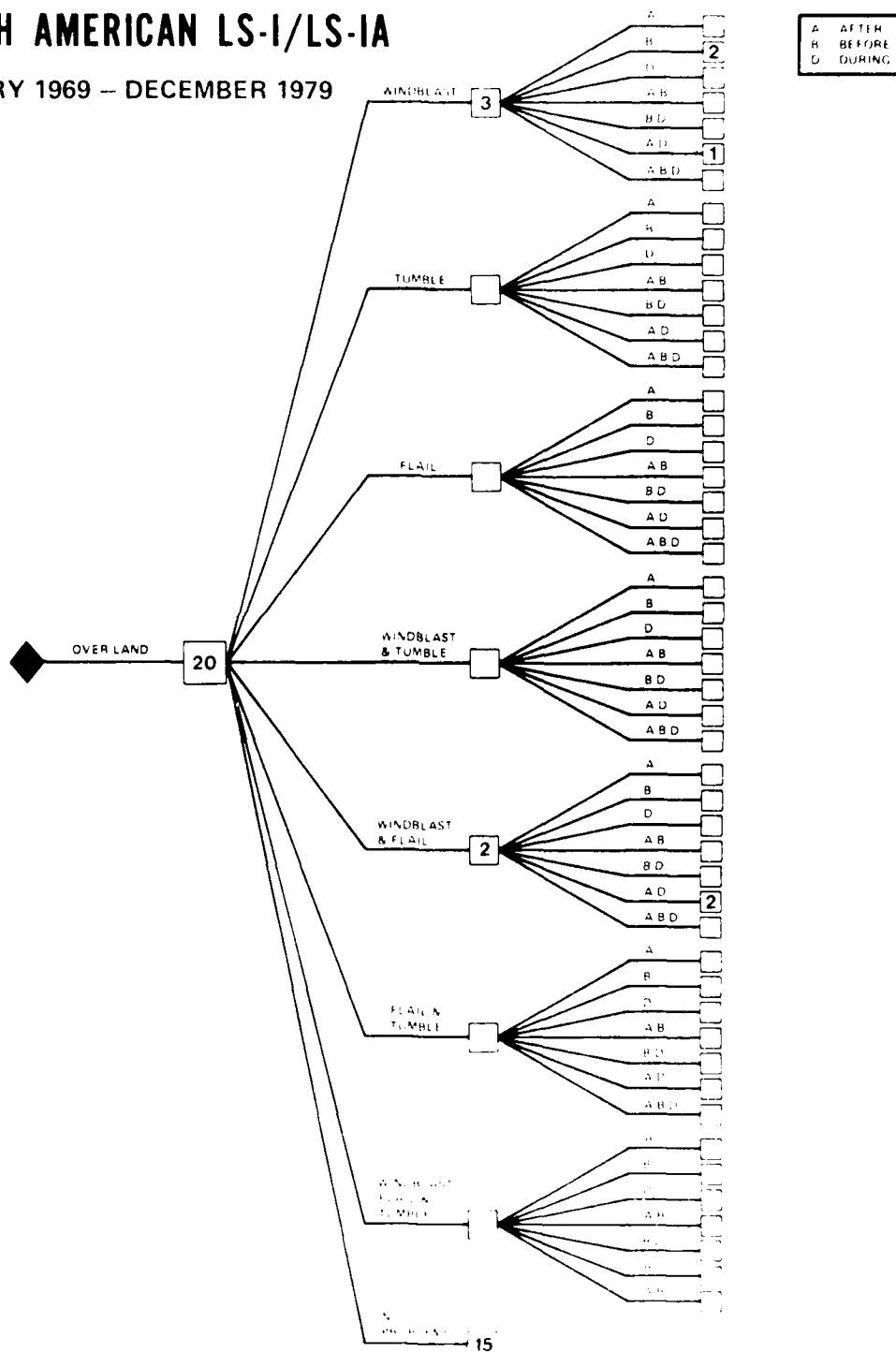
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

T-2/NORTH AMERICAN LS-1/LS-1A

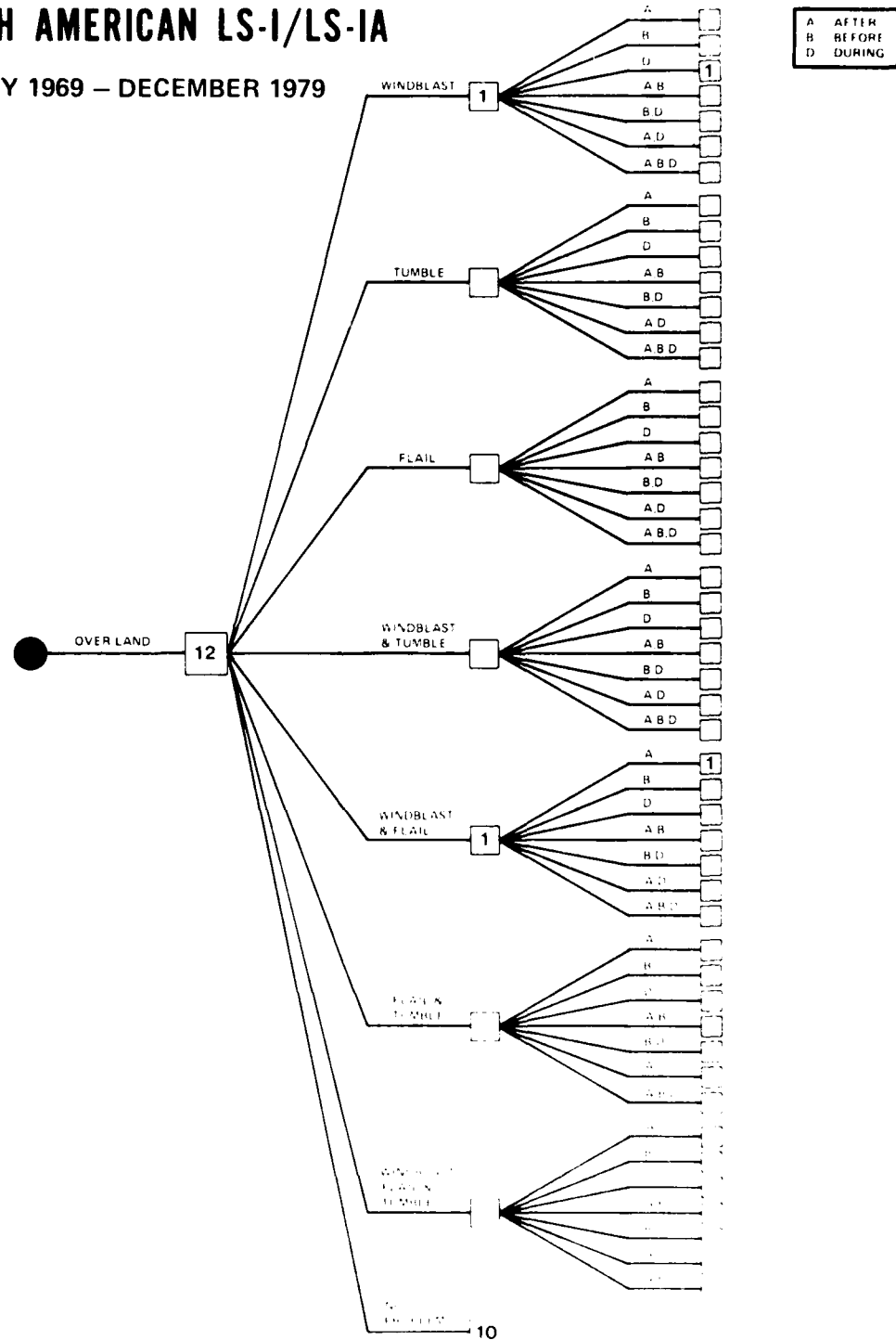
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

T-2/NORTH AMERICAN LS-1/LS-1A

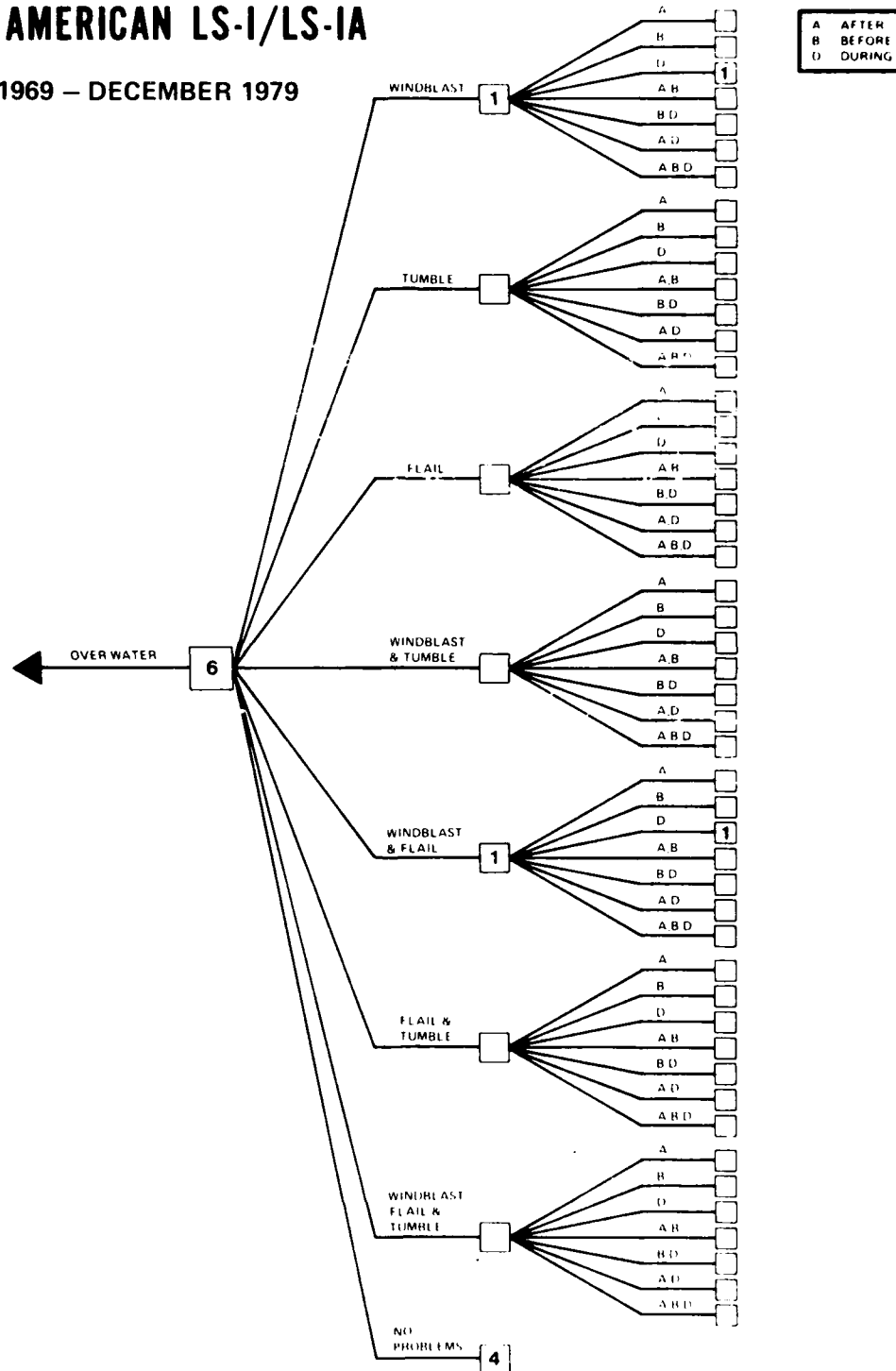
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

T-2/NORTH AMERICAN LS-1/LS-1A

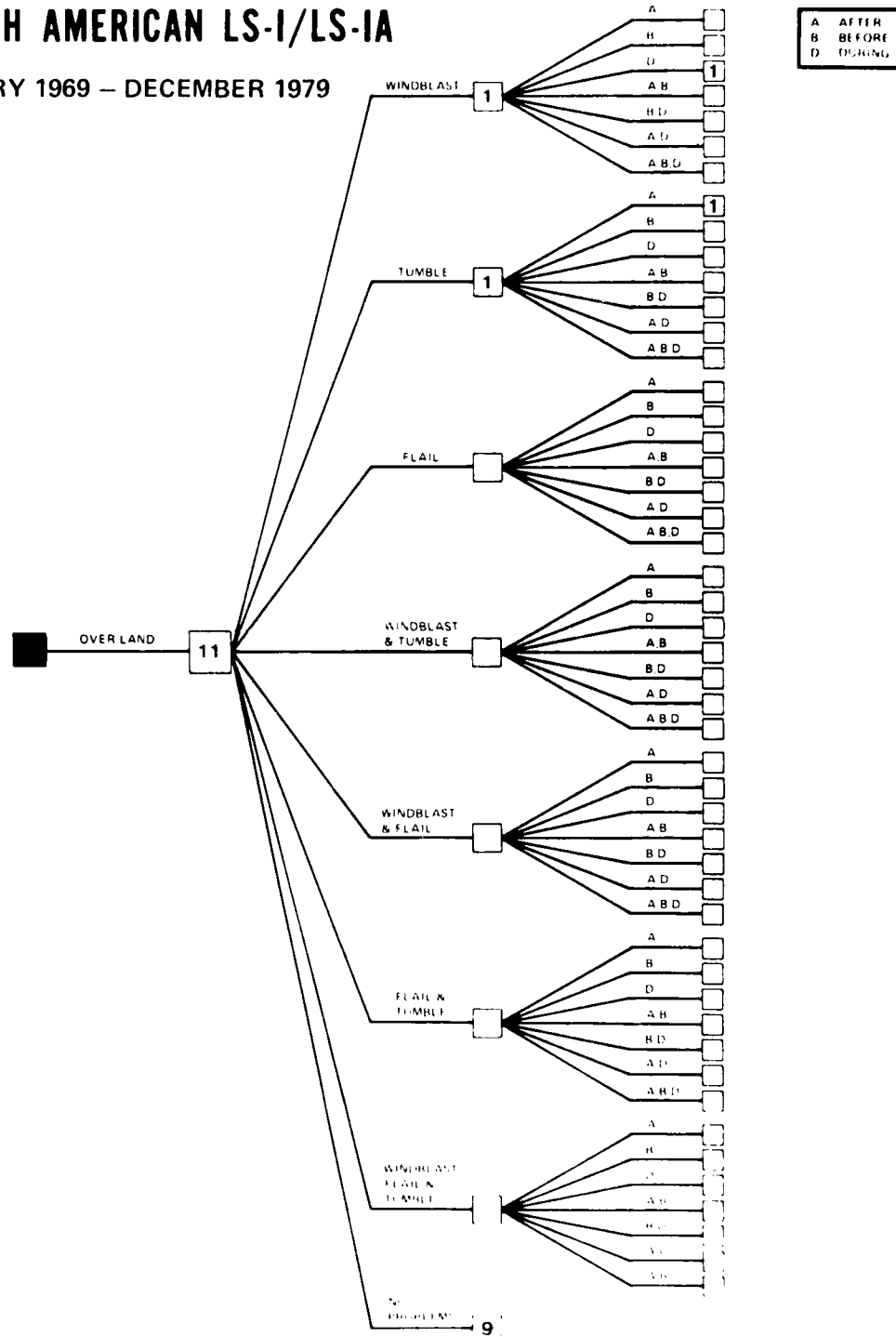
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

T-2/NORTH AMERICAN LS-1/LS-1A

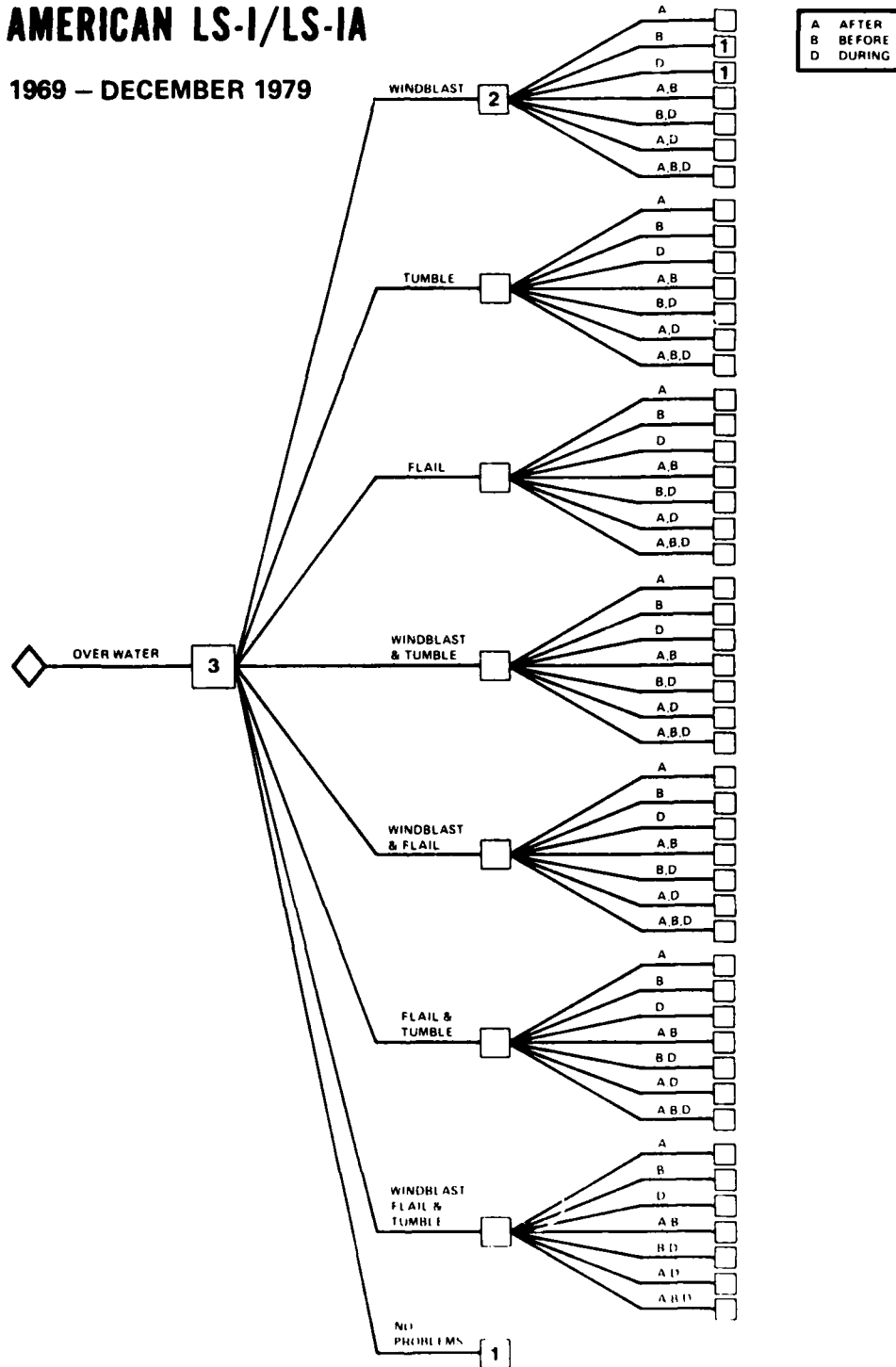
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

T-2/NORTH AMERICAN LS-1/LS-1A

JANUARY 1969 – DECEMBER 1979

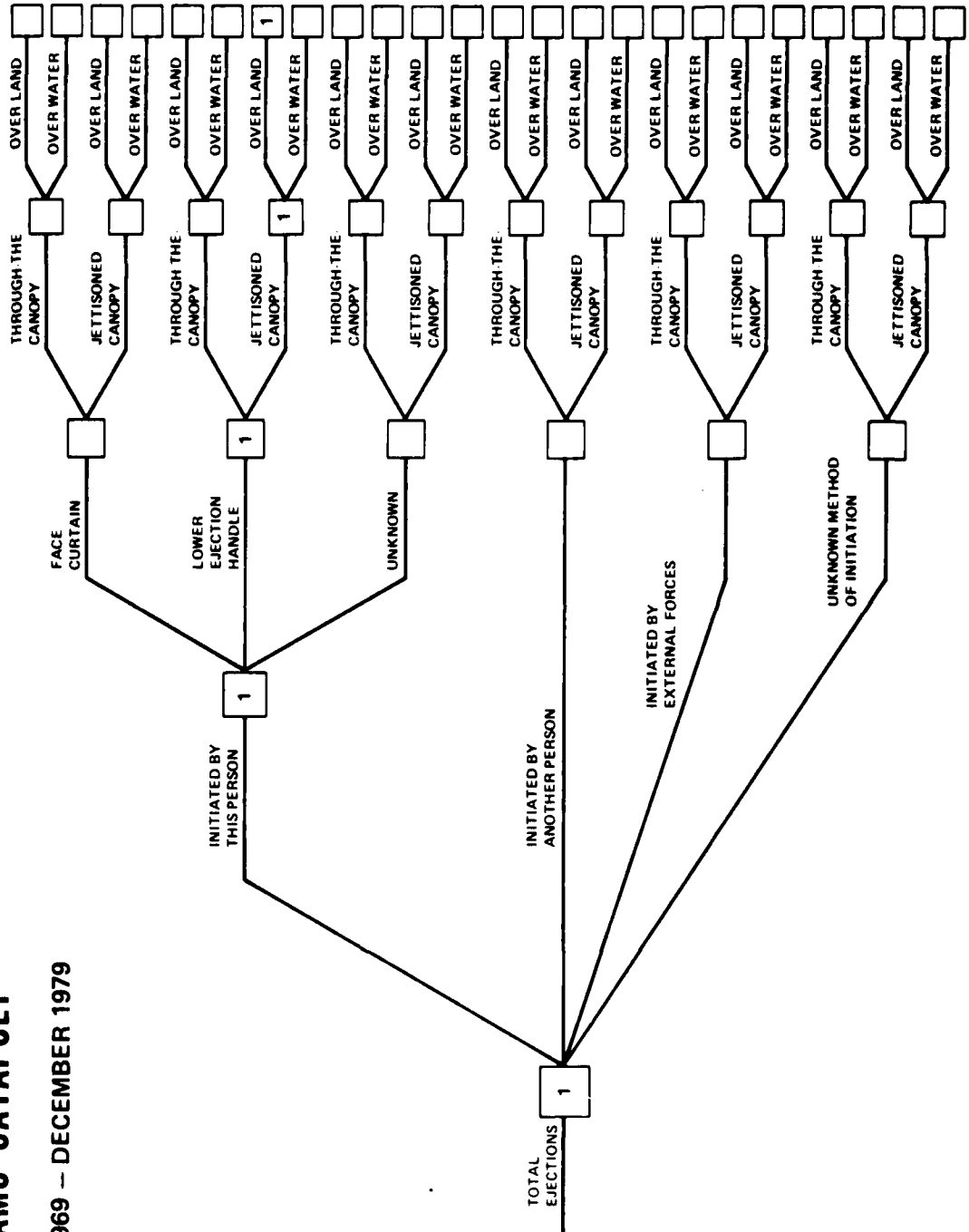


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

T-33/NAMC CATAPULT

JANUARY 1969 -- DECEMBER 1979

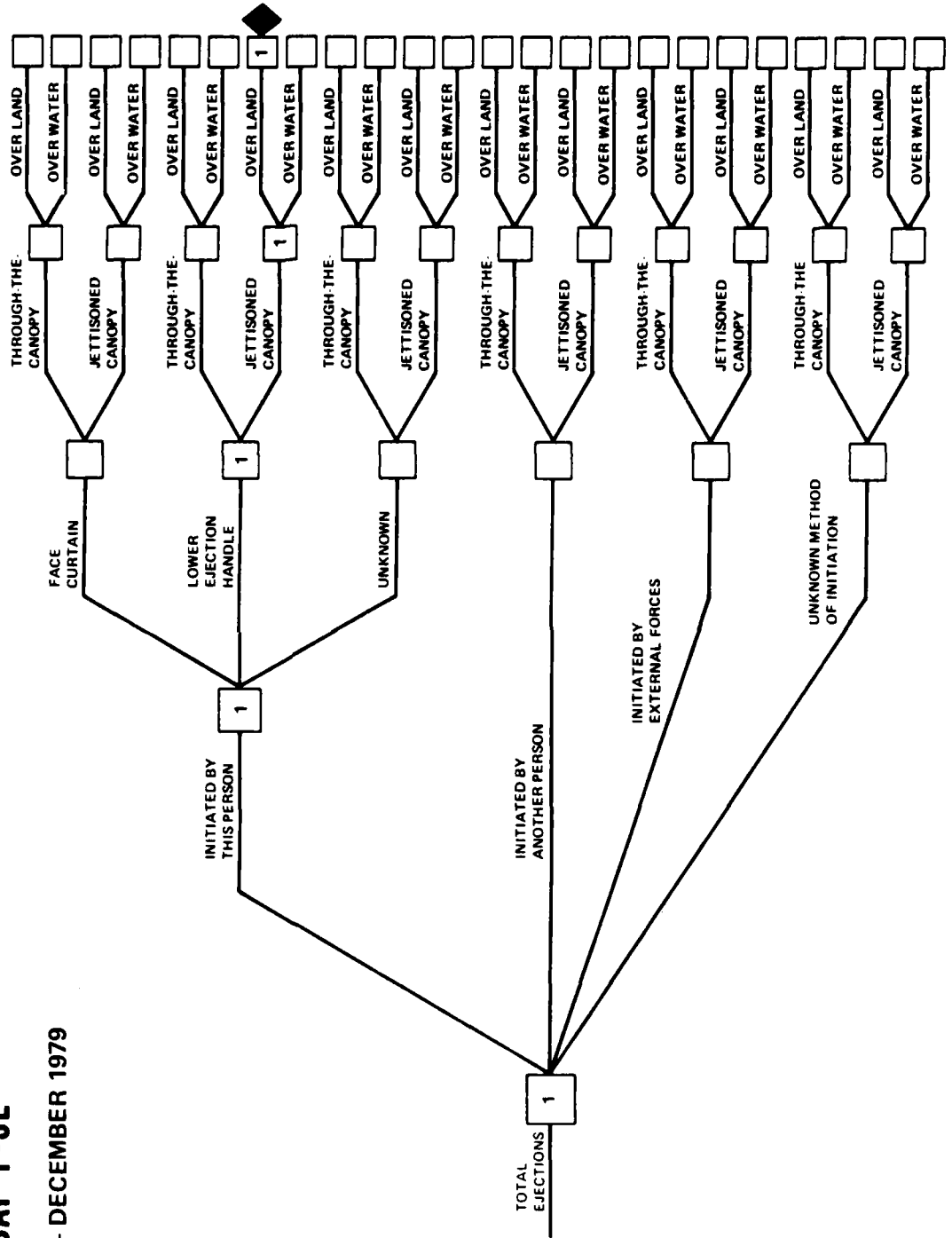


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

F-5/ USAF F-5E

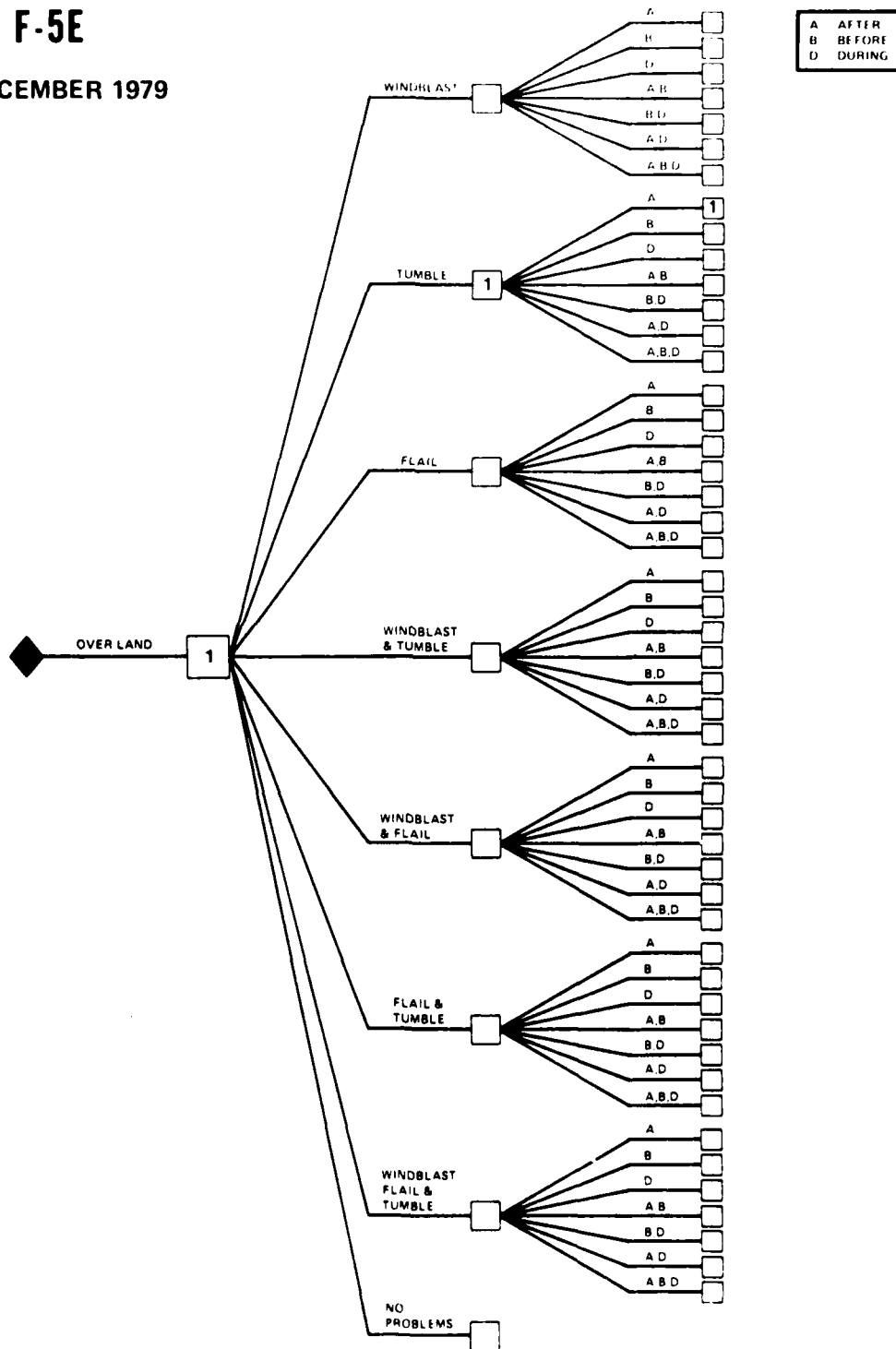
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

F-5/ USAF F-5E

JANUARY 1969 – DECEMBER 1979

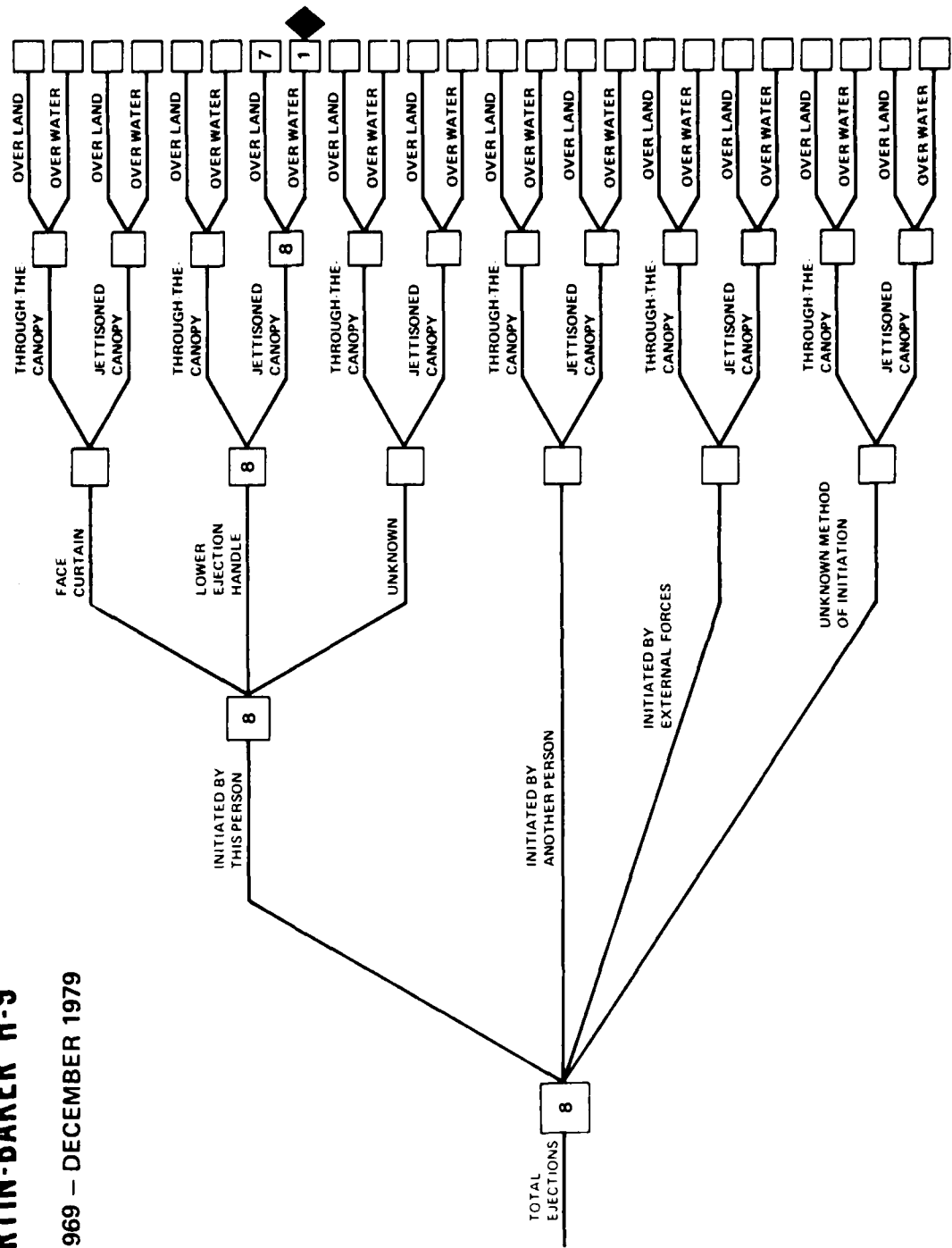


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

0-600+ KTS

V-8/MARTIN-BAKER H-9

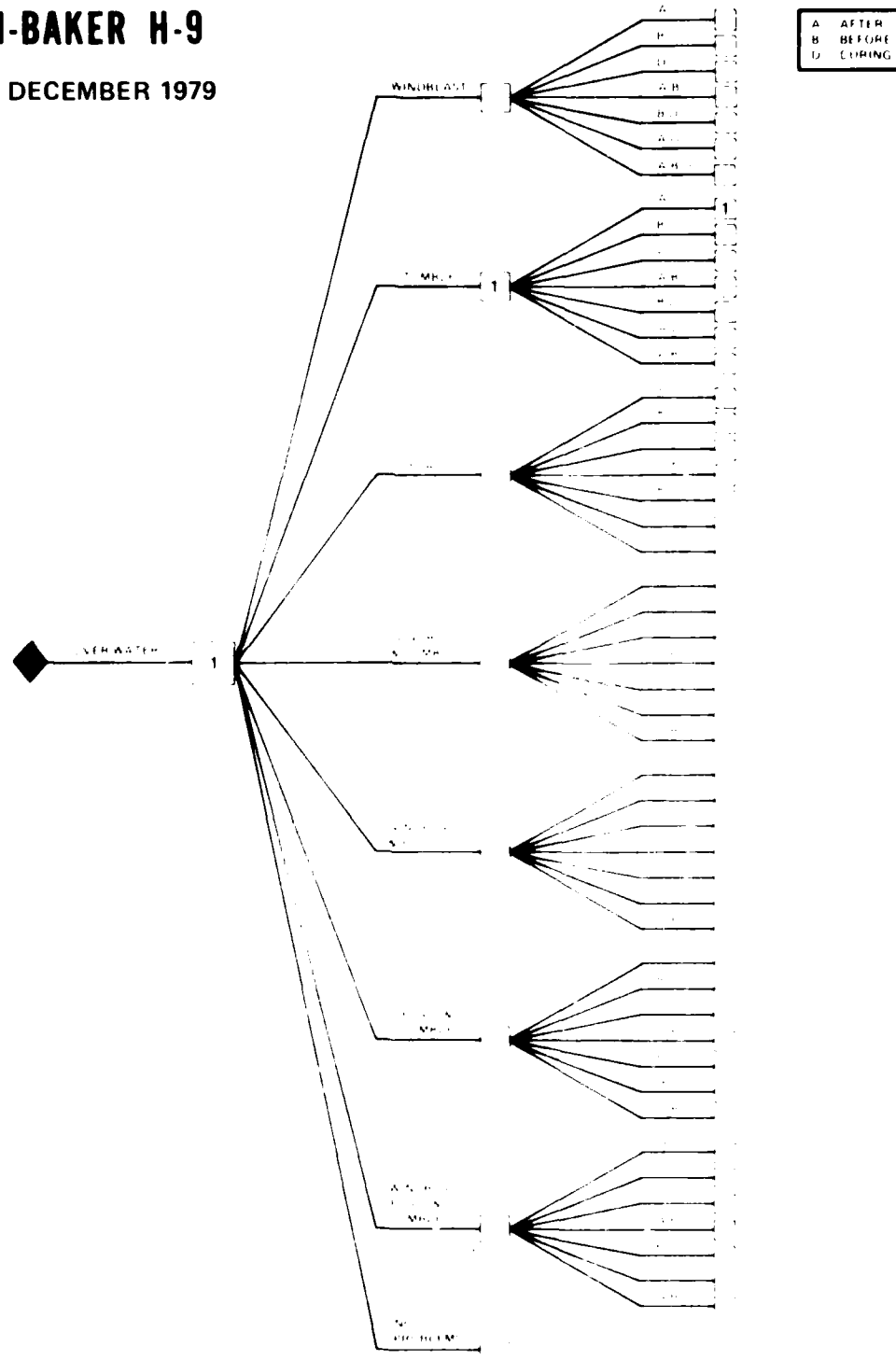
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

V-8/MARTIN-BAKER H-9

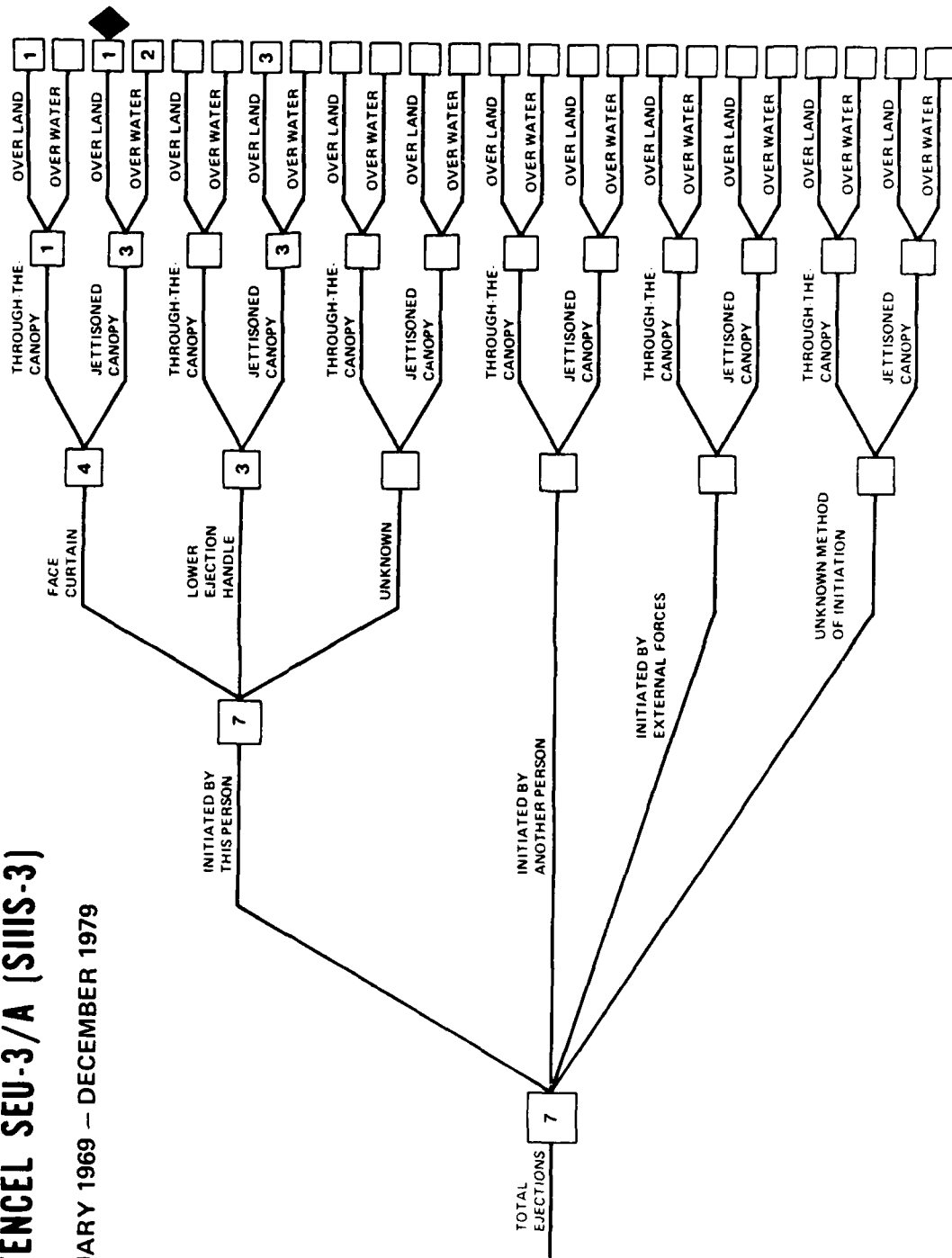
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 0-600+ KTS

V-8/STENCEL SEU-3/A (SIHS-3)

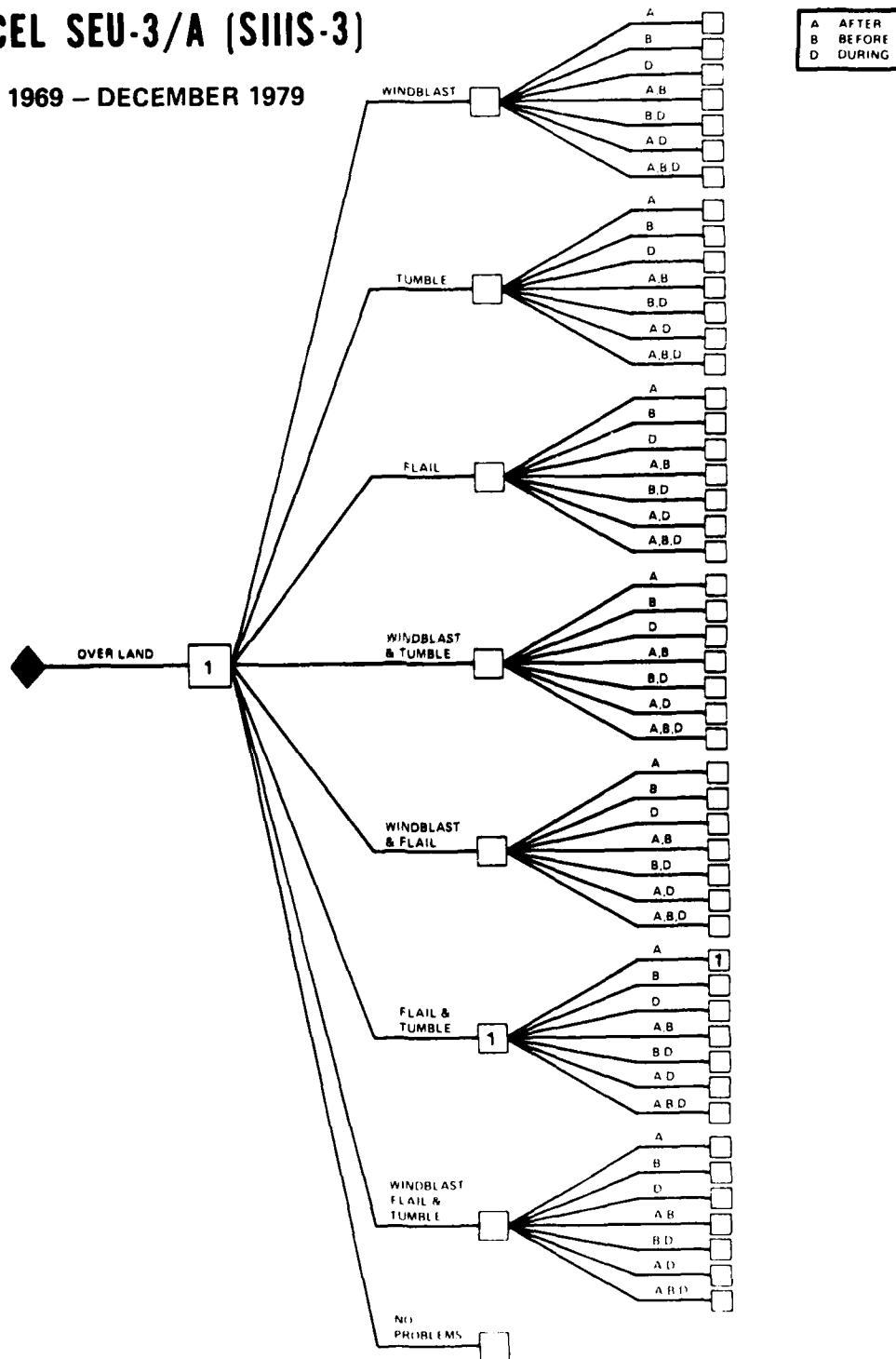
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 0-600+ KTS

V-8/STENCEL SEU-3/A (SIHS-3)

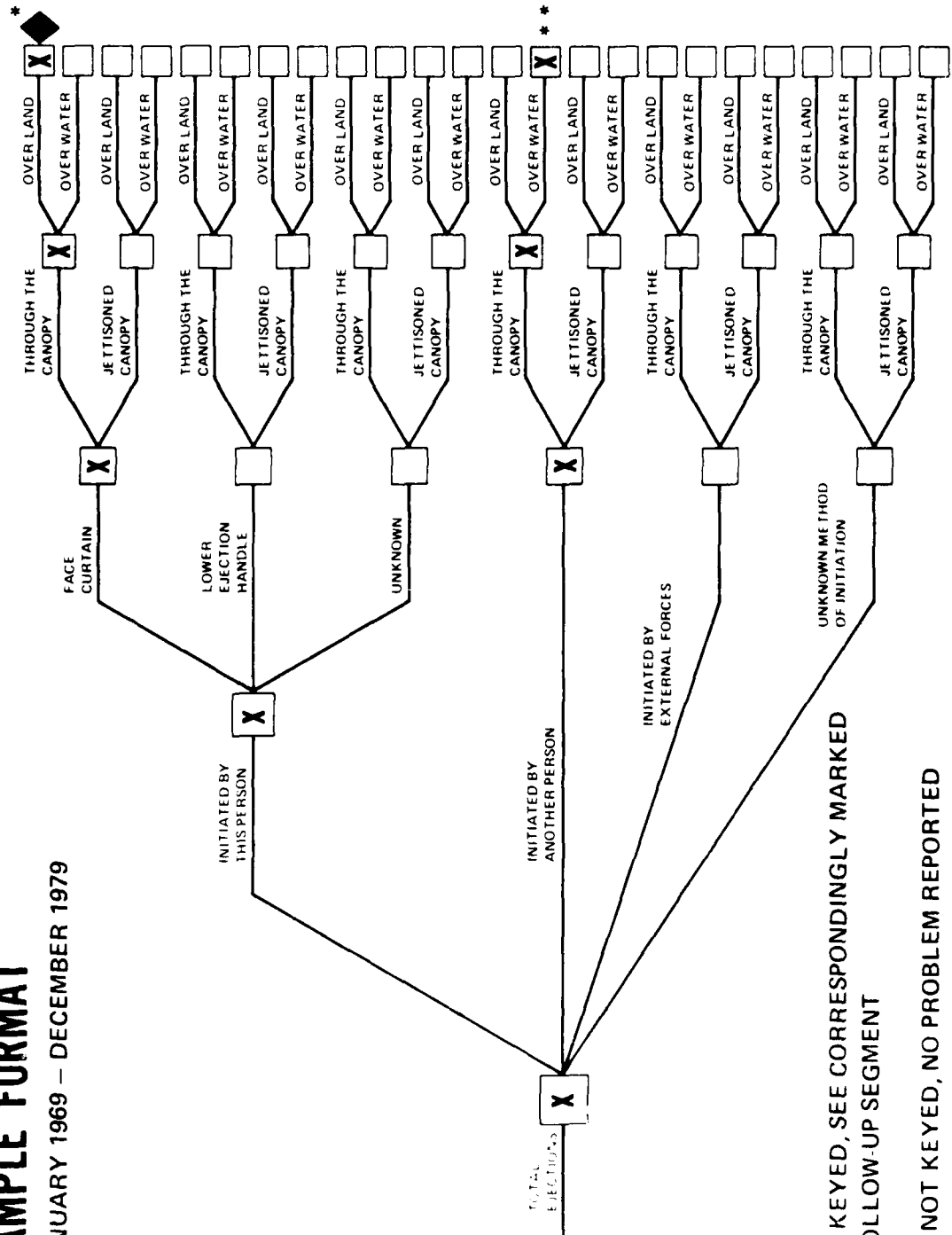
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

SAMPLE FORMAT

JANUARY 1969 - DECEMBER 1979



* IF KEYED, SEE CORRESPONDINGLY MARKED FOLLOW-UP SEGMENT

** IF NOT KEYED, NO PROBLEM REPORTED

DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-4/ESCAPAC I

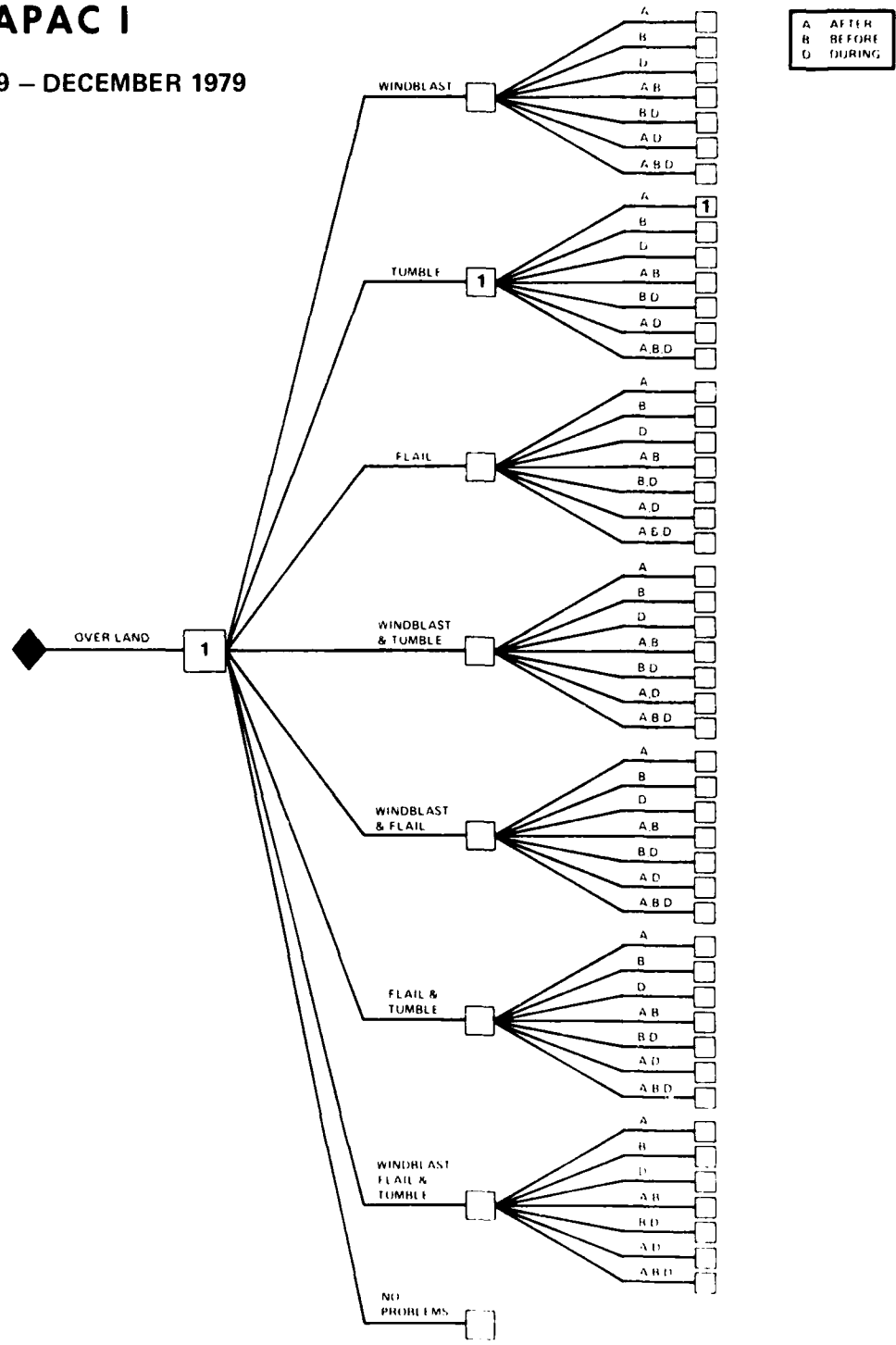
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

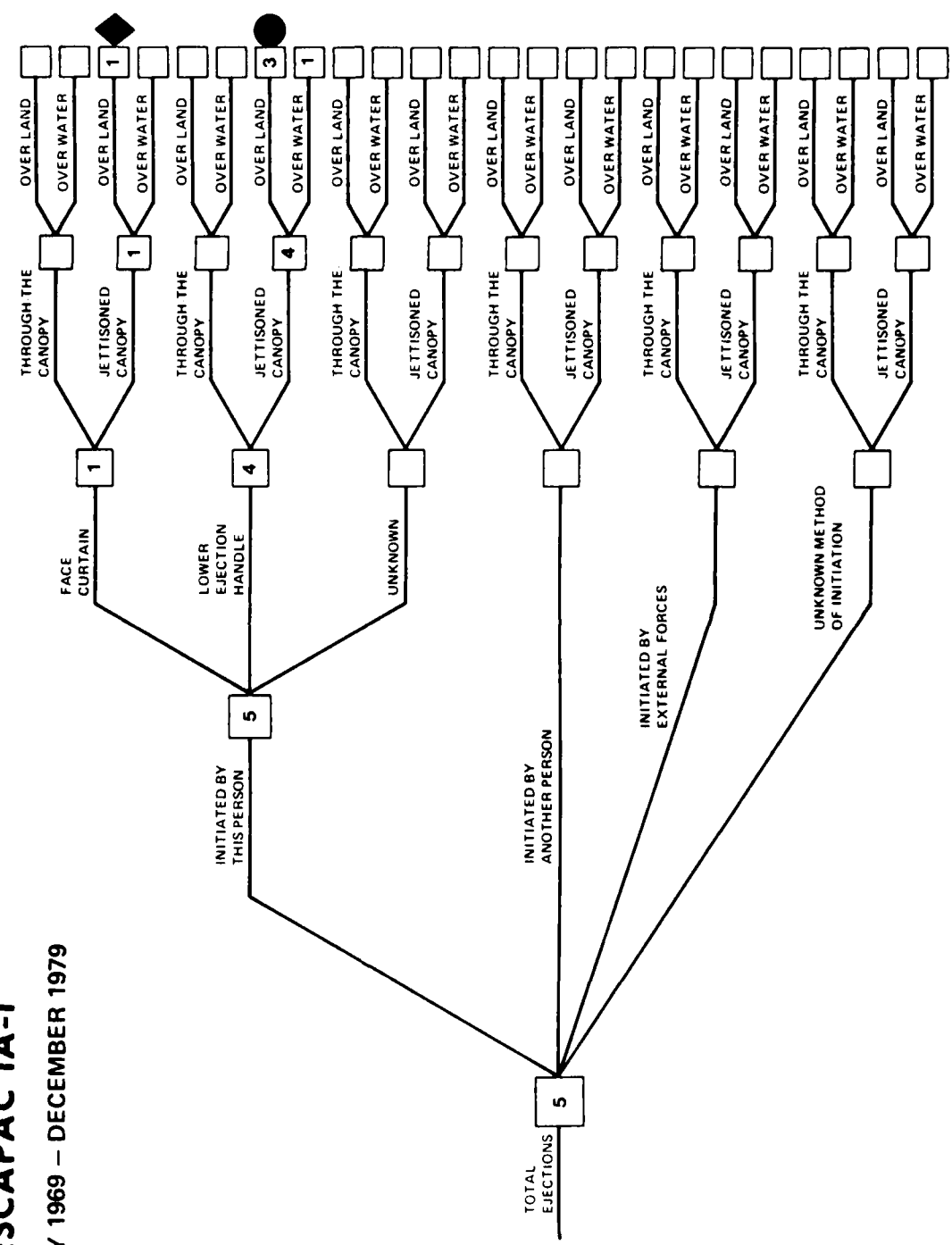
A-4/ESCAPAC I

JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

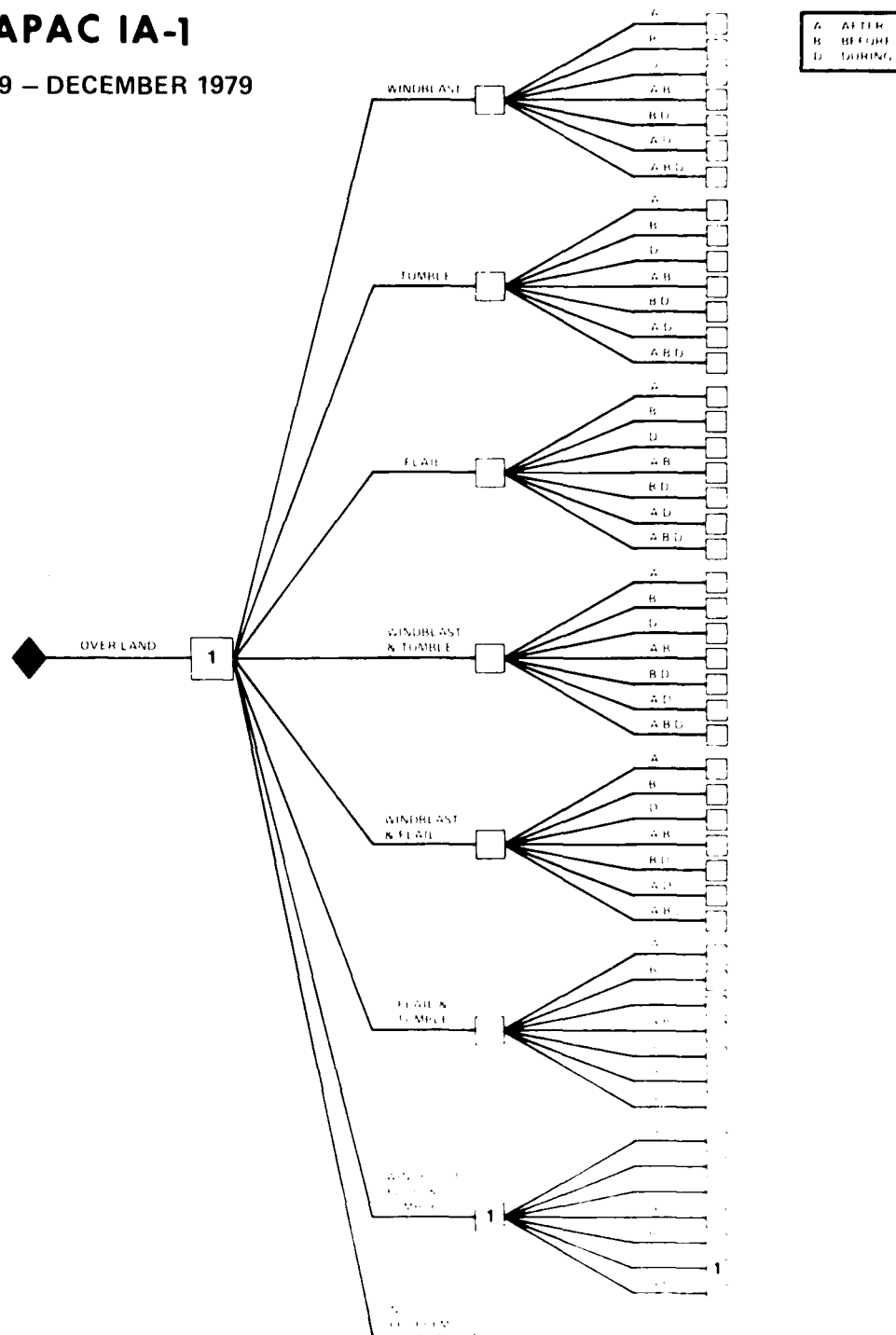
A-4/ESCAPAC IA-1
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-4/ESCAPAC IA-1

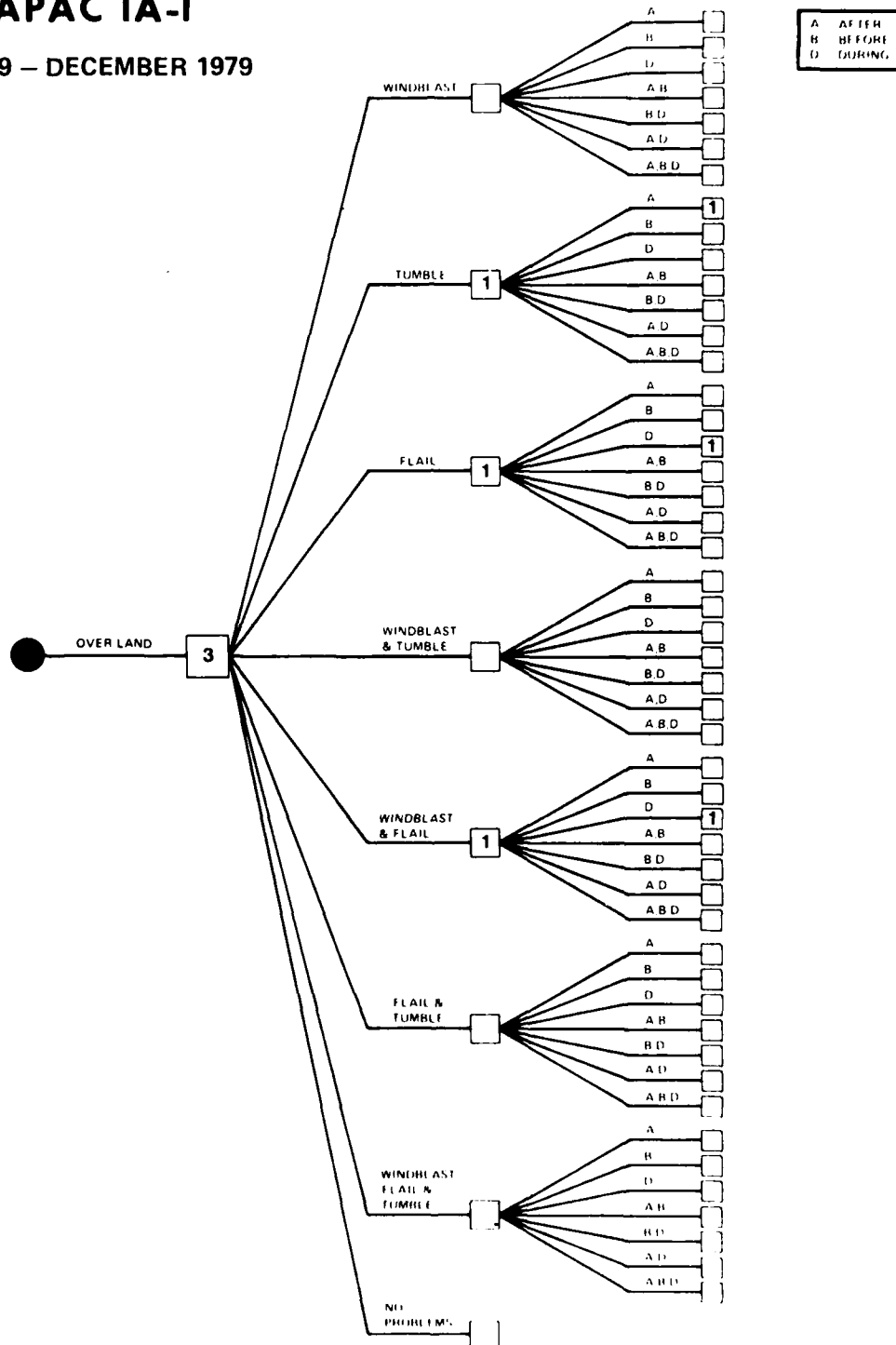
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-4/ESCAPAC IA-1

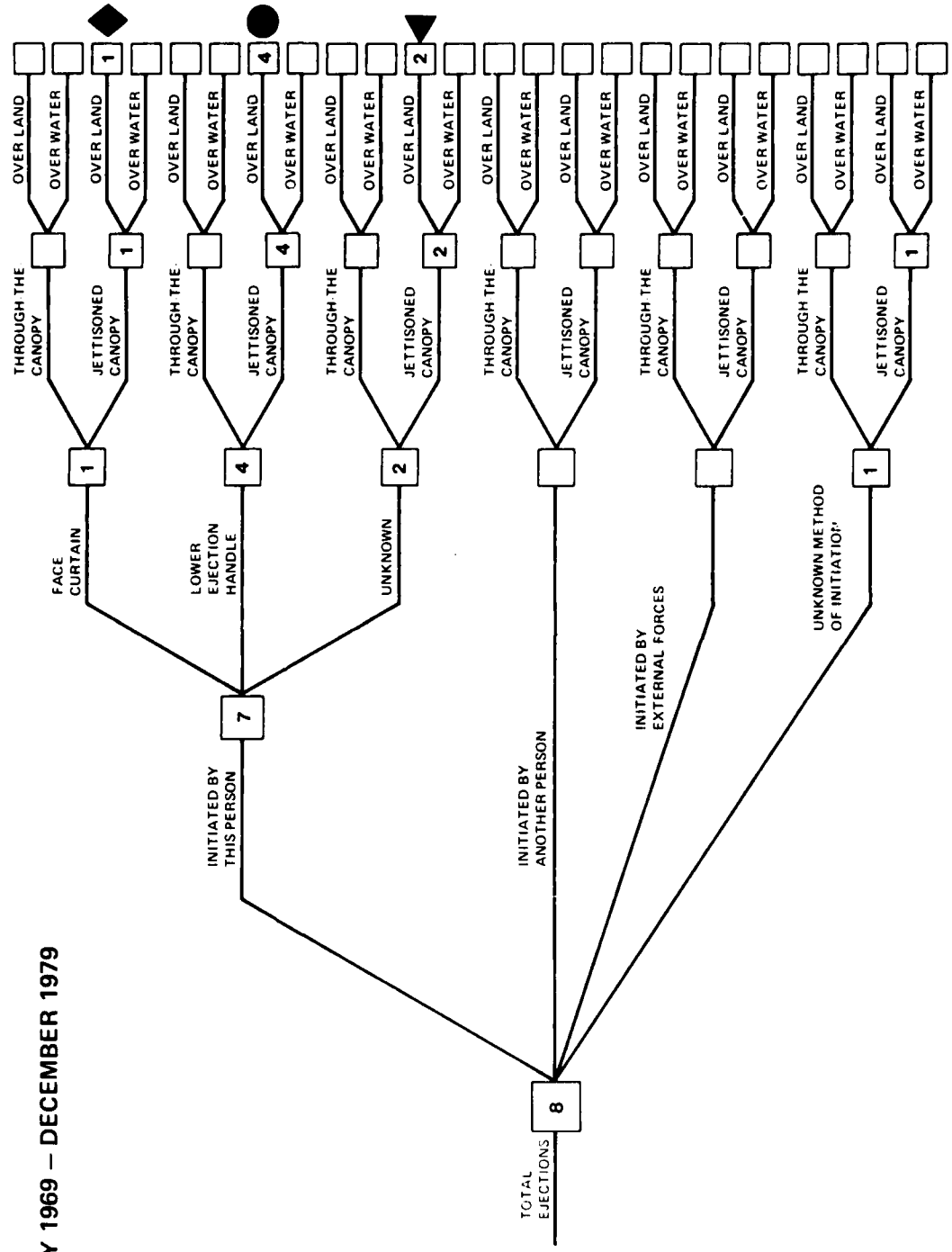
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-4/ESCAPAC IC-3

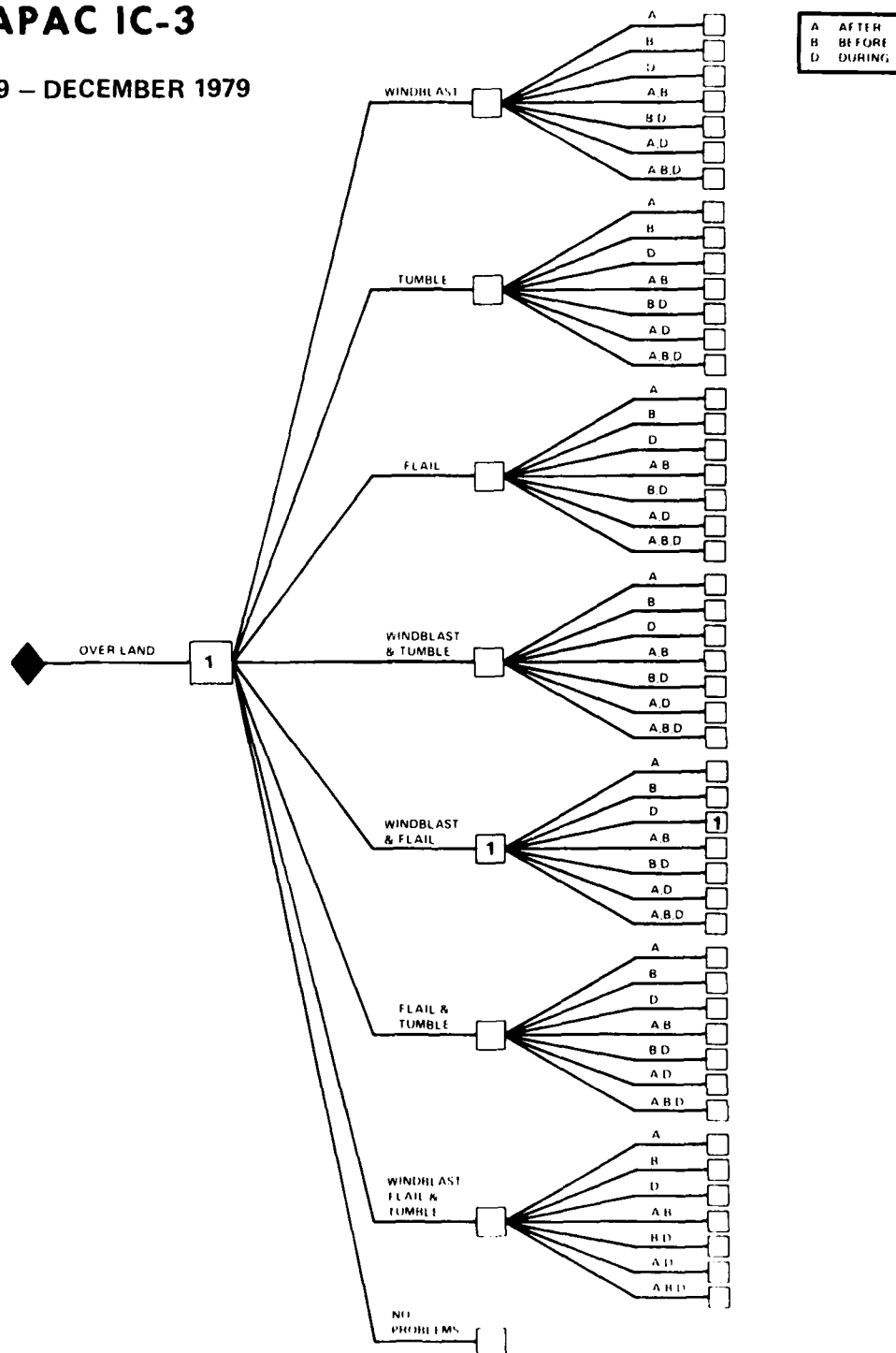
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-4/ESCAPAC IC-3

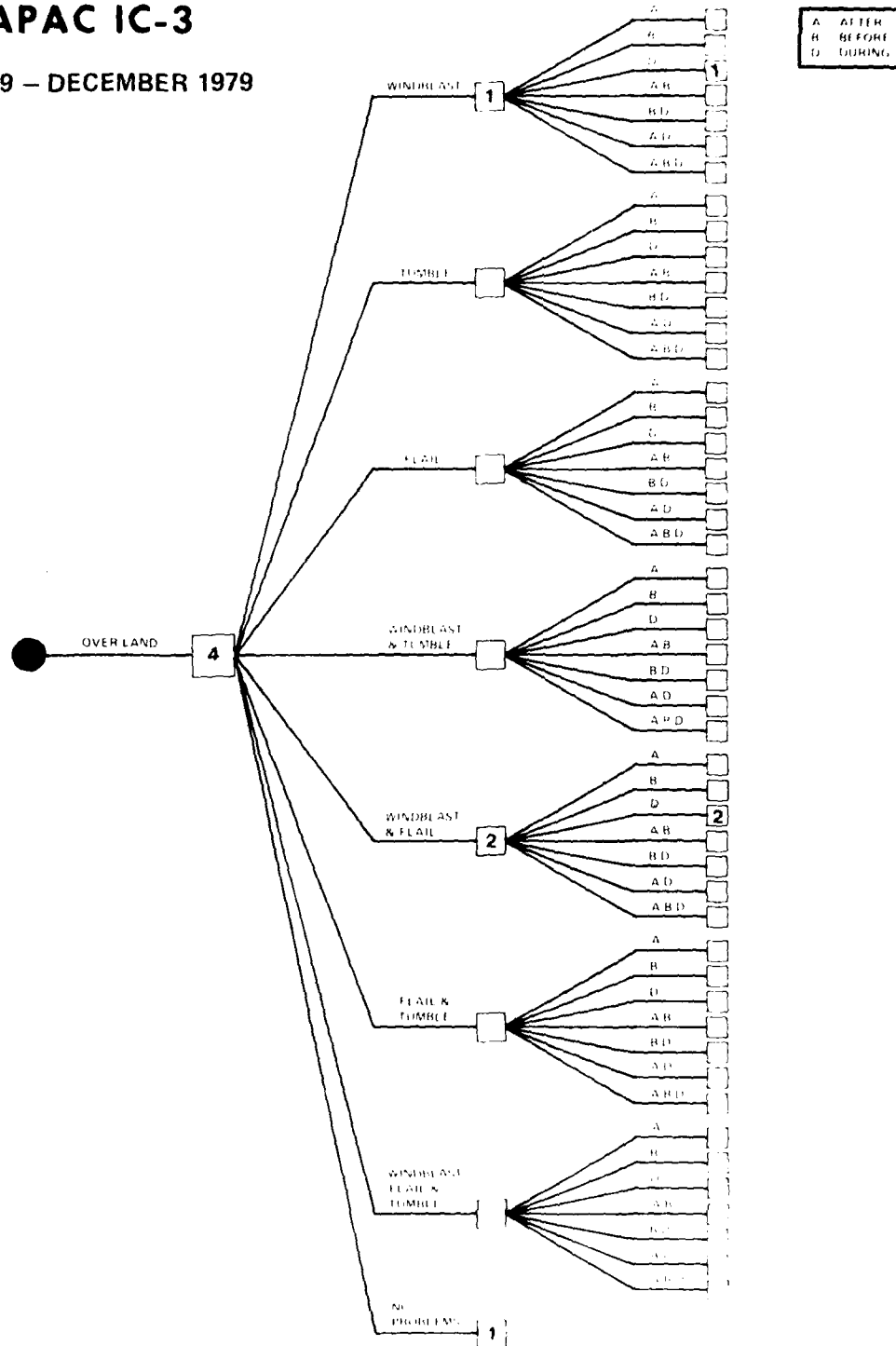
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-4/ESCAPAC IC-3

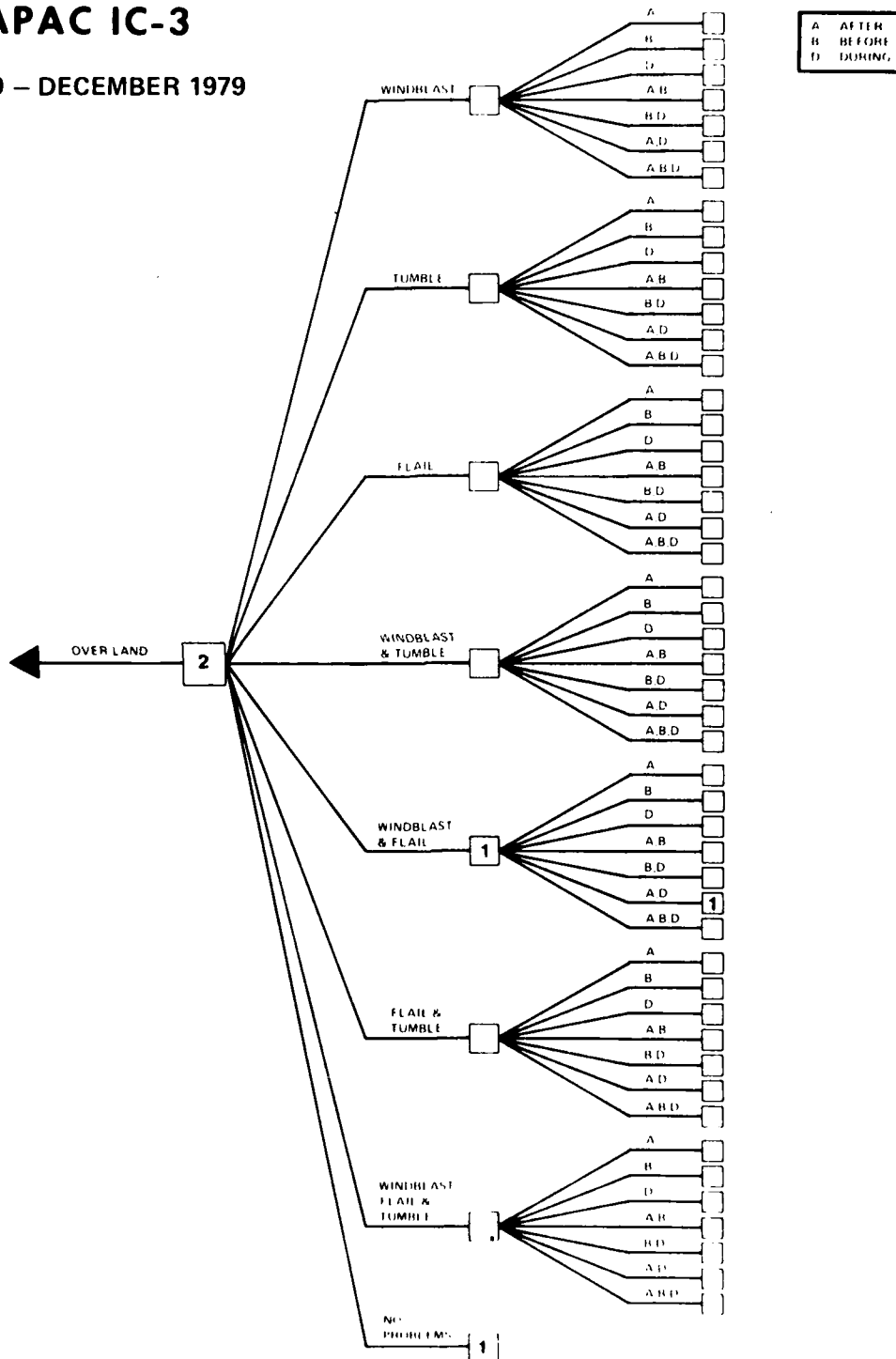
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-4/ESCAPAC IC-3

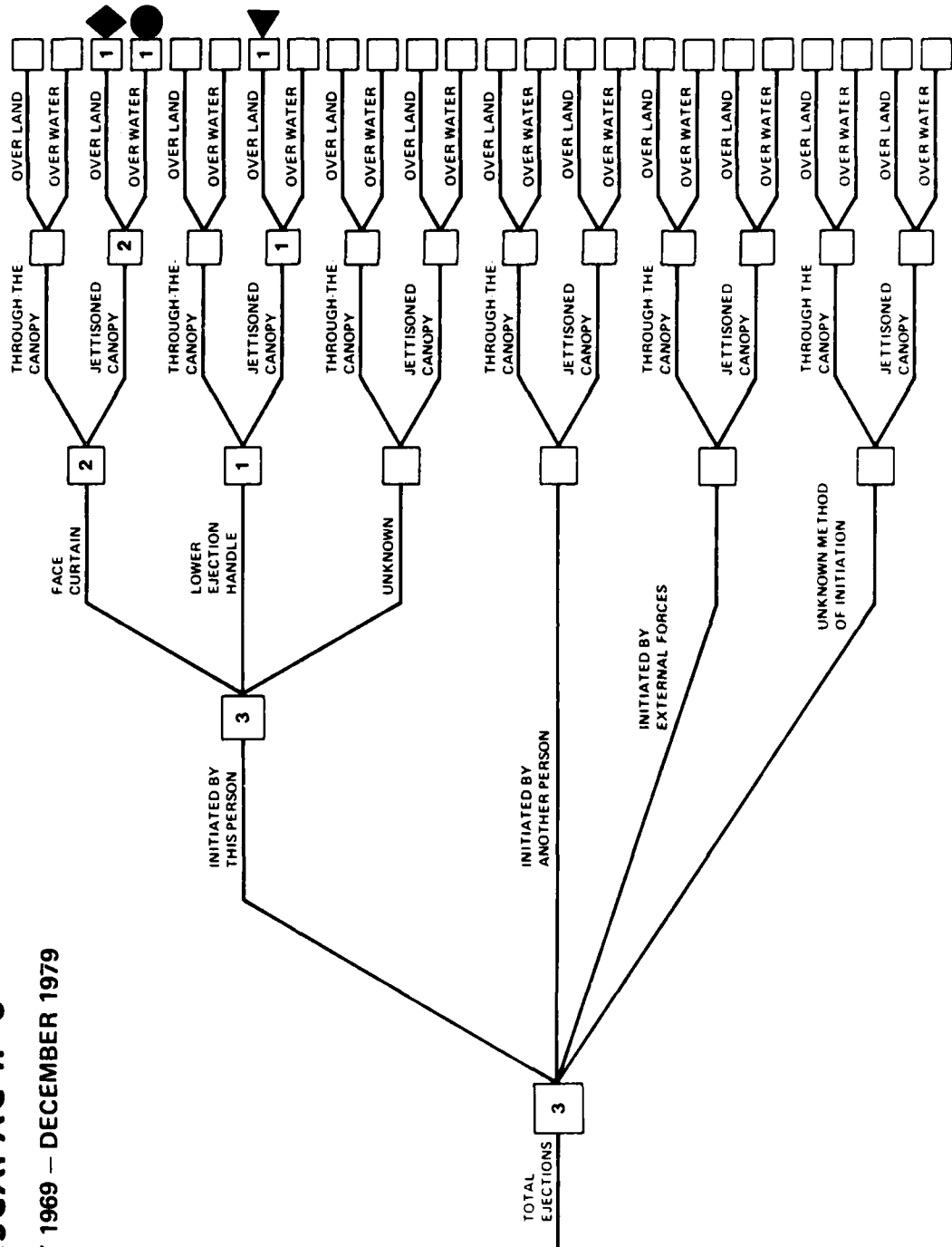
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-4/ESCAPAC IF-3

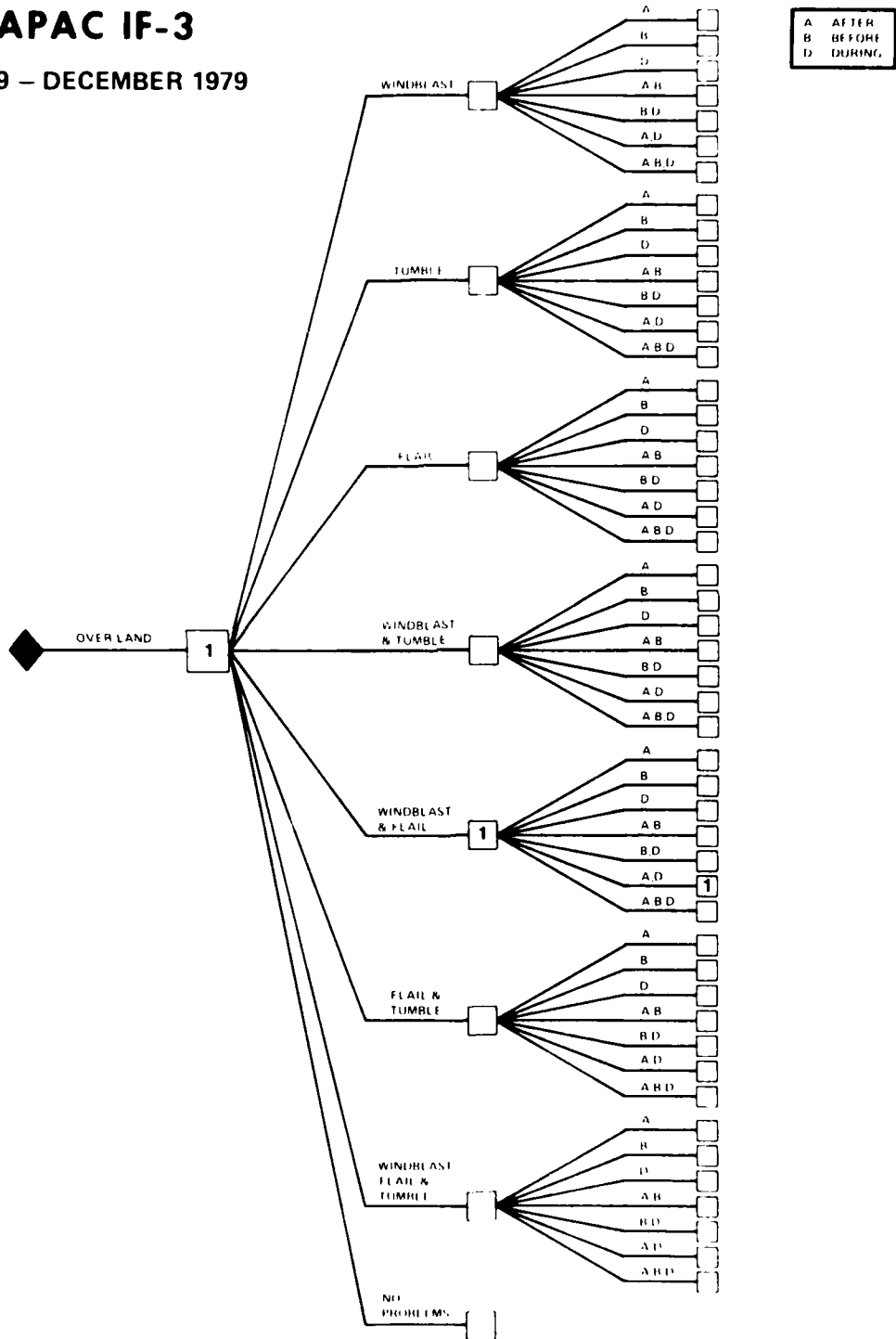
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

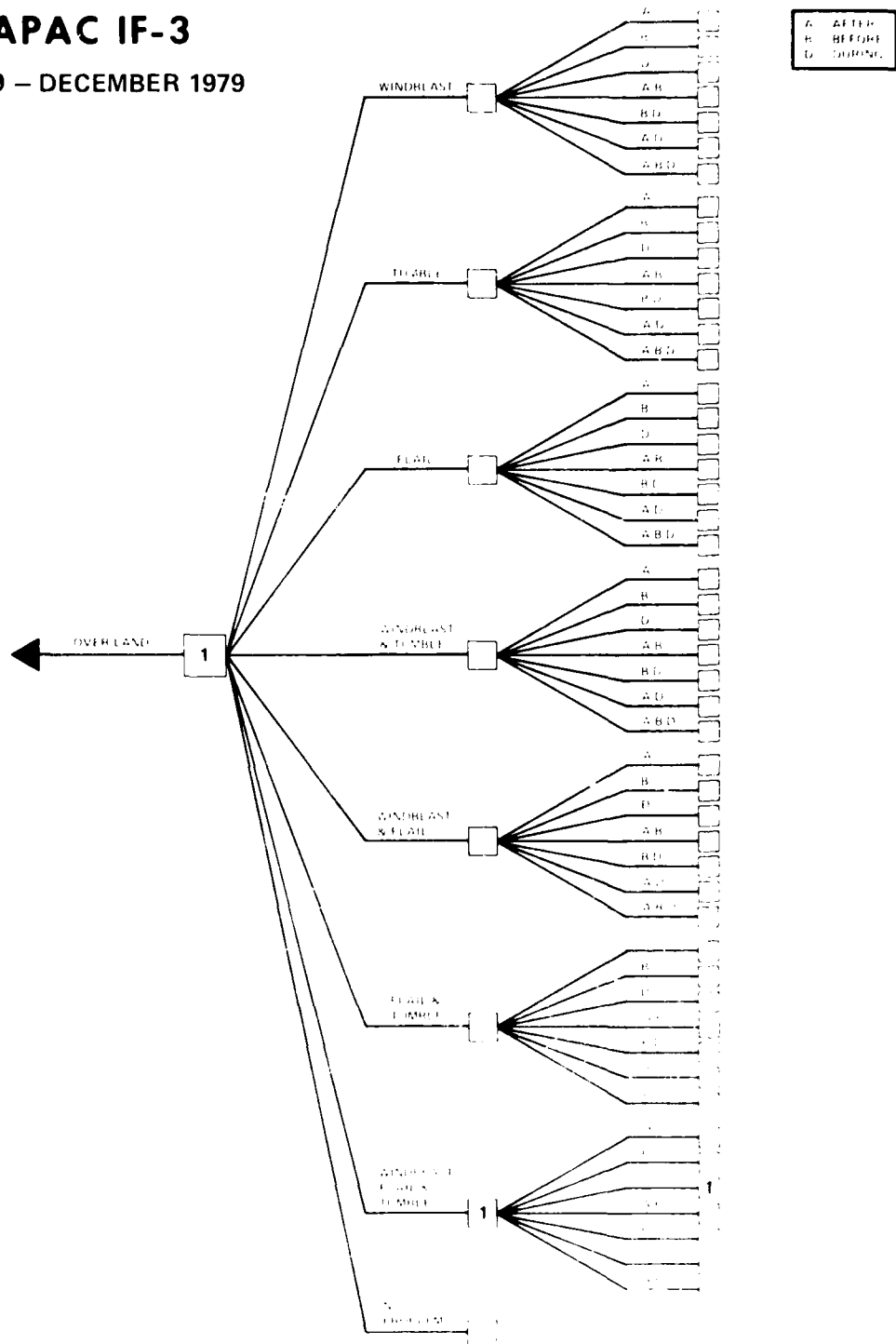
A-4/ESCAPAC IF-3

JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

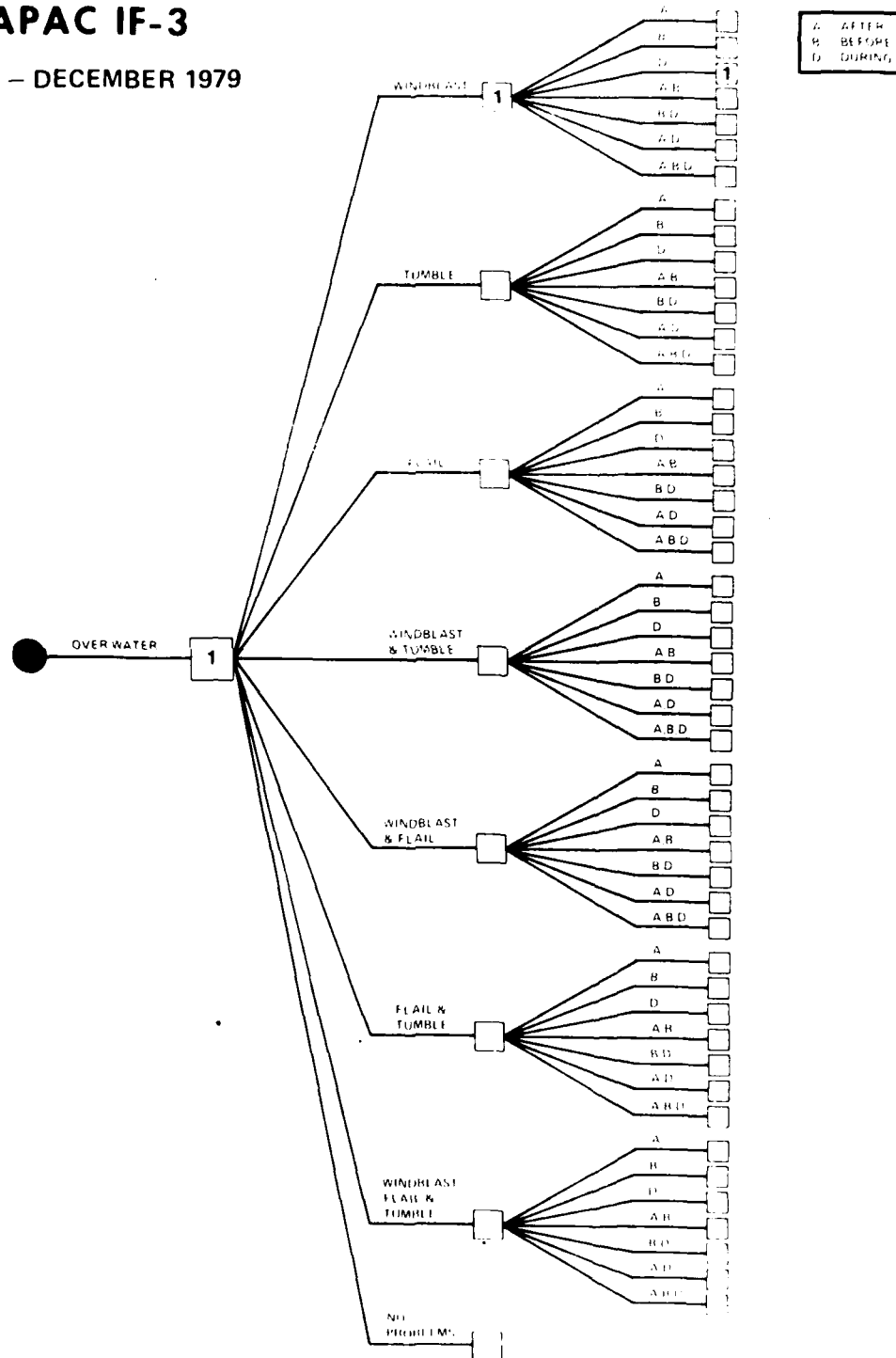
A-4/ESCAPAC IF-3
 JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-4/ESCAPAC IF-3

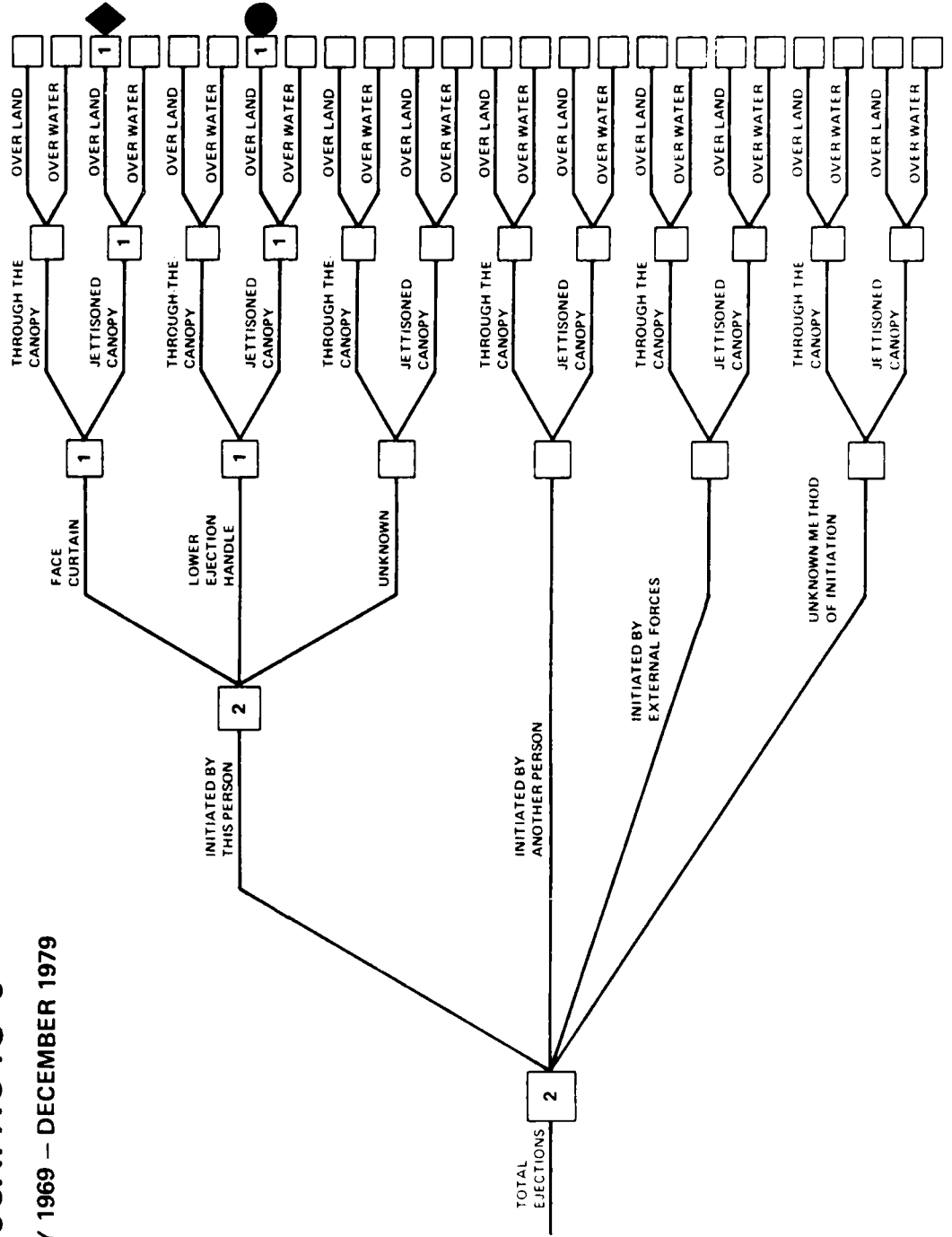
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-4/ESCAPAC IG-3

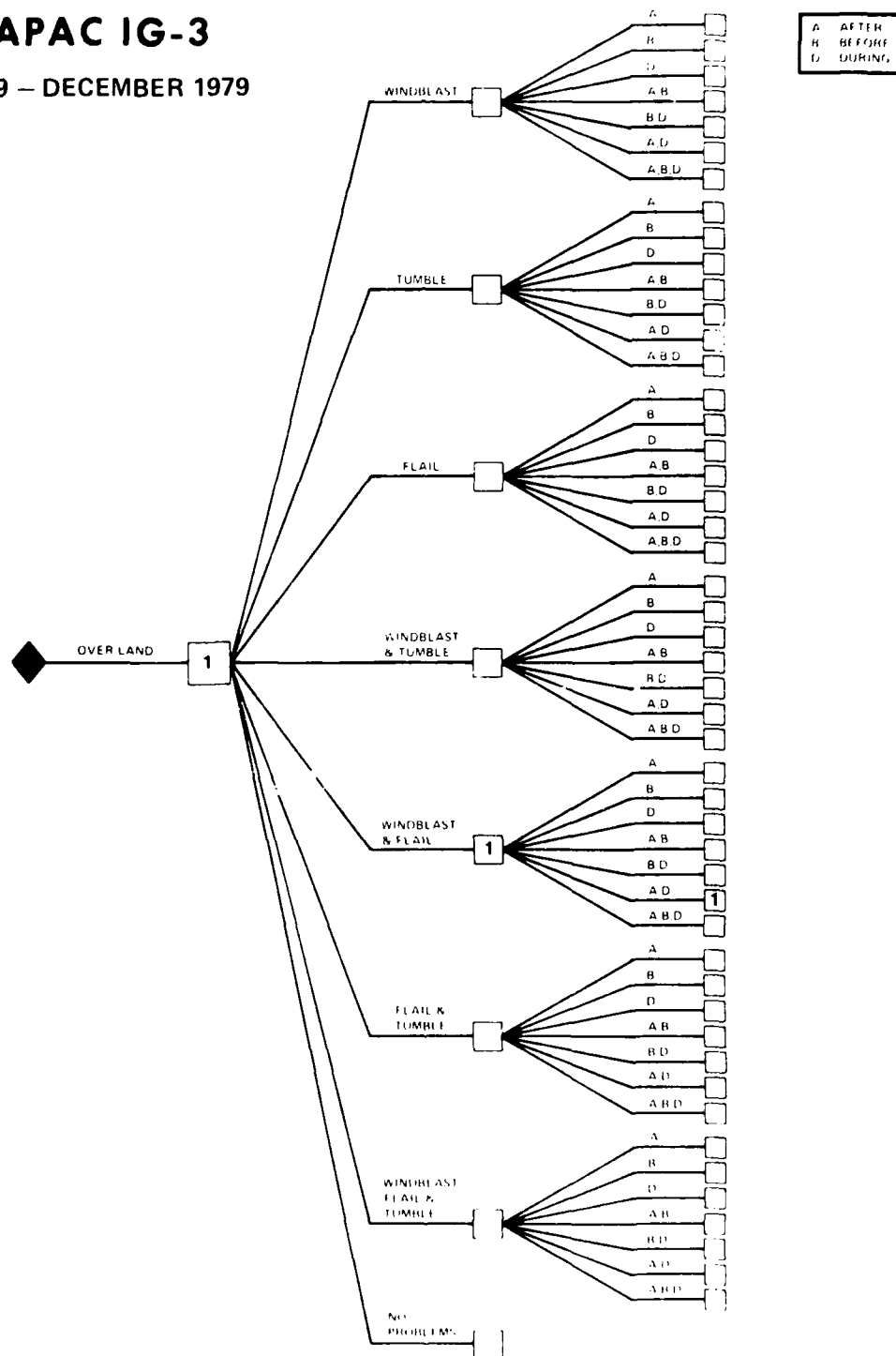
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-4/ESCAPAC IG-3

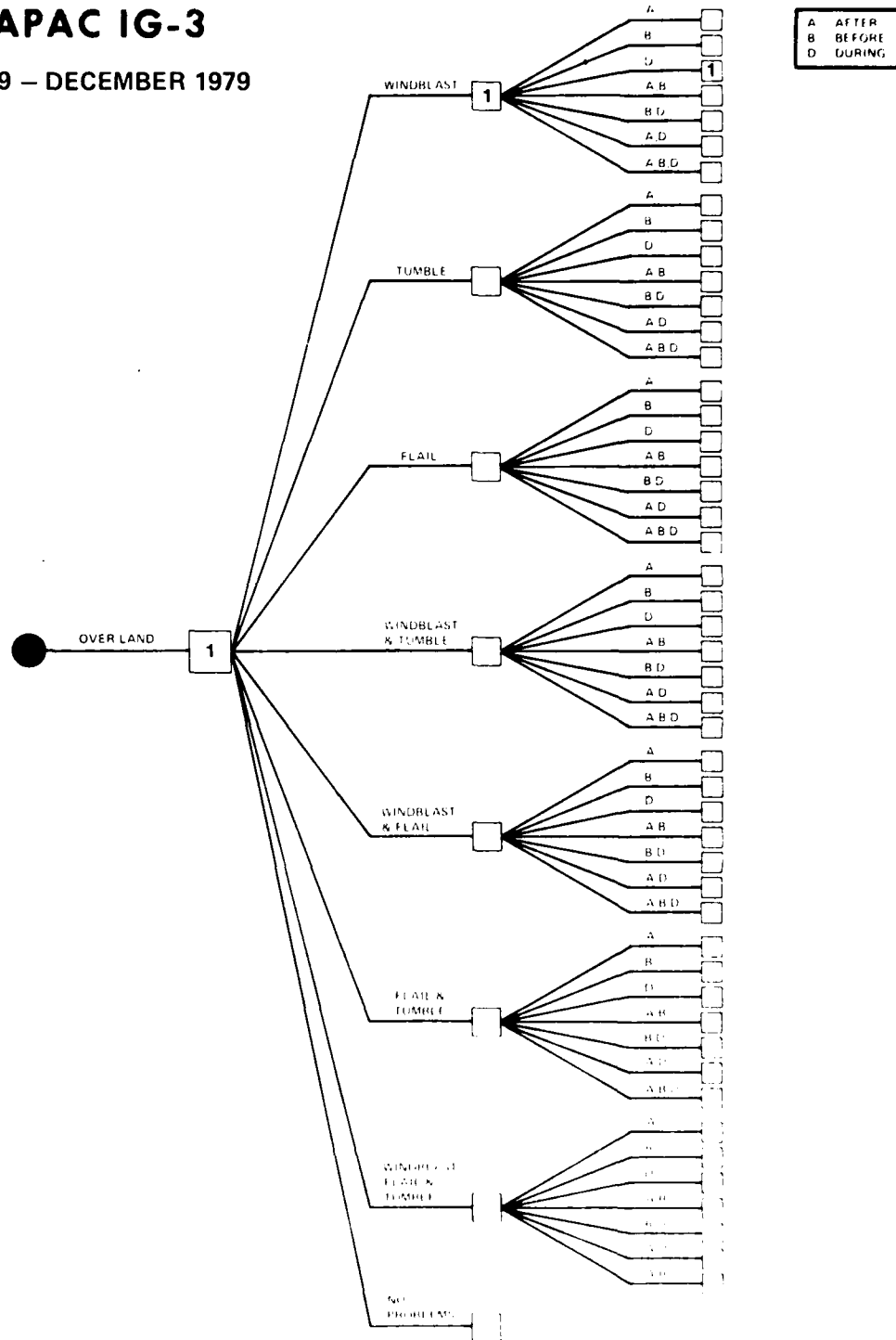
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-4/ESCAPAC IG-3

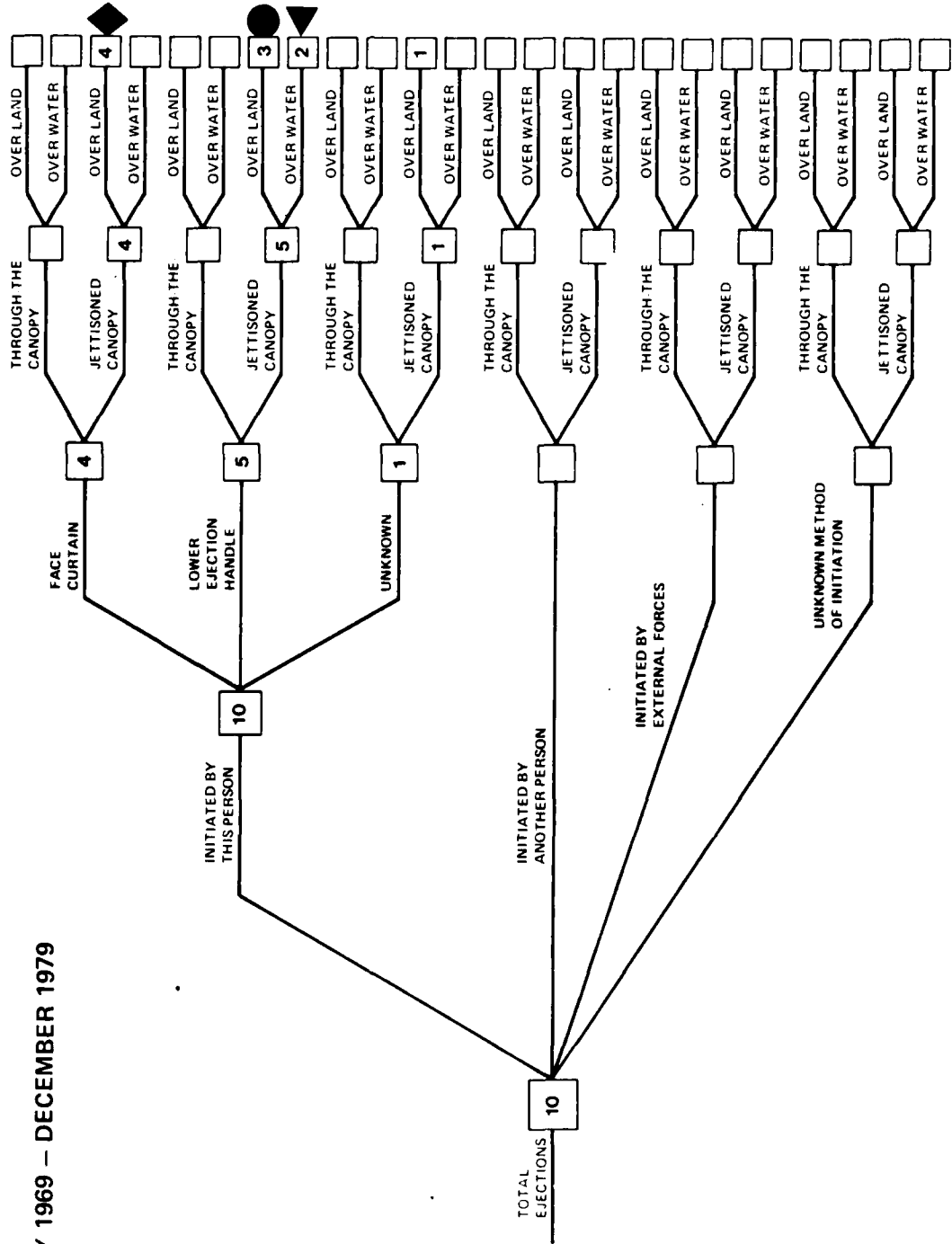
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-7 / ESCAPAC IC-2

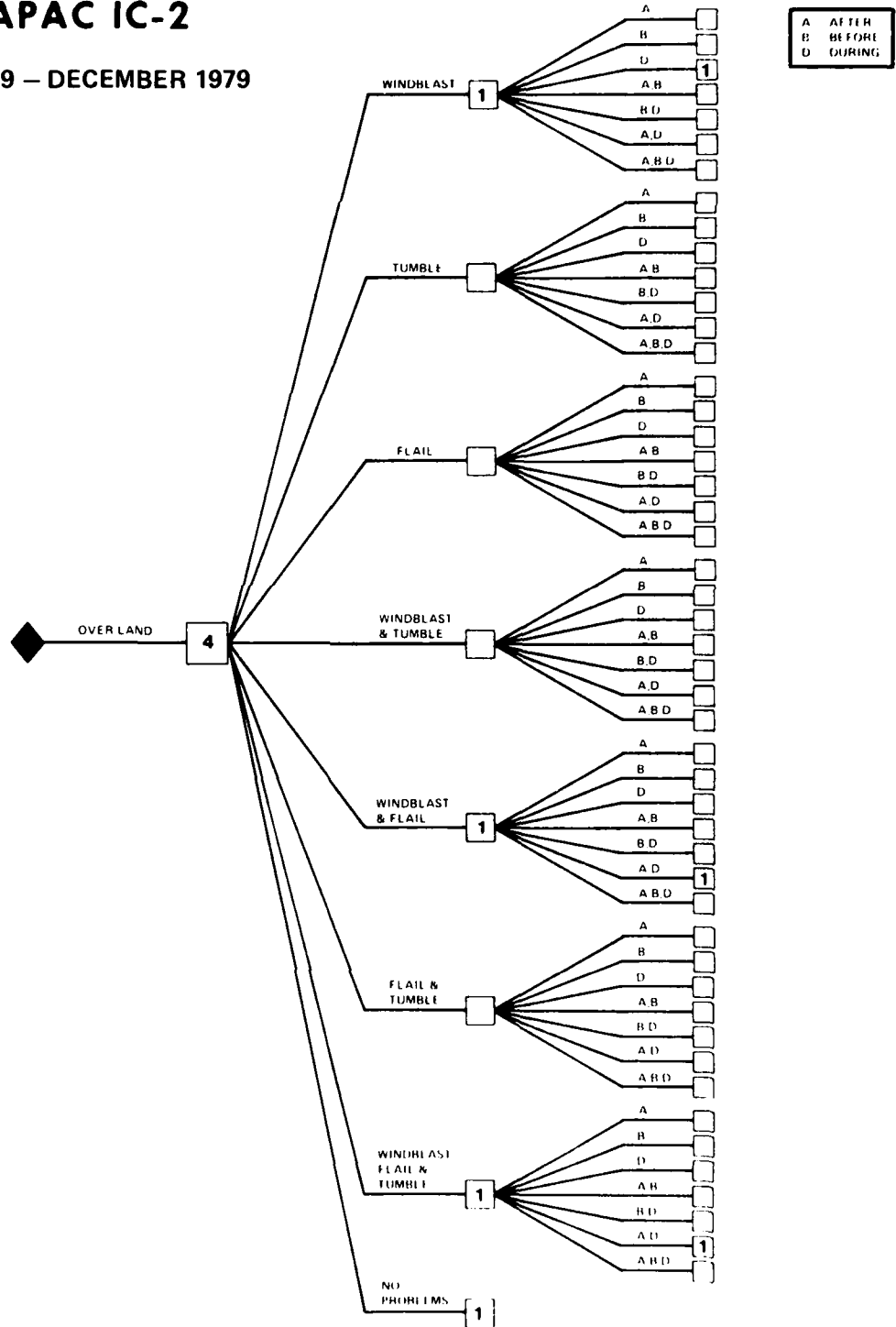
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-7/ESCAPAC IC-2

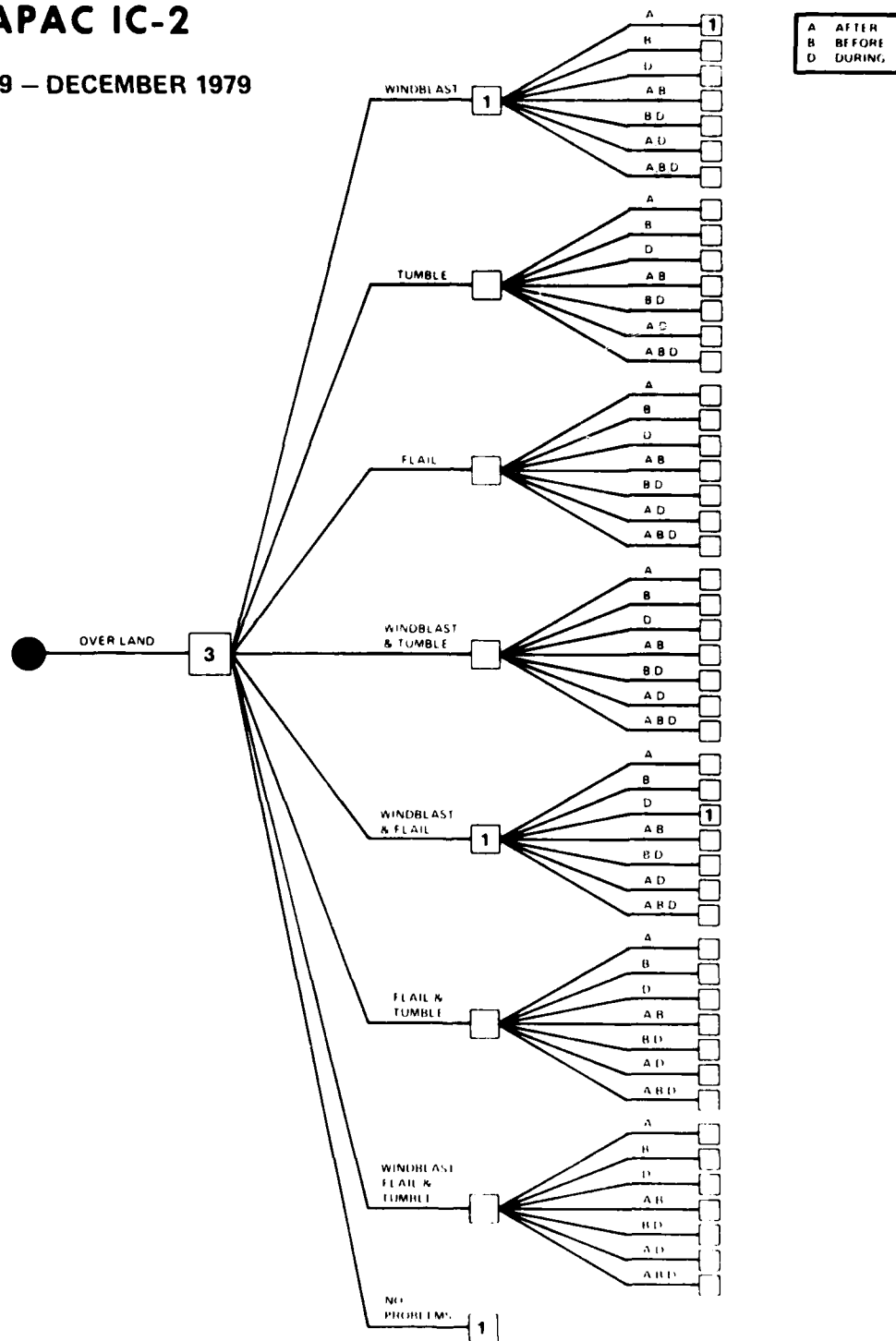
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-7/ESCAPAC IC-2

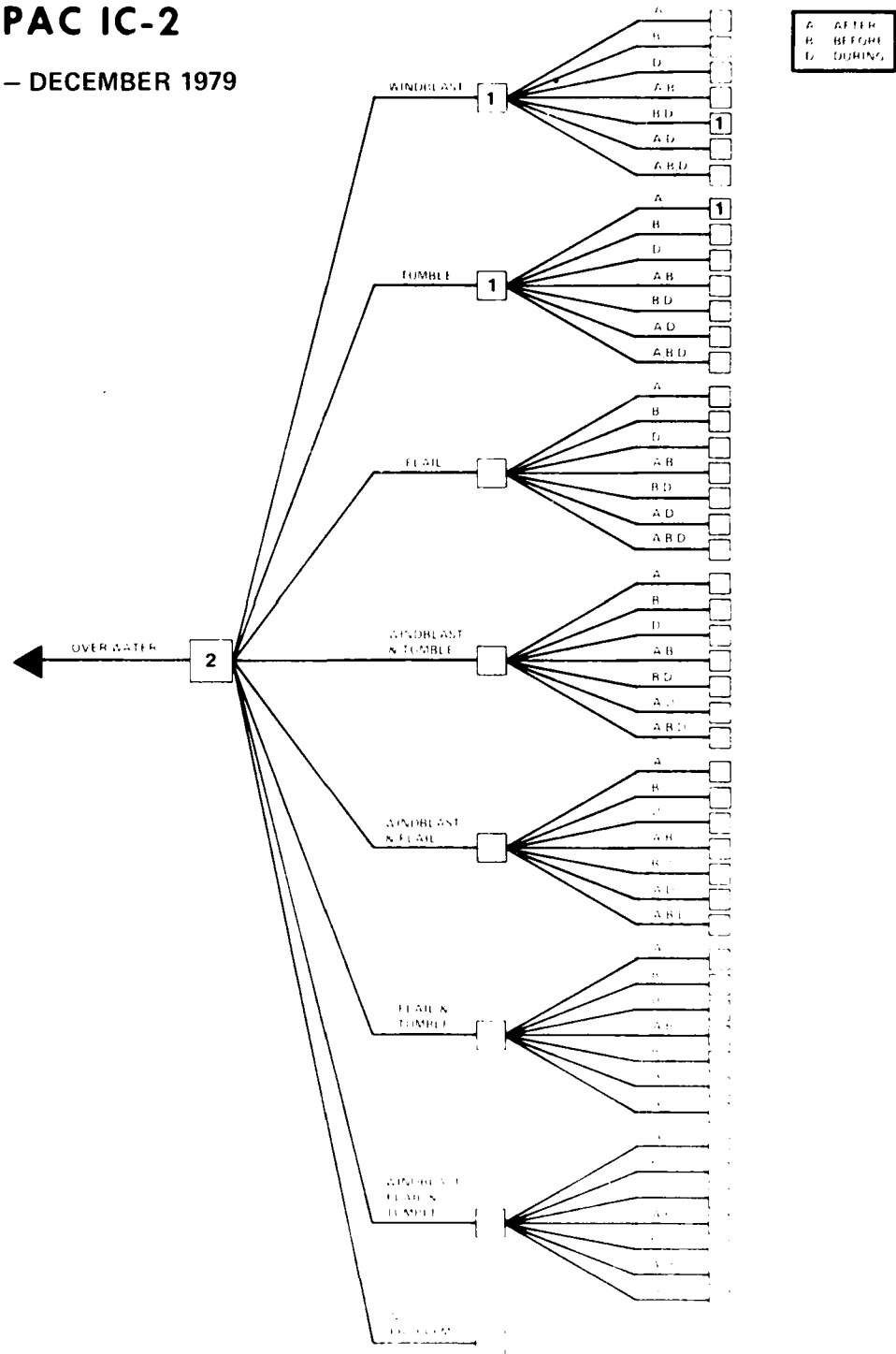
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-7/ESCAPAC IC-2

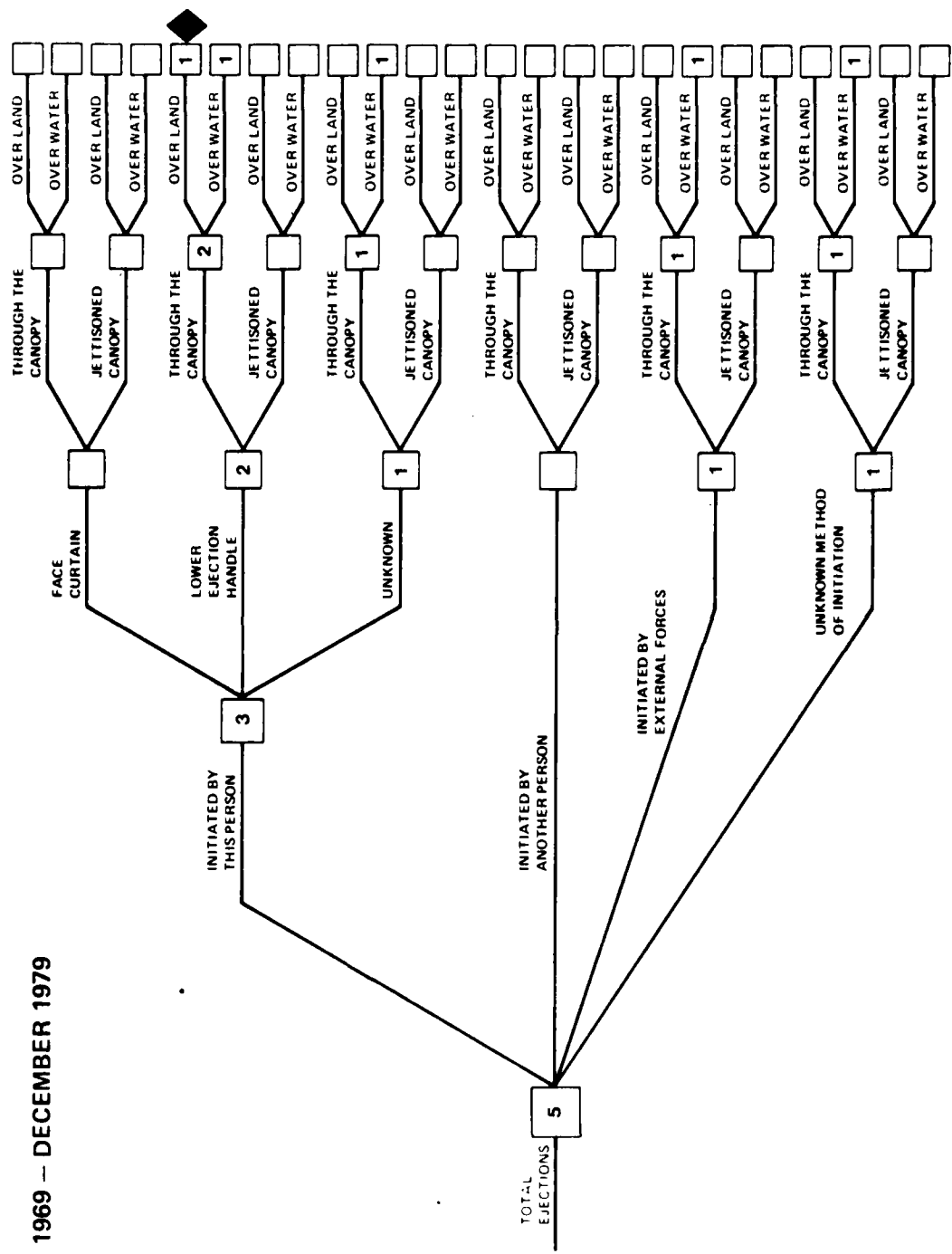
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-7/ESCAPAC IG-2

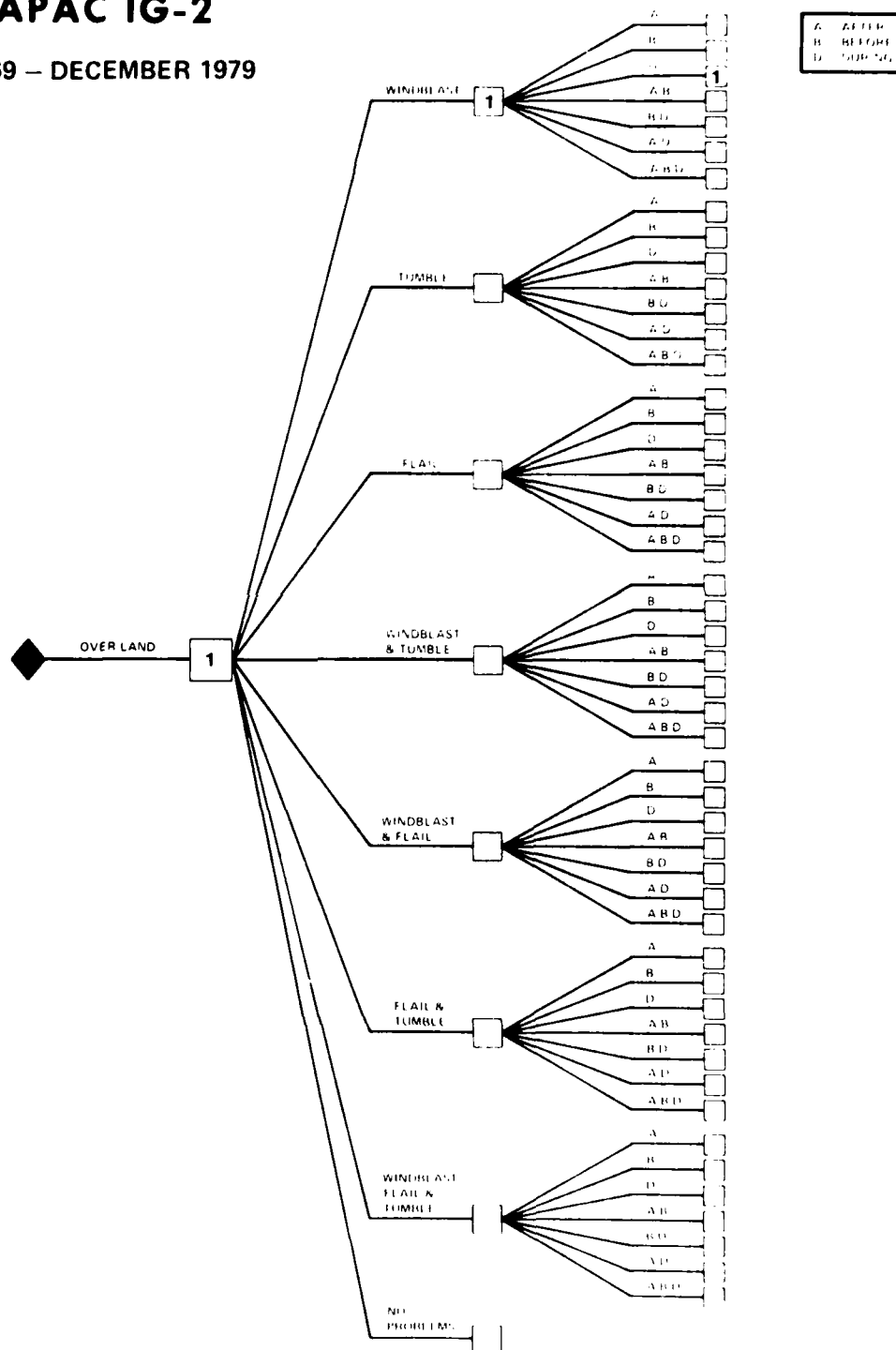
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-7/ESCAPAC IG-2

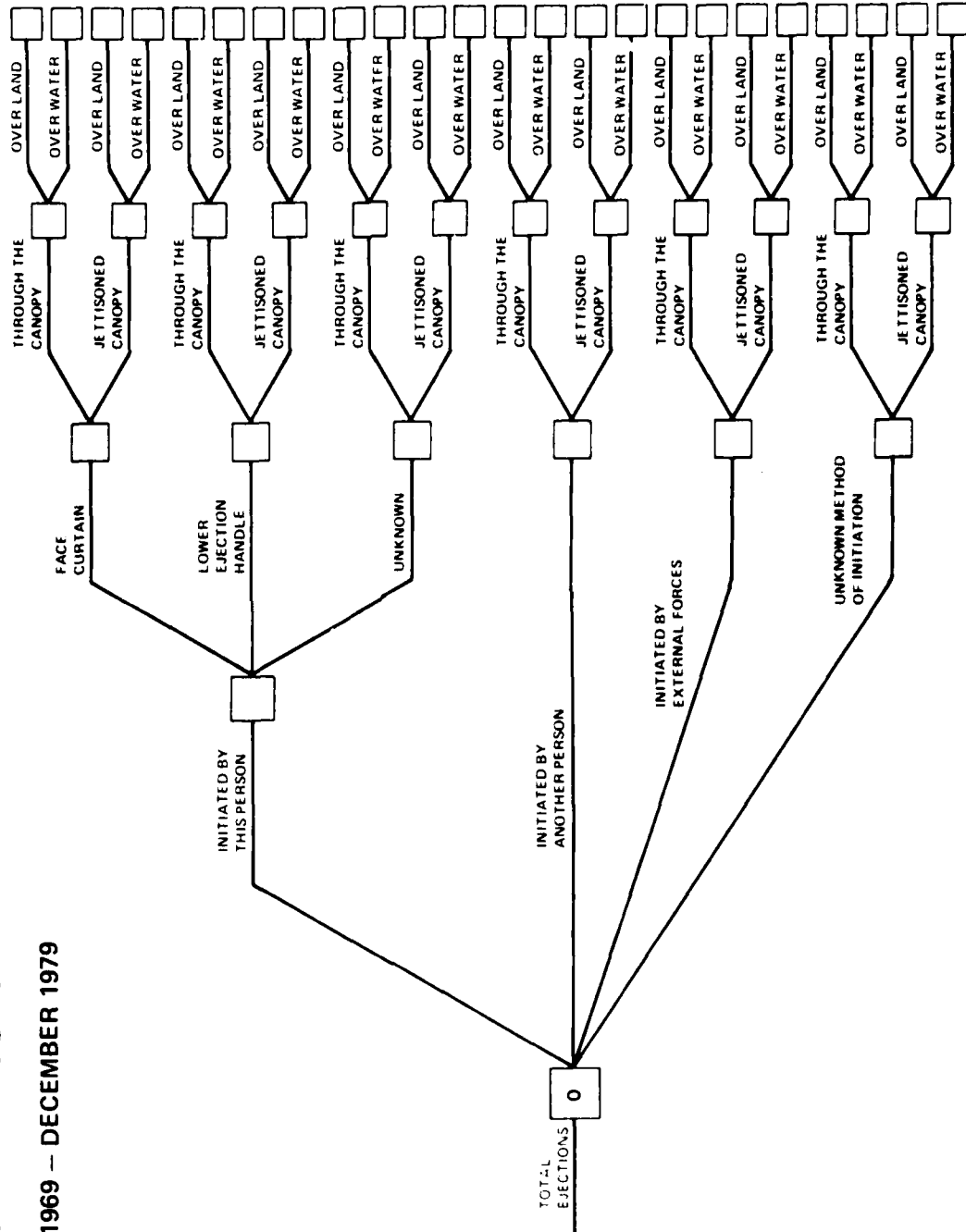
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-7 / ESCAPAC IG-4

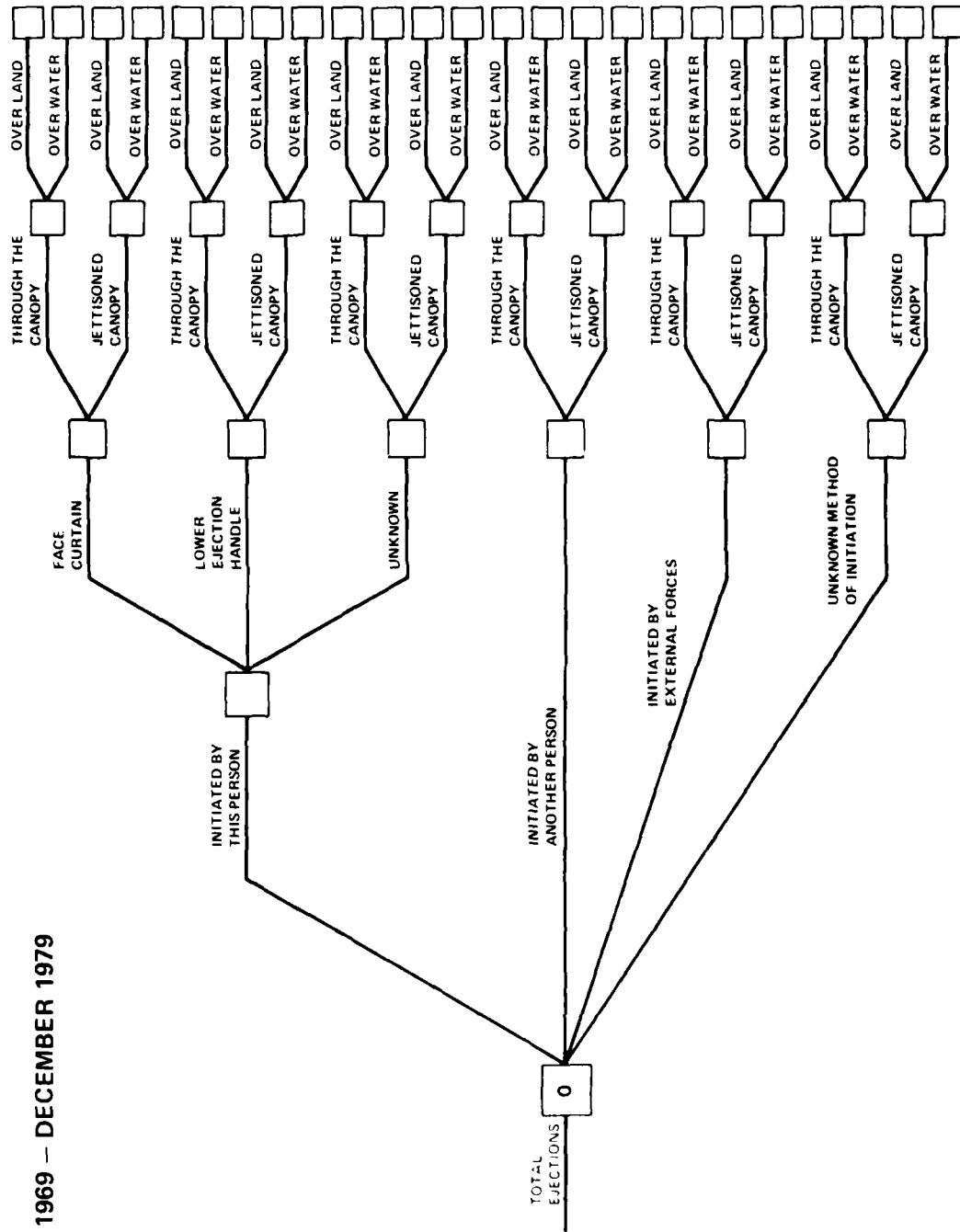
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

S-3/ESCAPAC IE-1

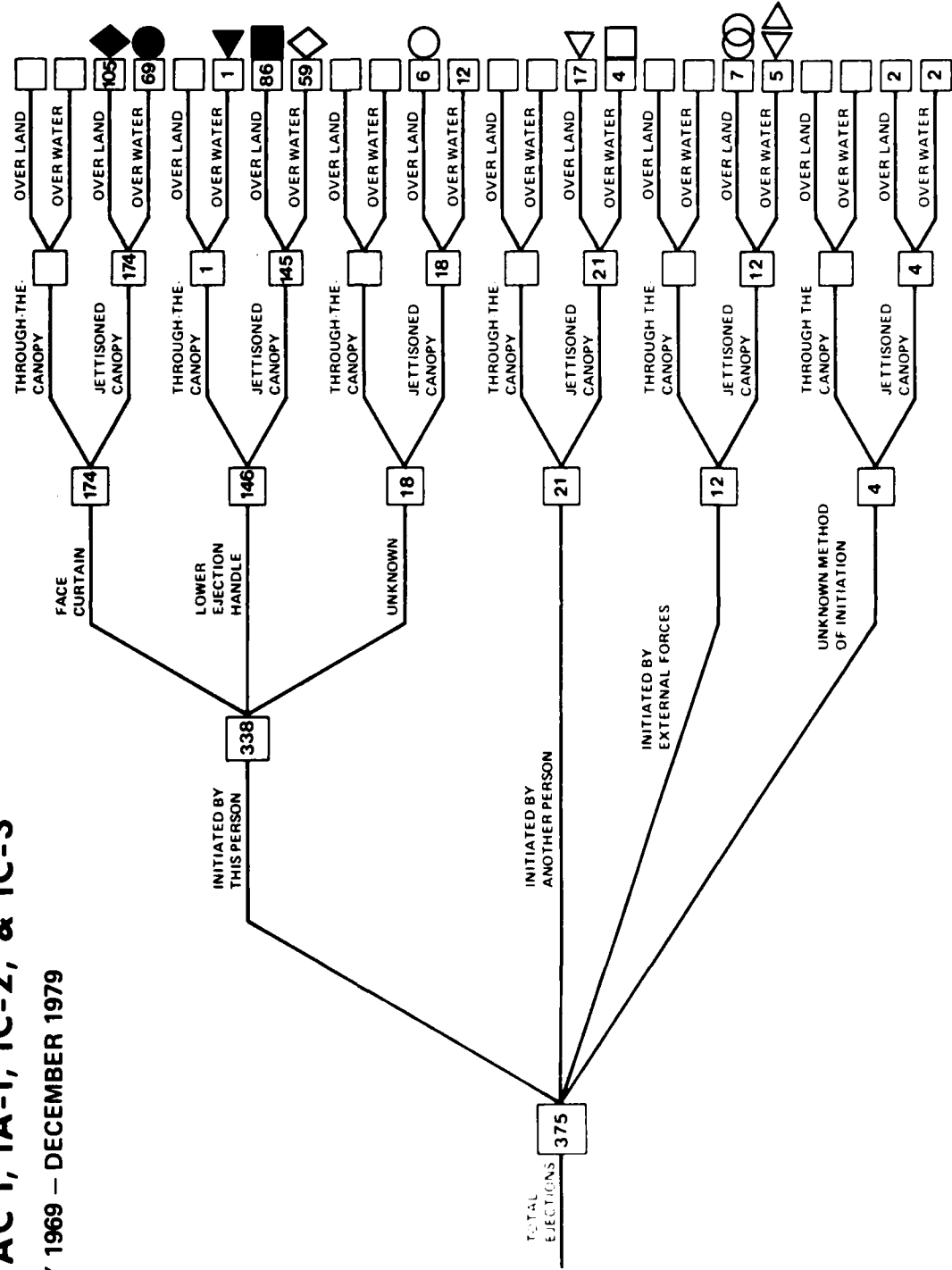
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3

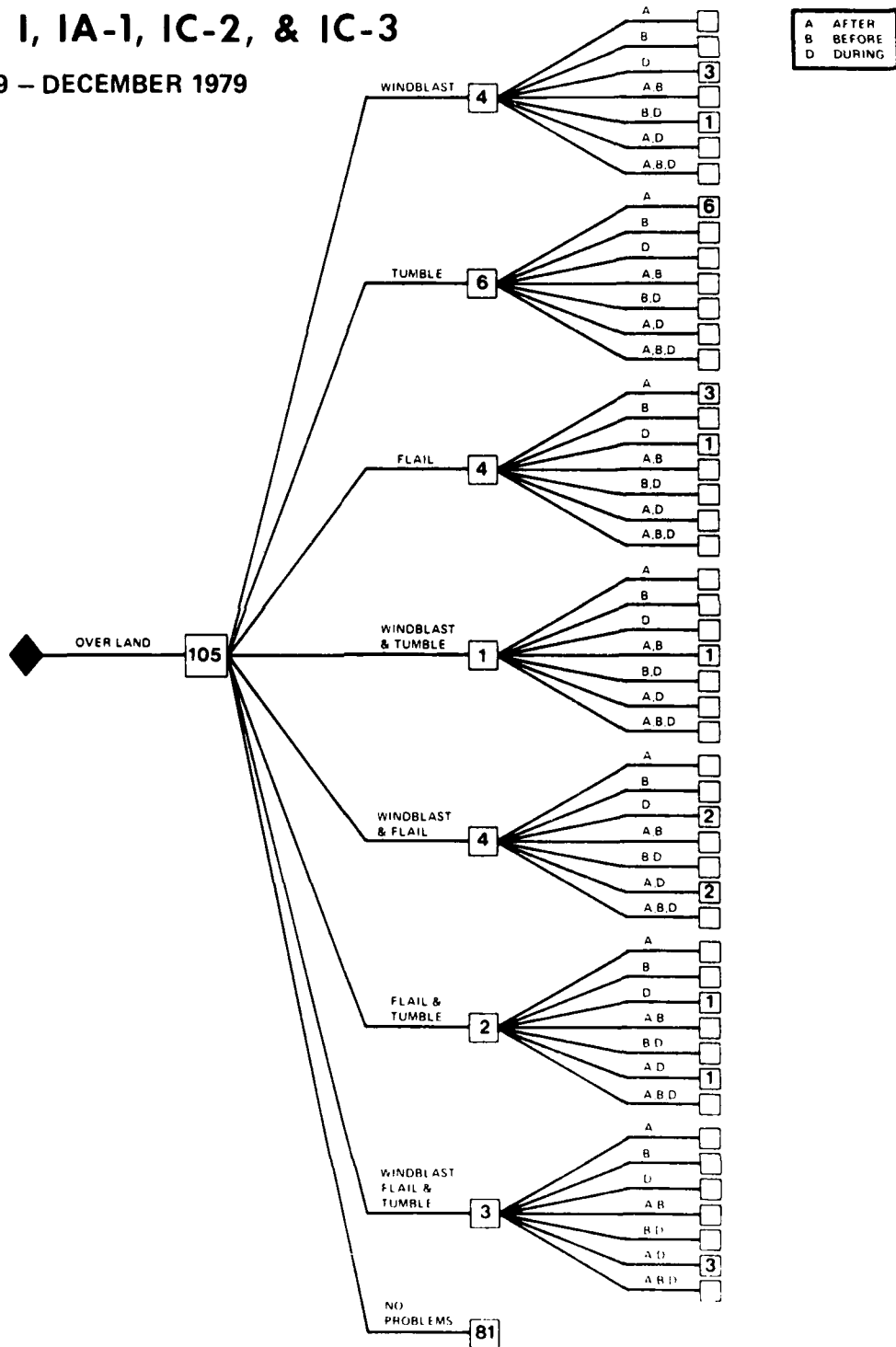
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3

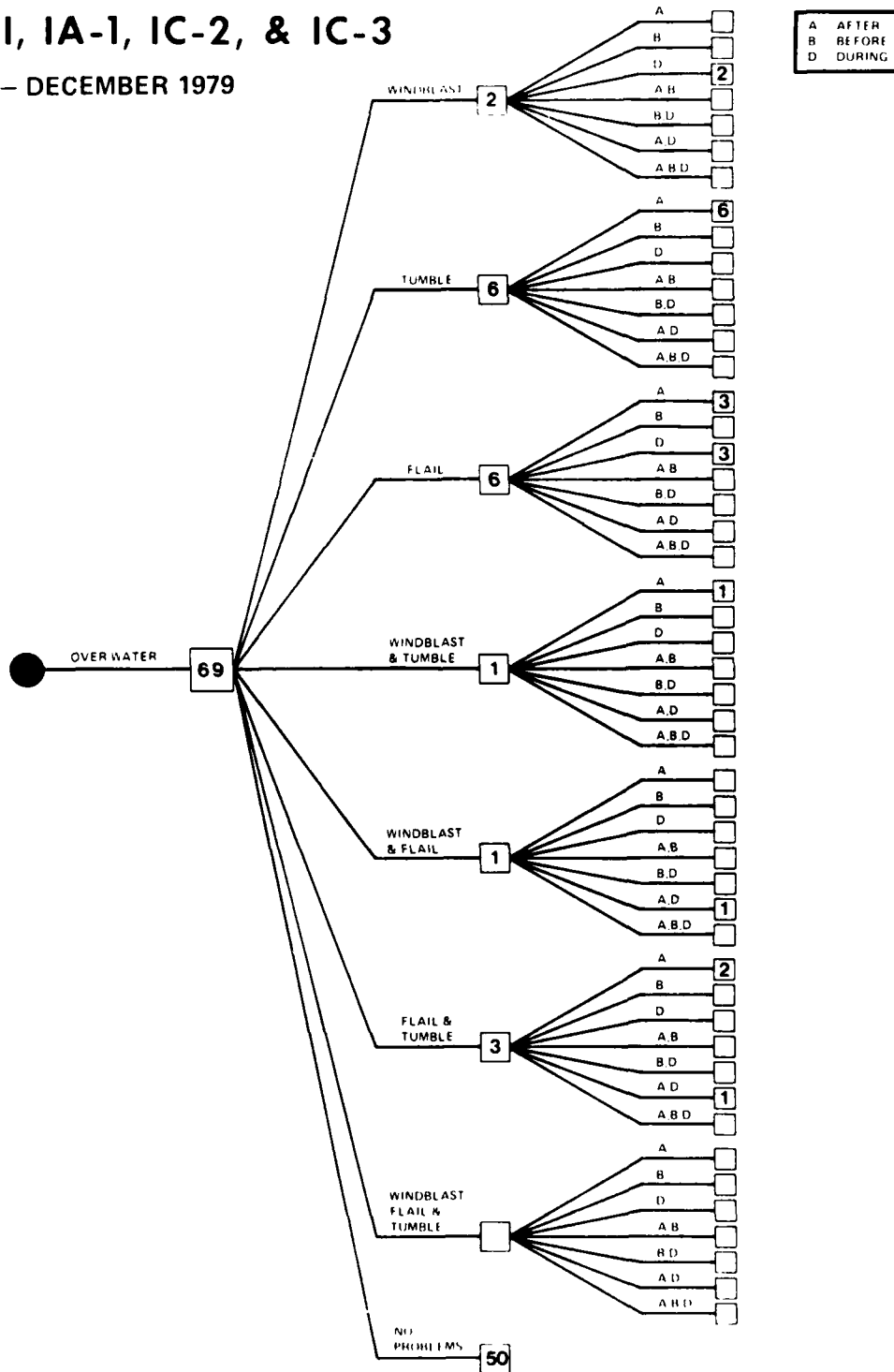
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3

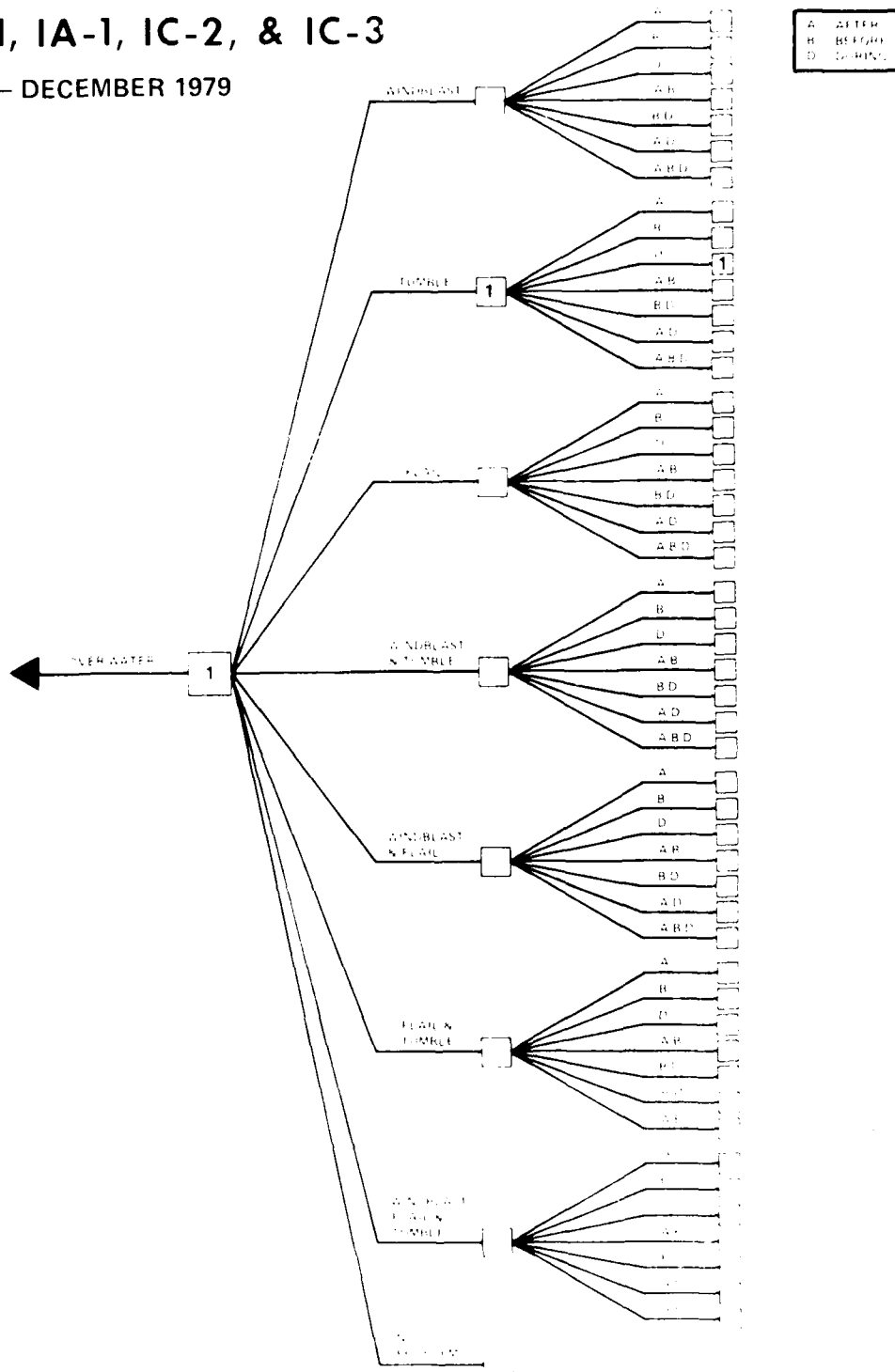
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3

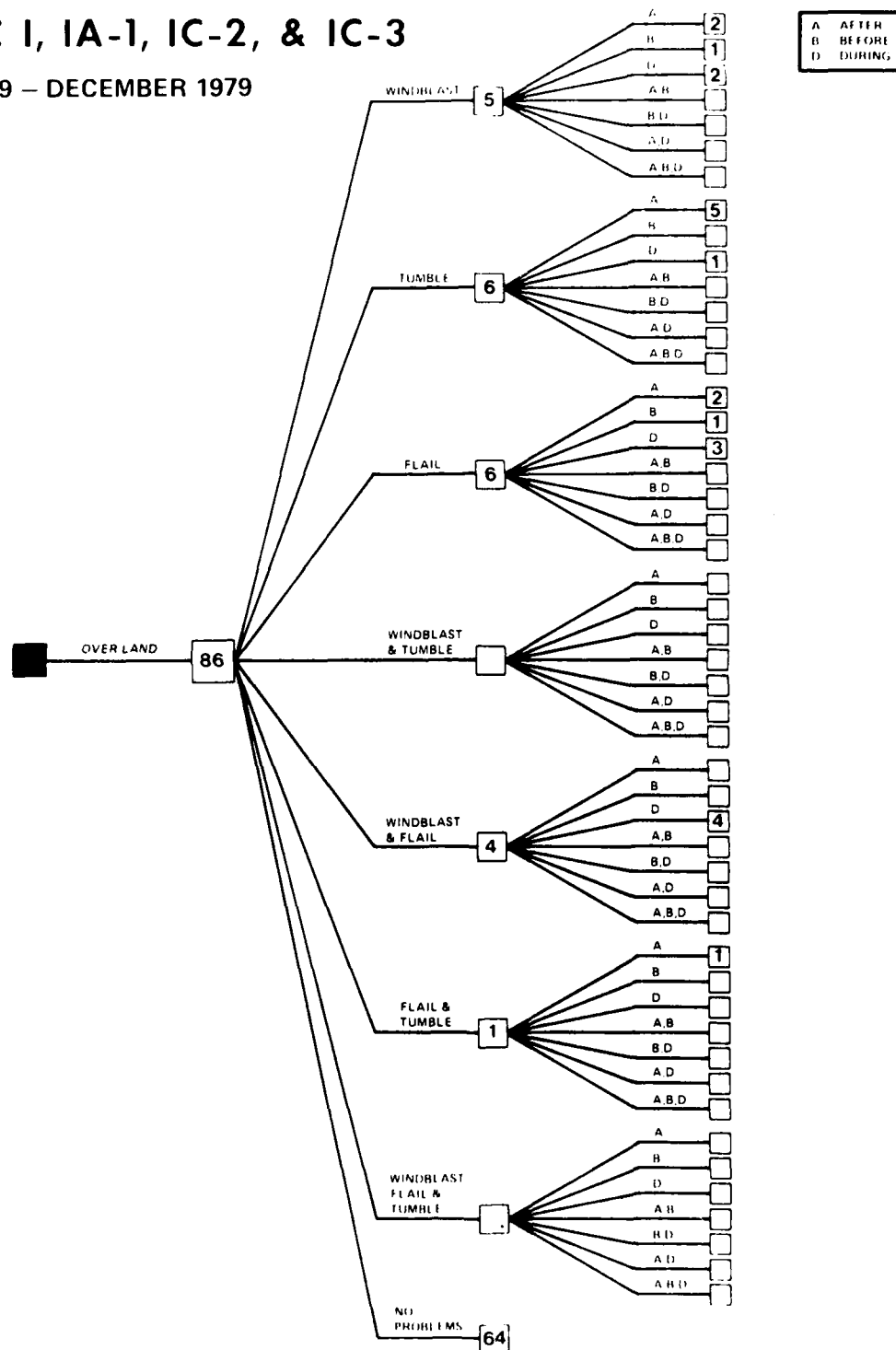
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3

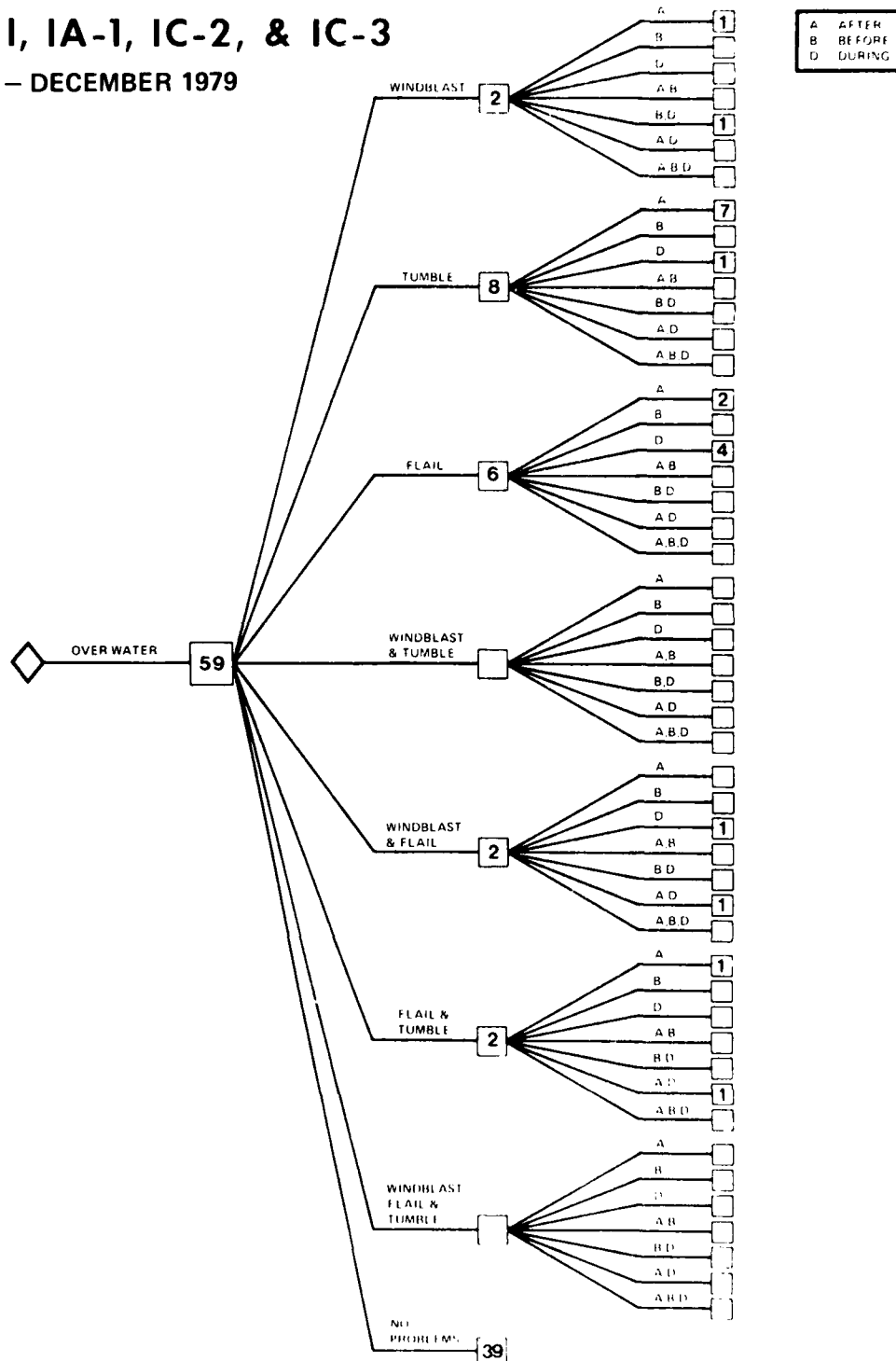
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3

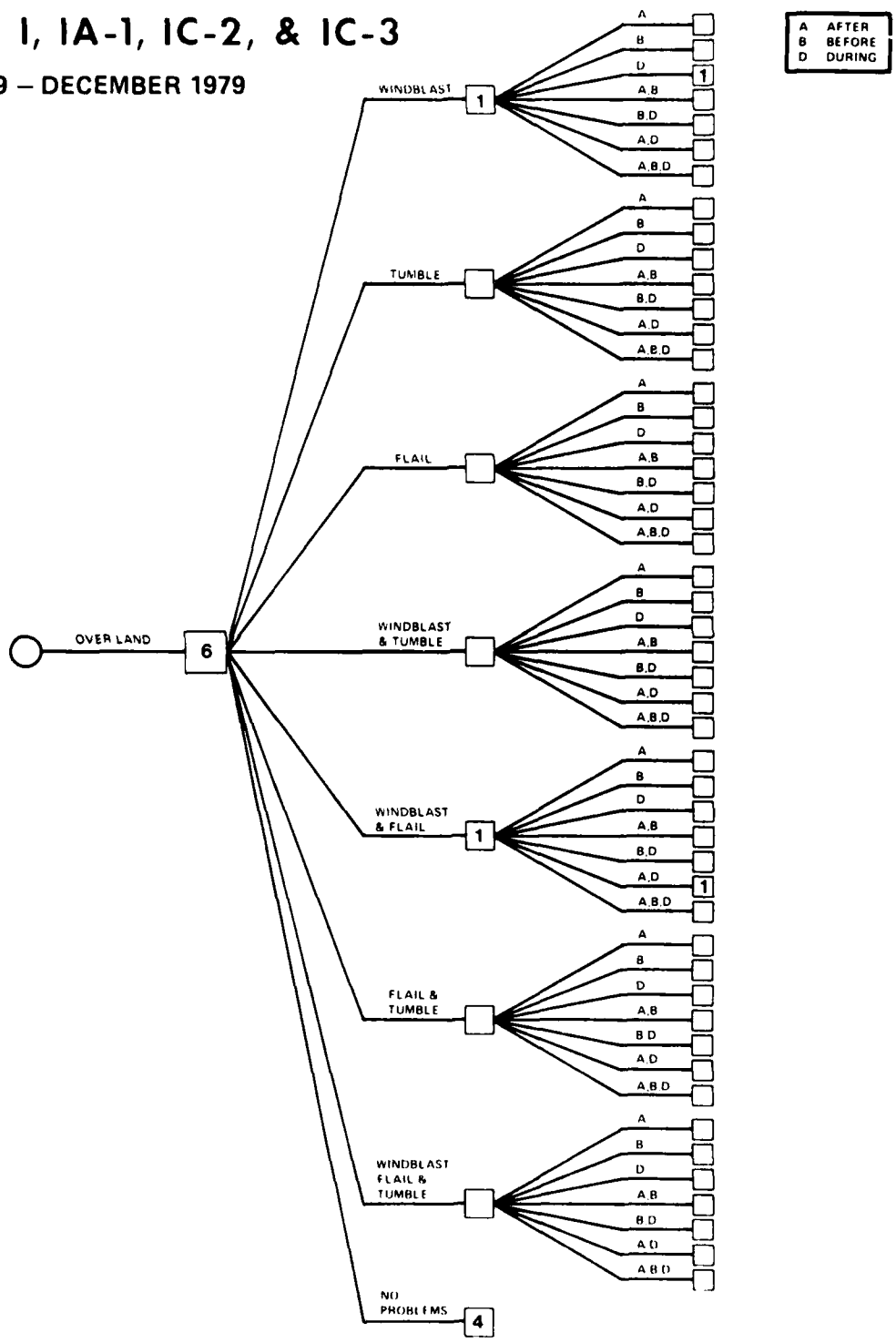
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

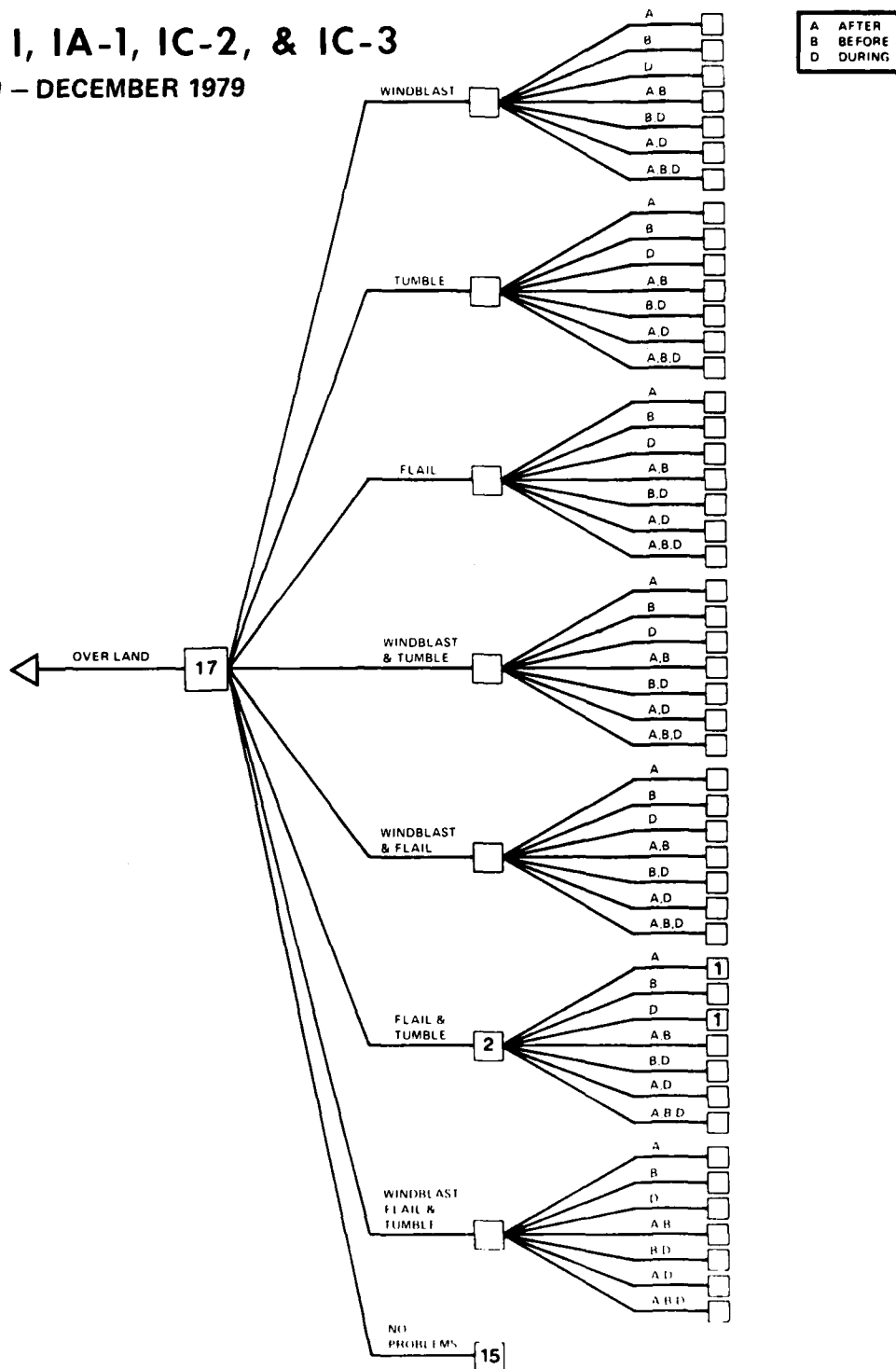
ESCAPAC I, IA-1, IC-2, & IC-3

JANUARY 1969 - DECEMBER 1979



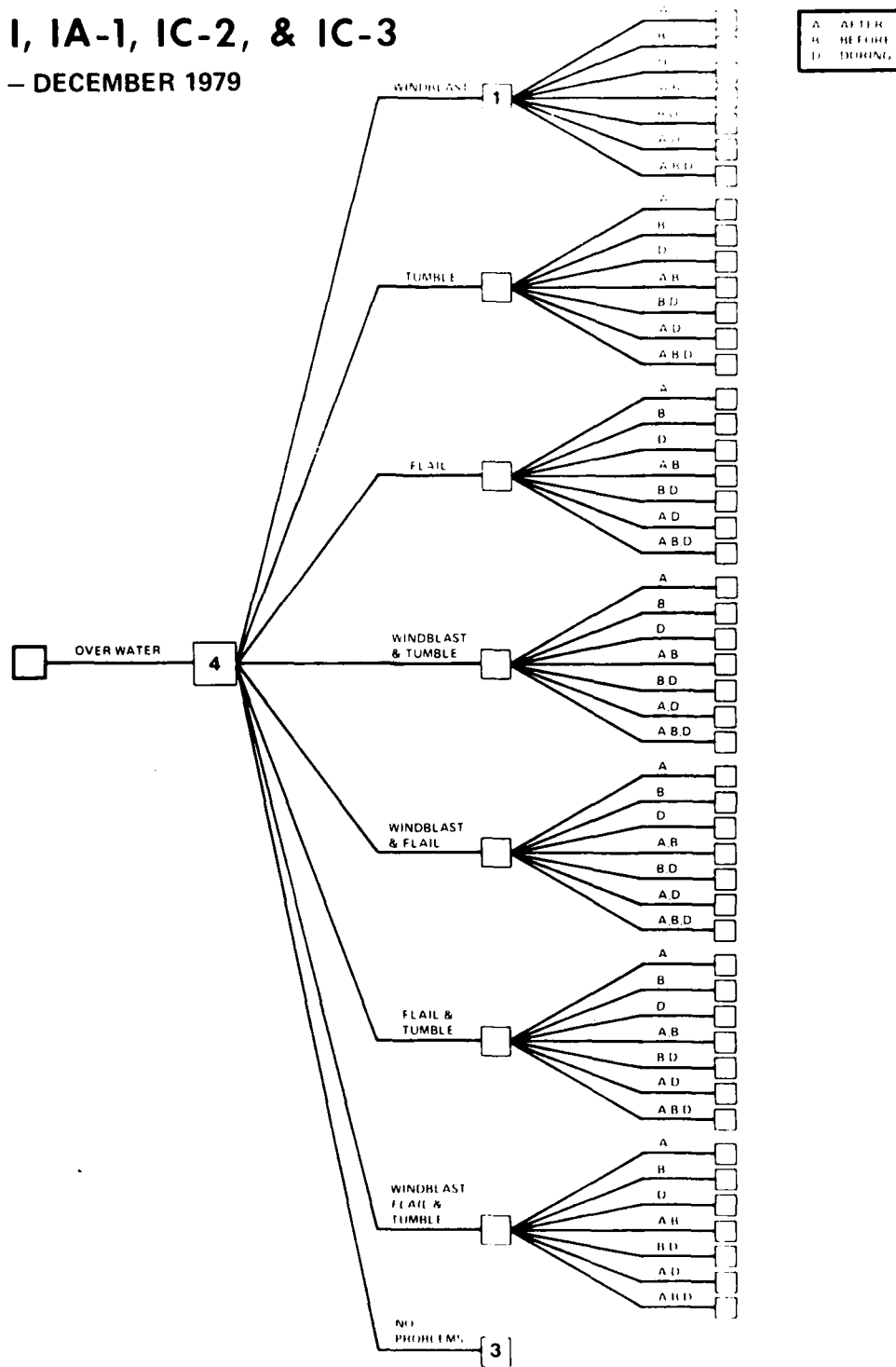
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC 1, IA-1, IC-2, & IC-3
JANUARY 1969 - DECEMBER 1979



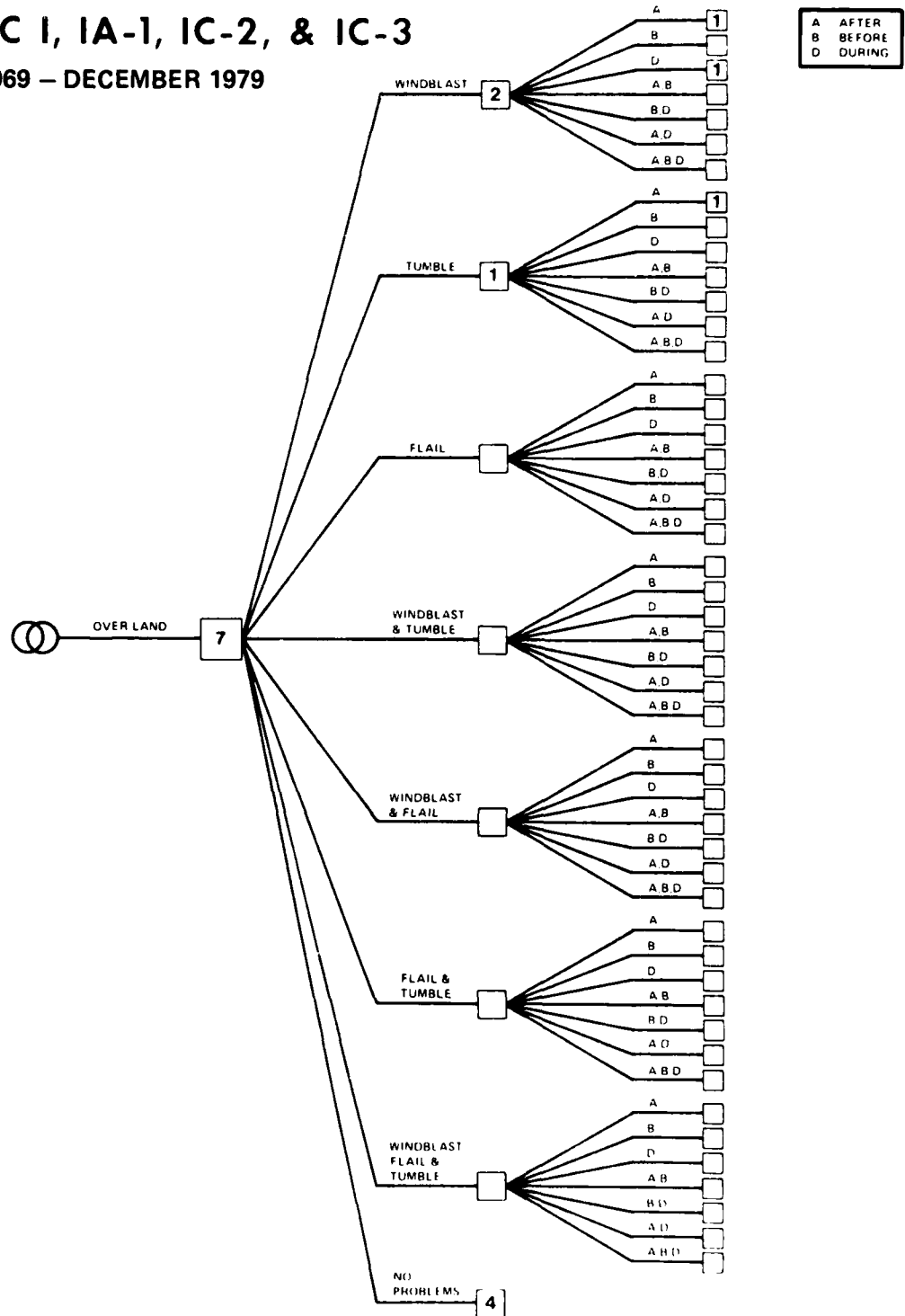
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3
JANUARY 1969 - DECEMBER 1979



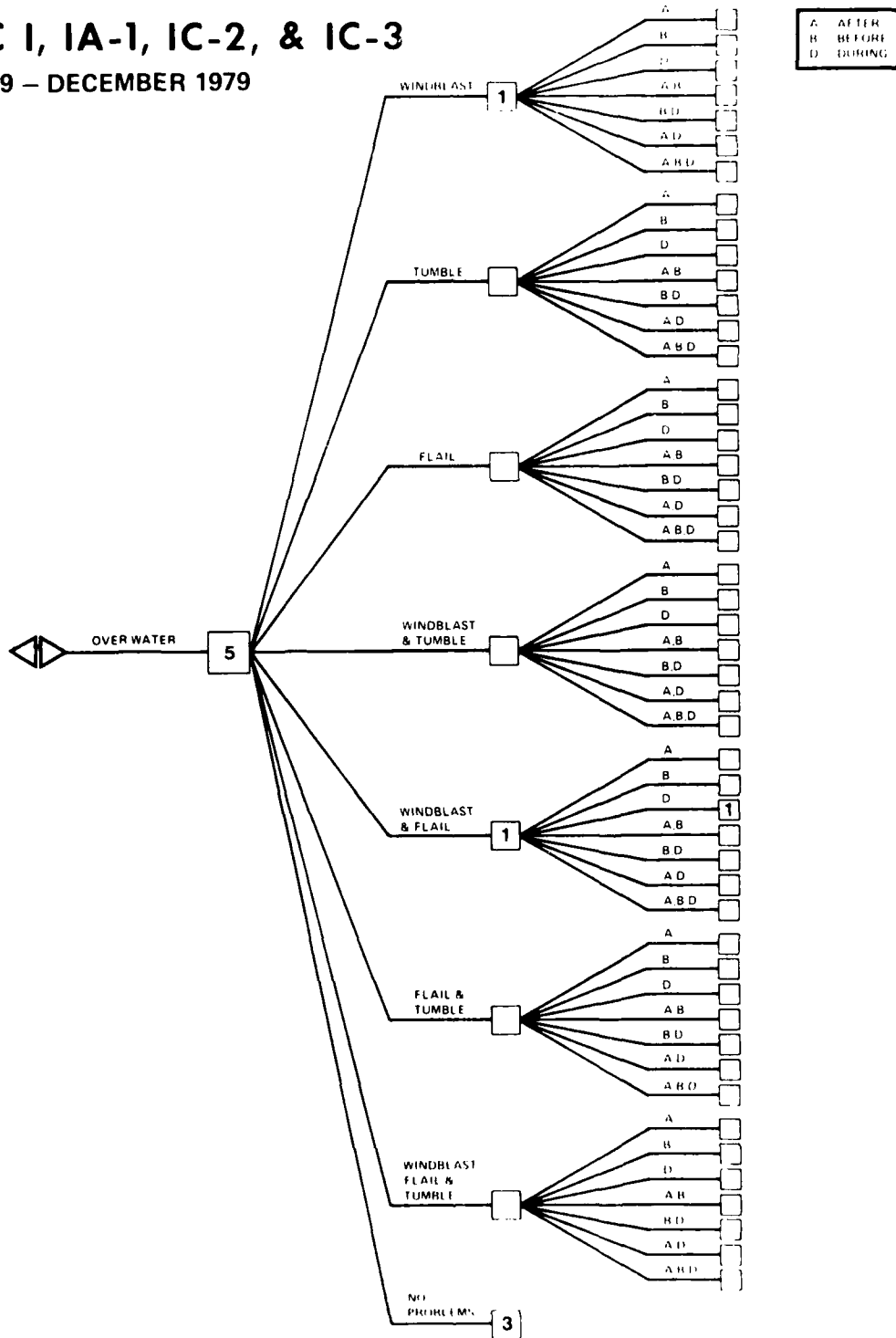
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3
JANUARY 1969 – DECEMBER 1979



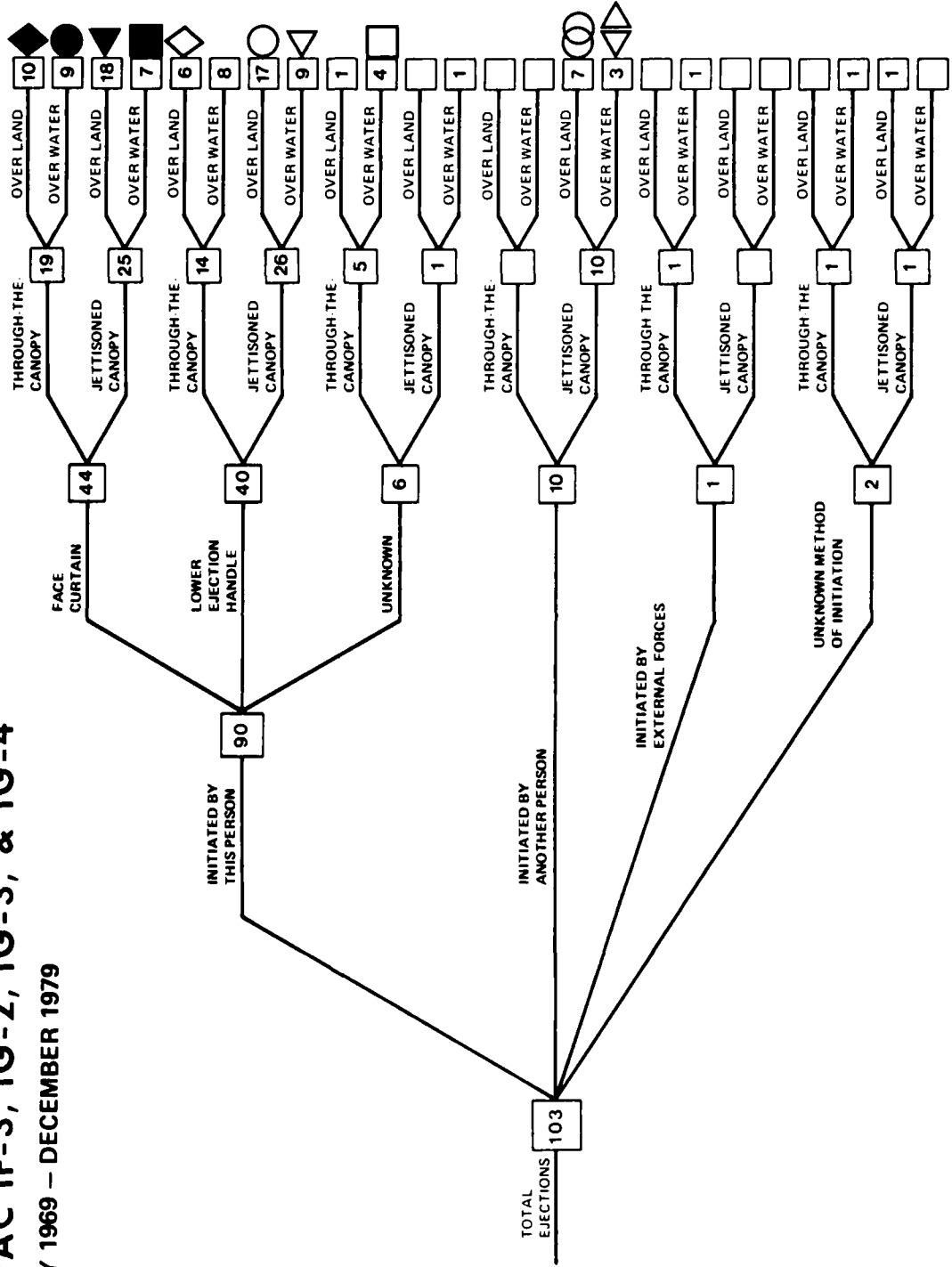
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC I, IA-1, IC-2, & IC-3
 JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

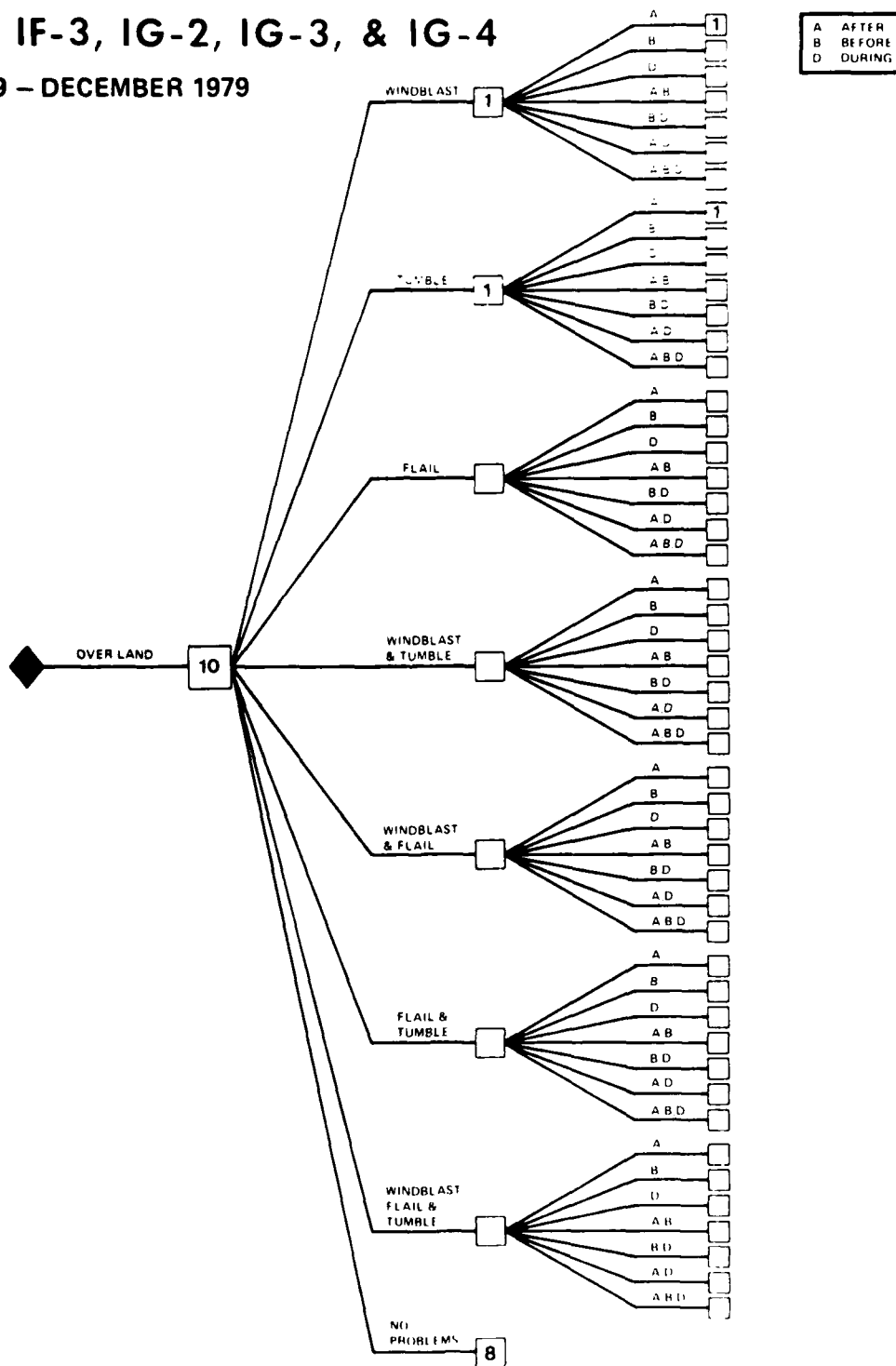
ESCAPAC IF-3, IG-2, IG-3, & IG-4
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC IF-3, IG-2, IG-3, & IG-4

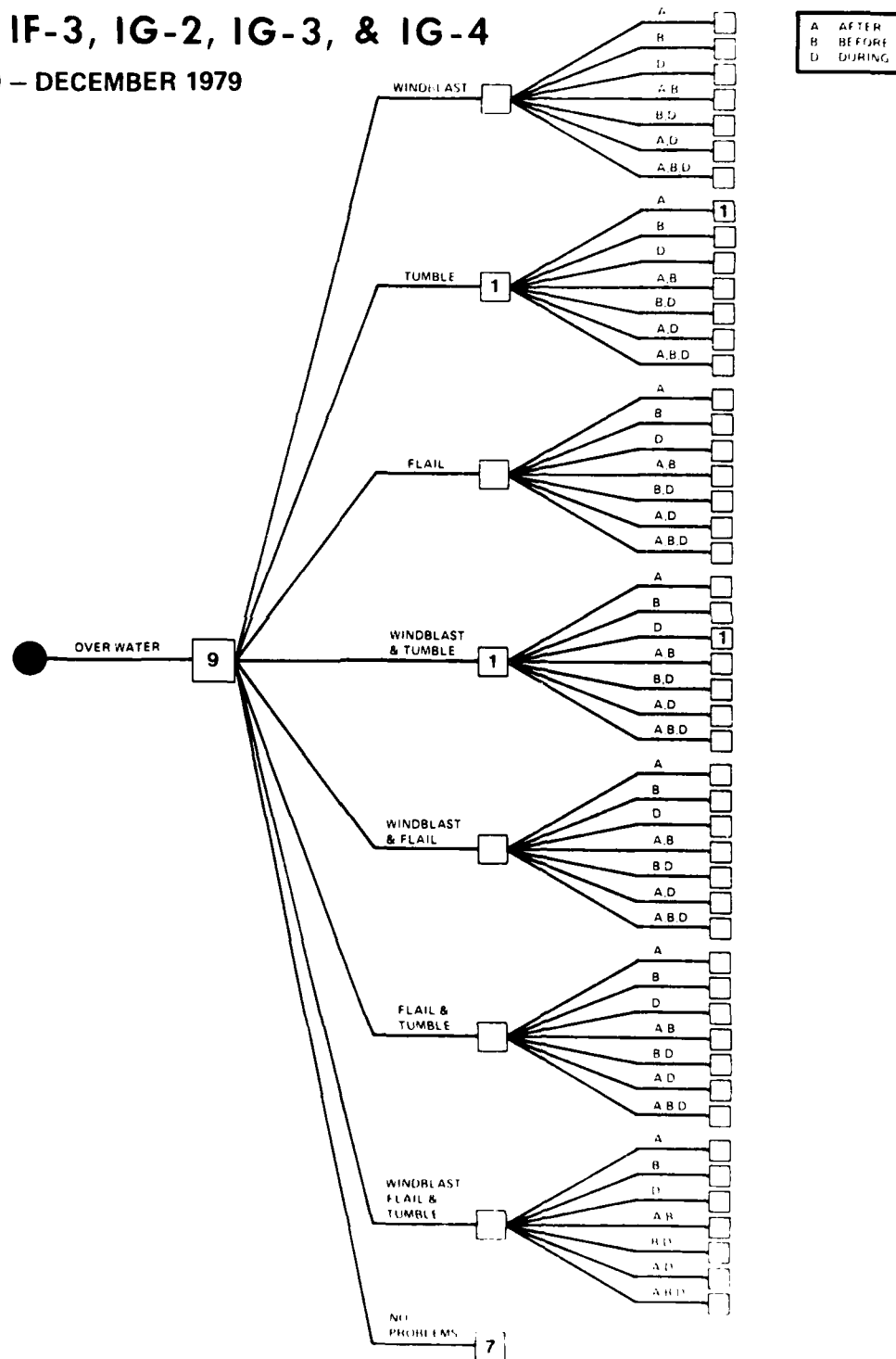
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC IF-3, IG-2, IG-3, & IG-4

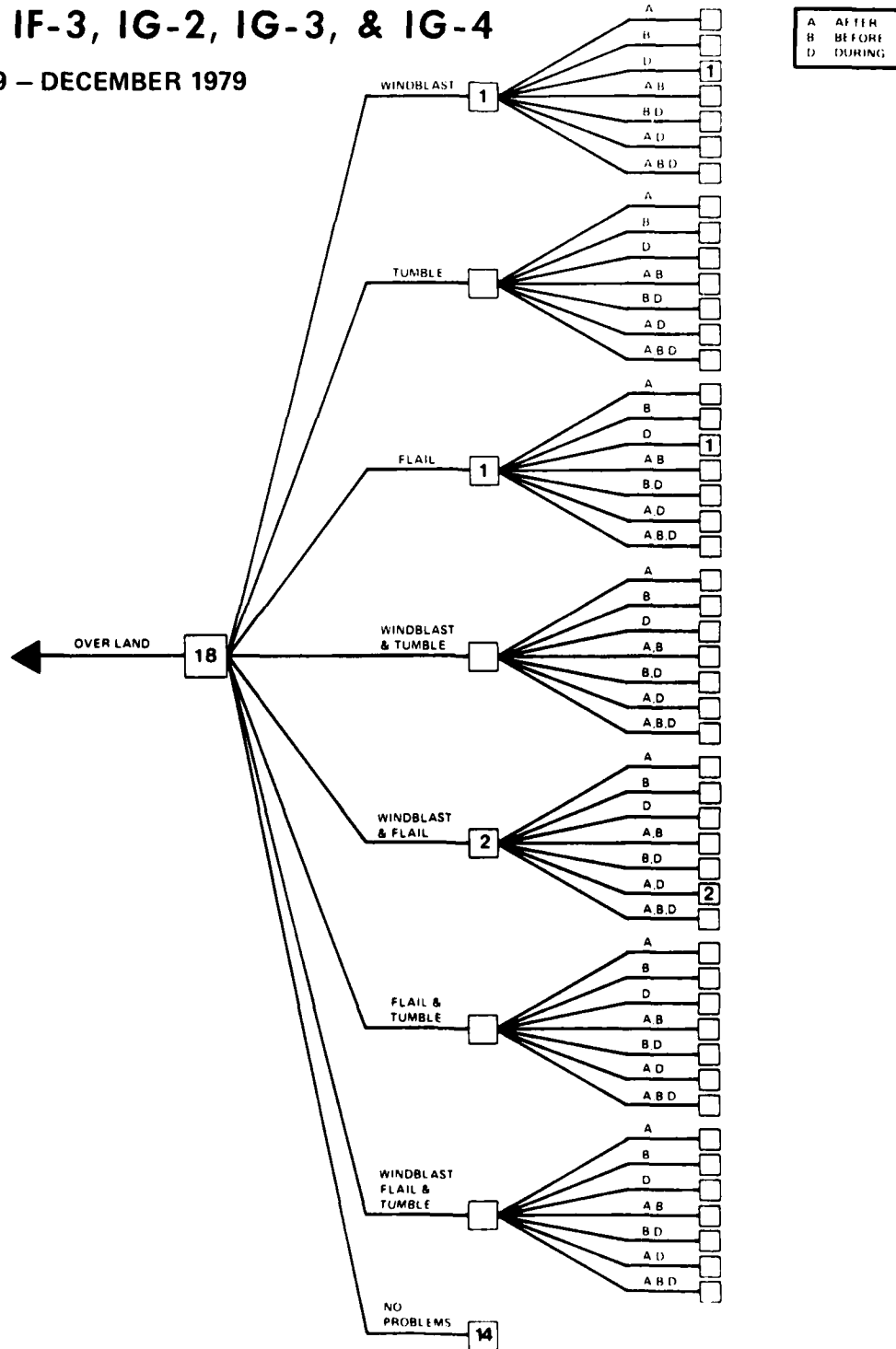
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC IF-3, IG-2, IG-3, & IG-4

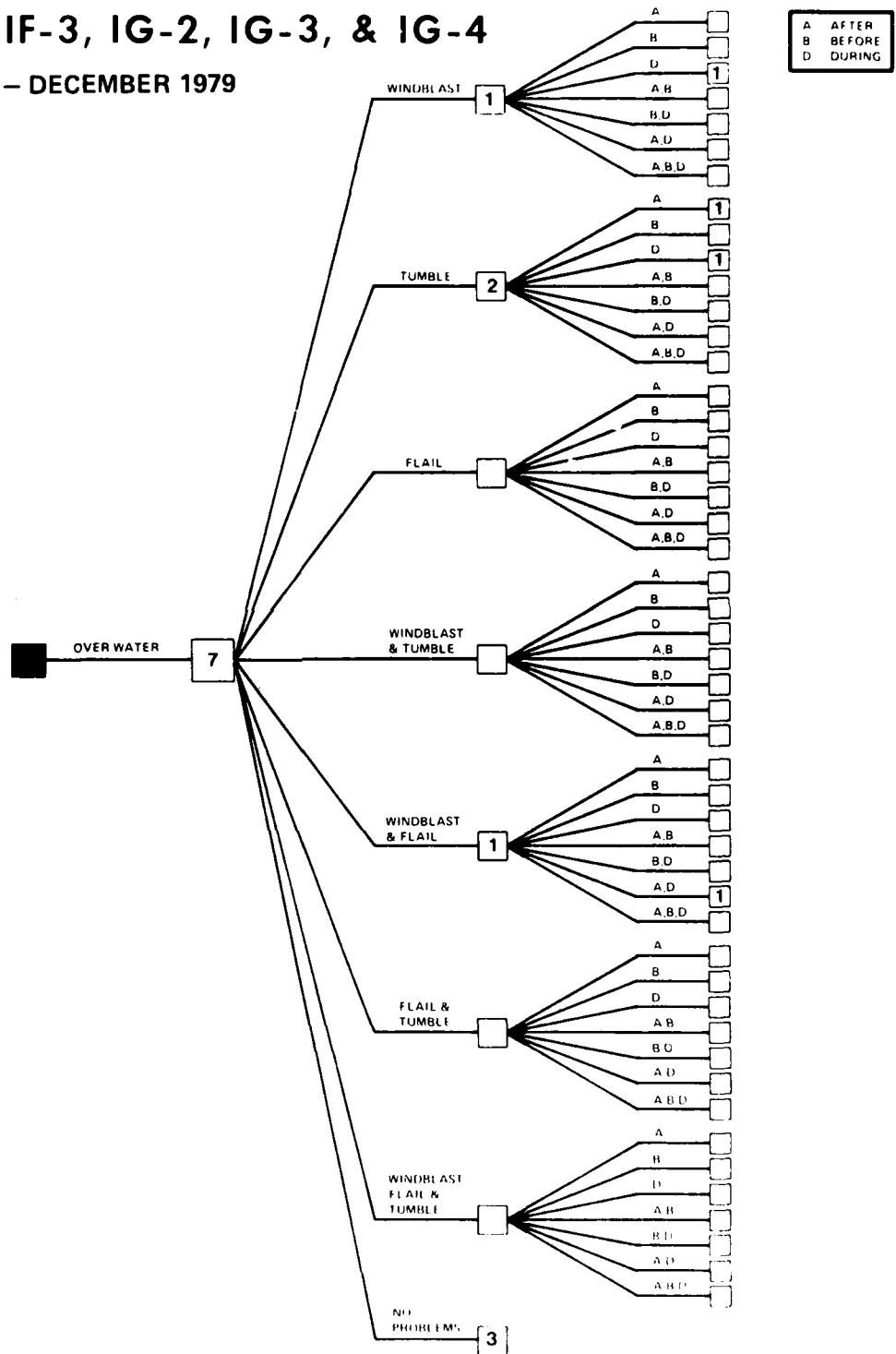
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC IF-3, IG-2, IG-3, & IG-4

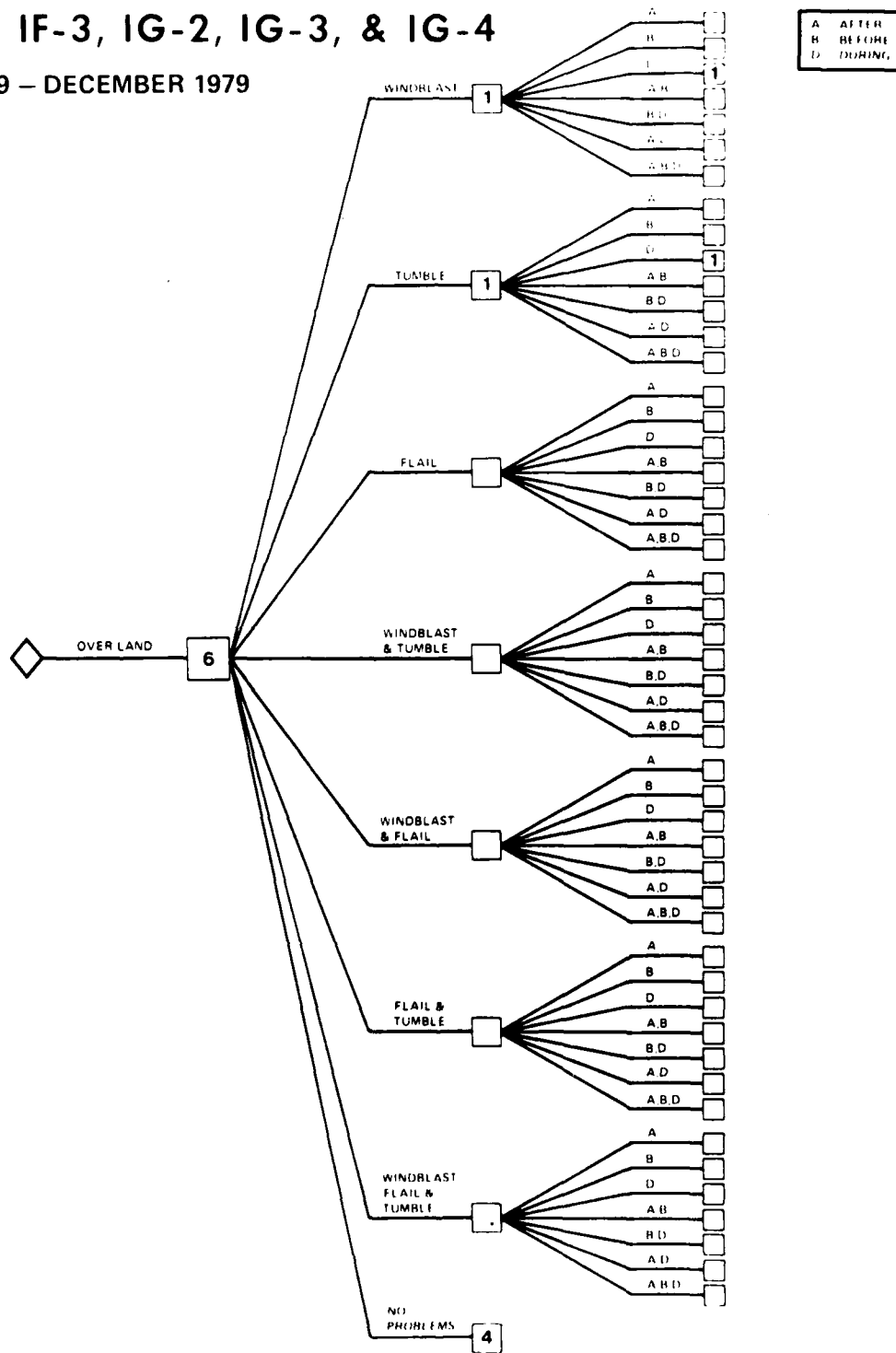
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

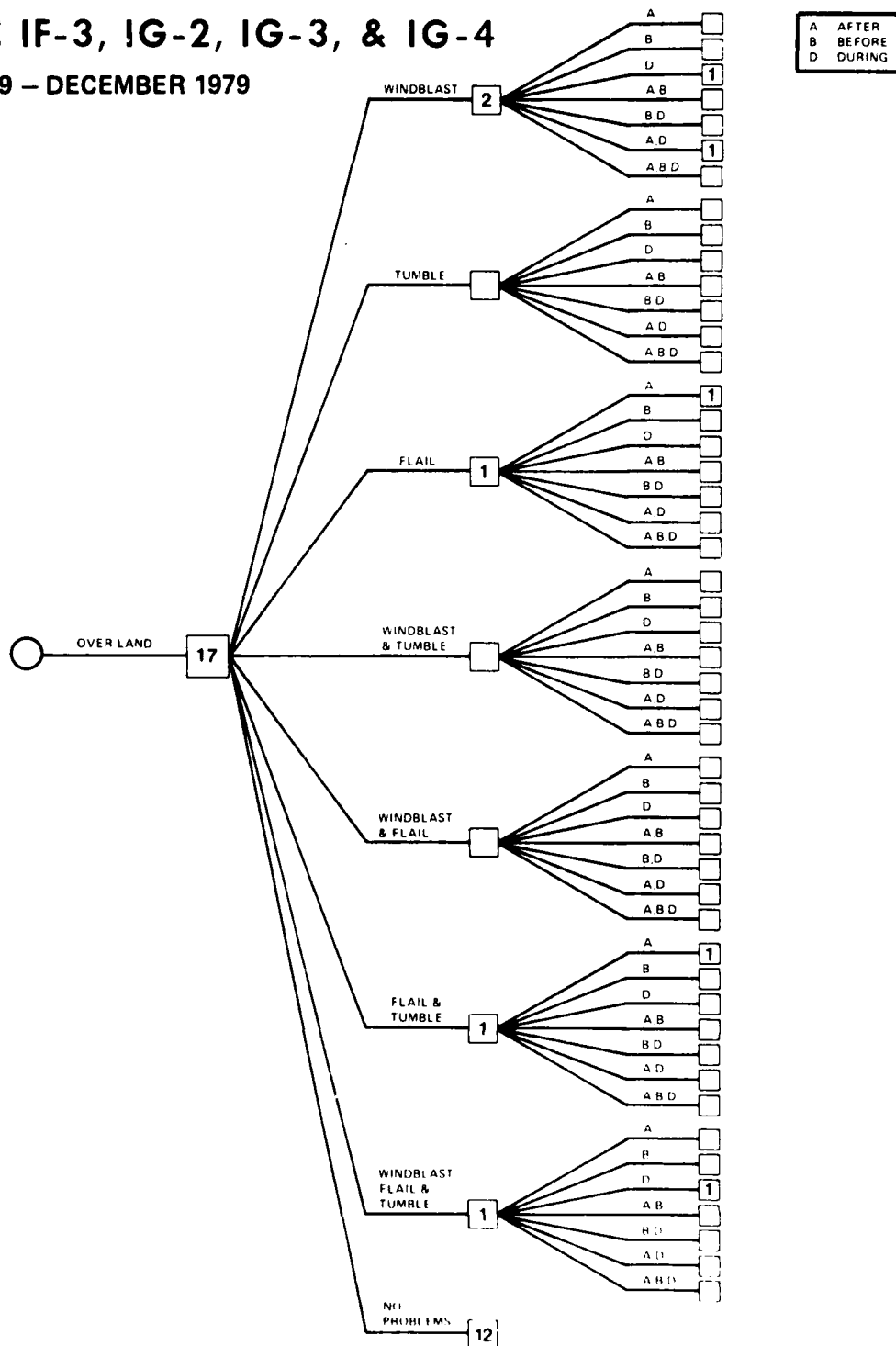
ESCAPAC IF-3, IG-2, IG-3, & IG-4

JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

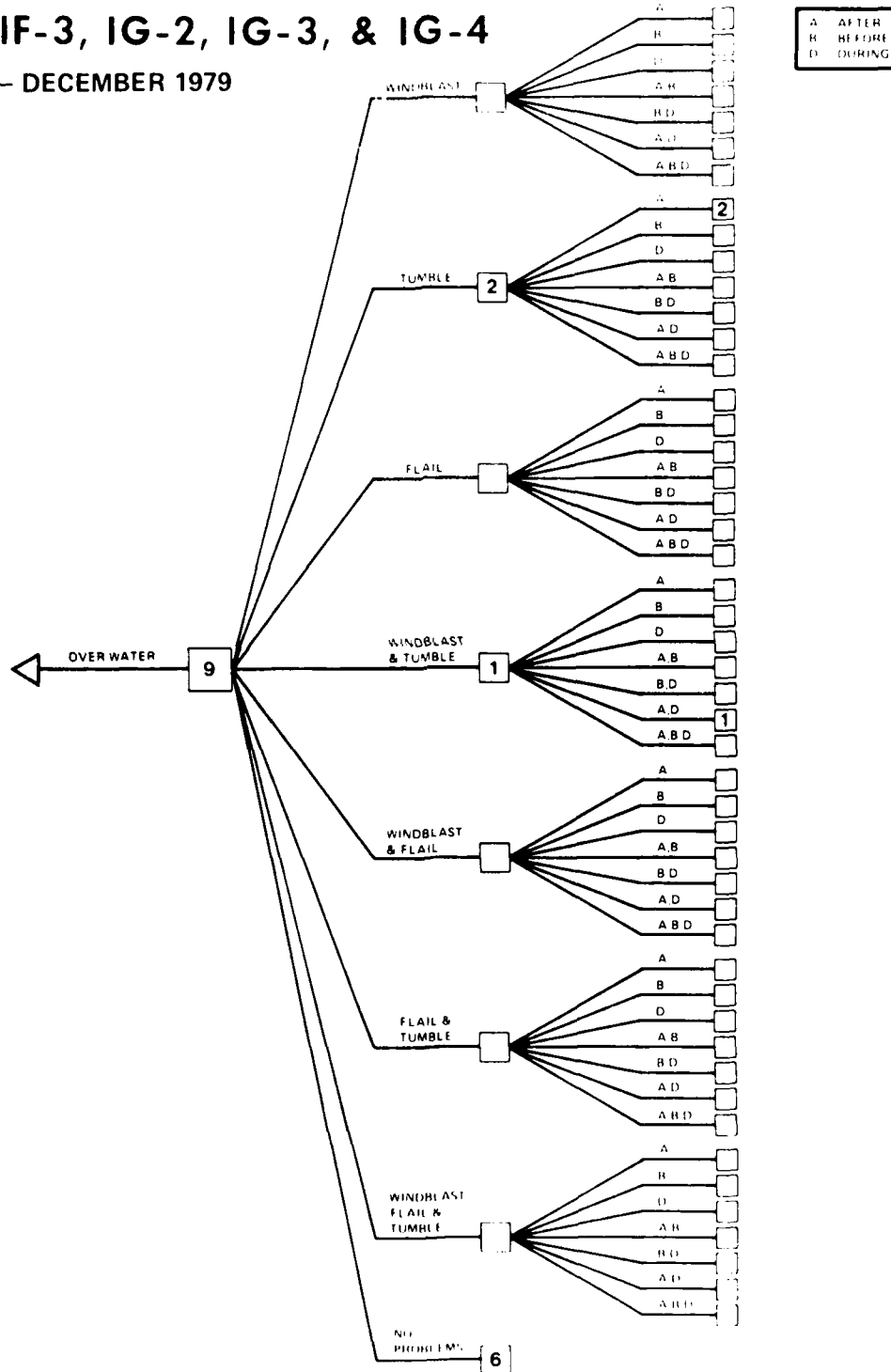
ESCAPAC IF-3, IG-2, IG-3, & IG-4
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC IF-3, IG-2, IG-3, & IG-4

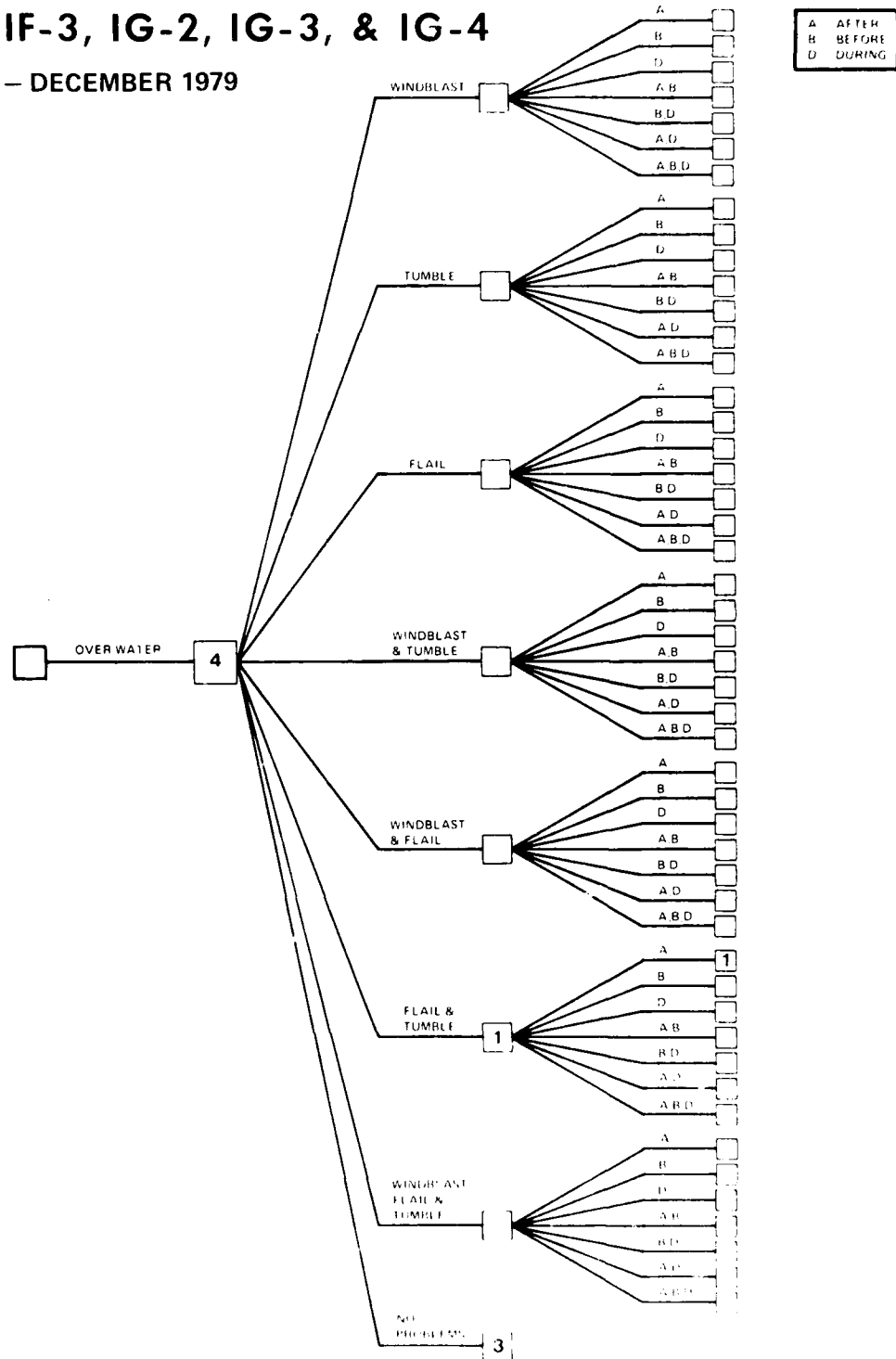
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC IF-3, IG-2, IG-3, & IG-4

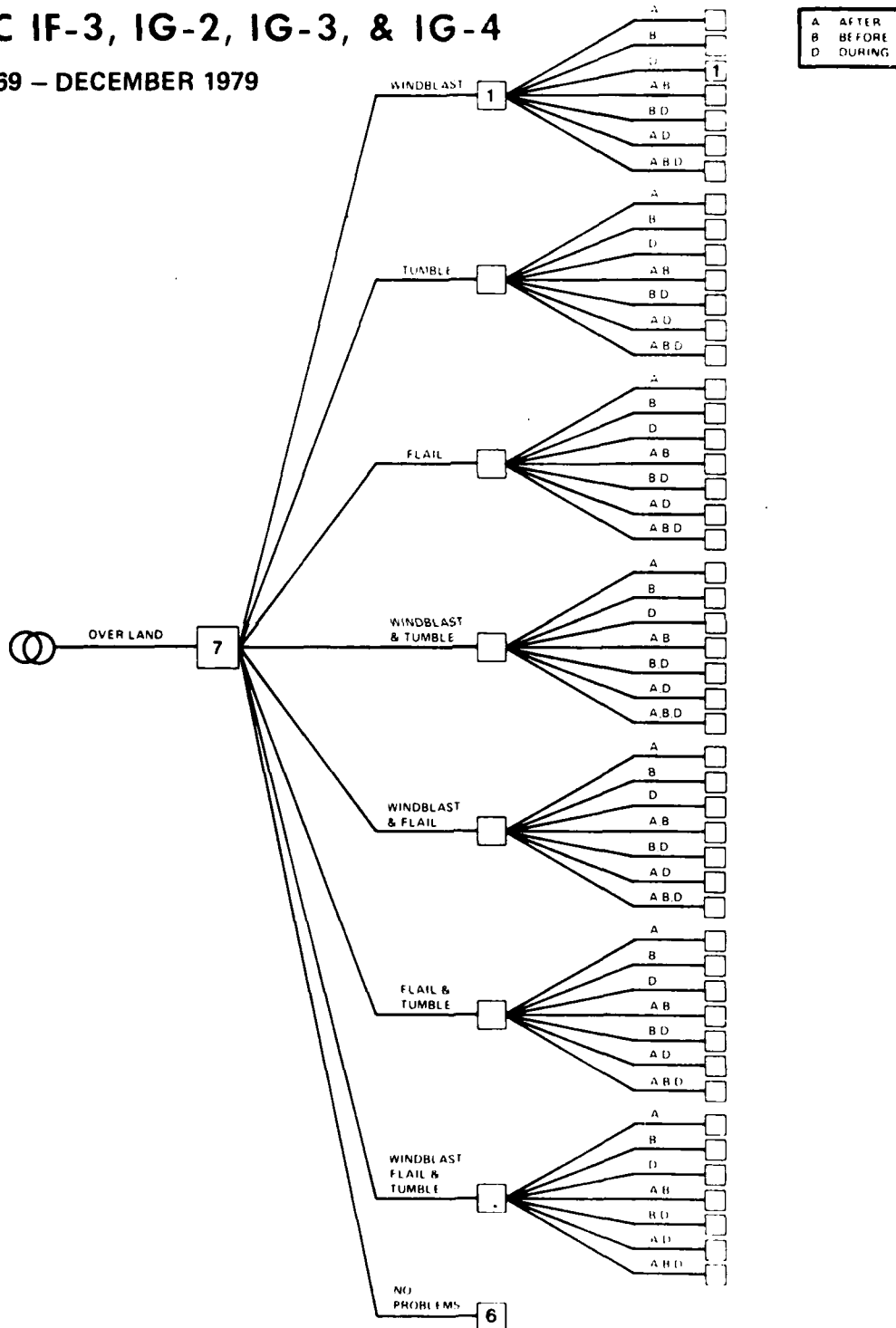
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC IF-3, IG-2, IG-3, & IG-4

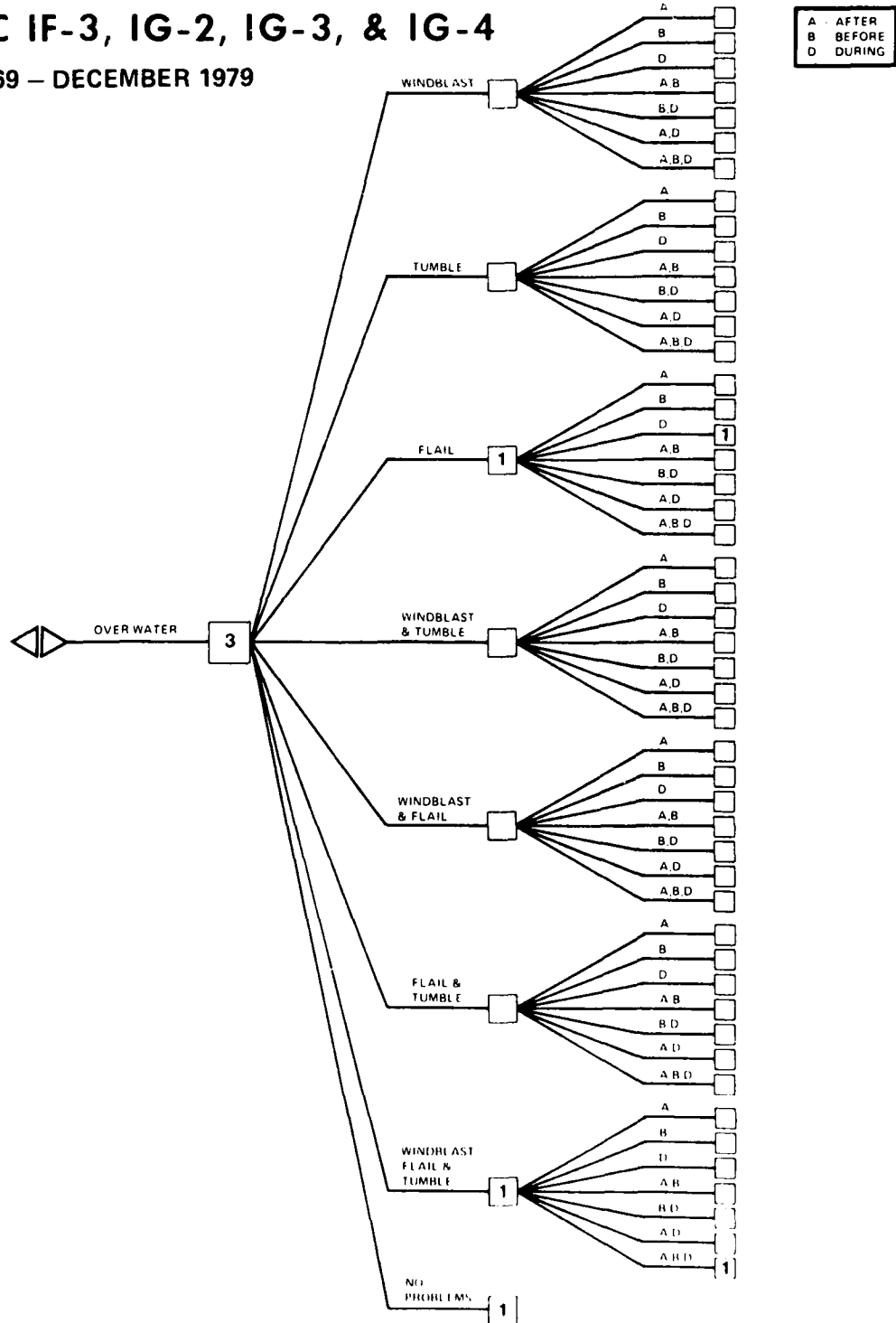
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

ESCAPAC IF-3, IG-2, IG-3, & IG-4

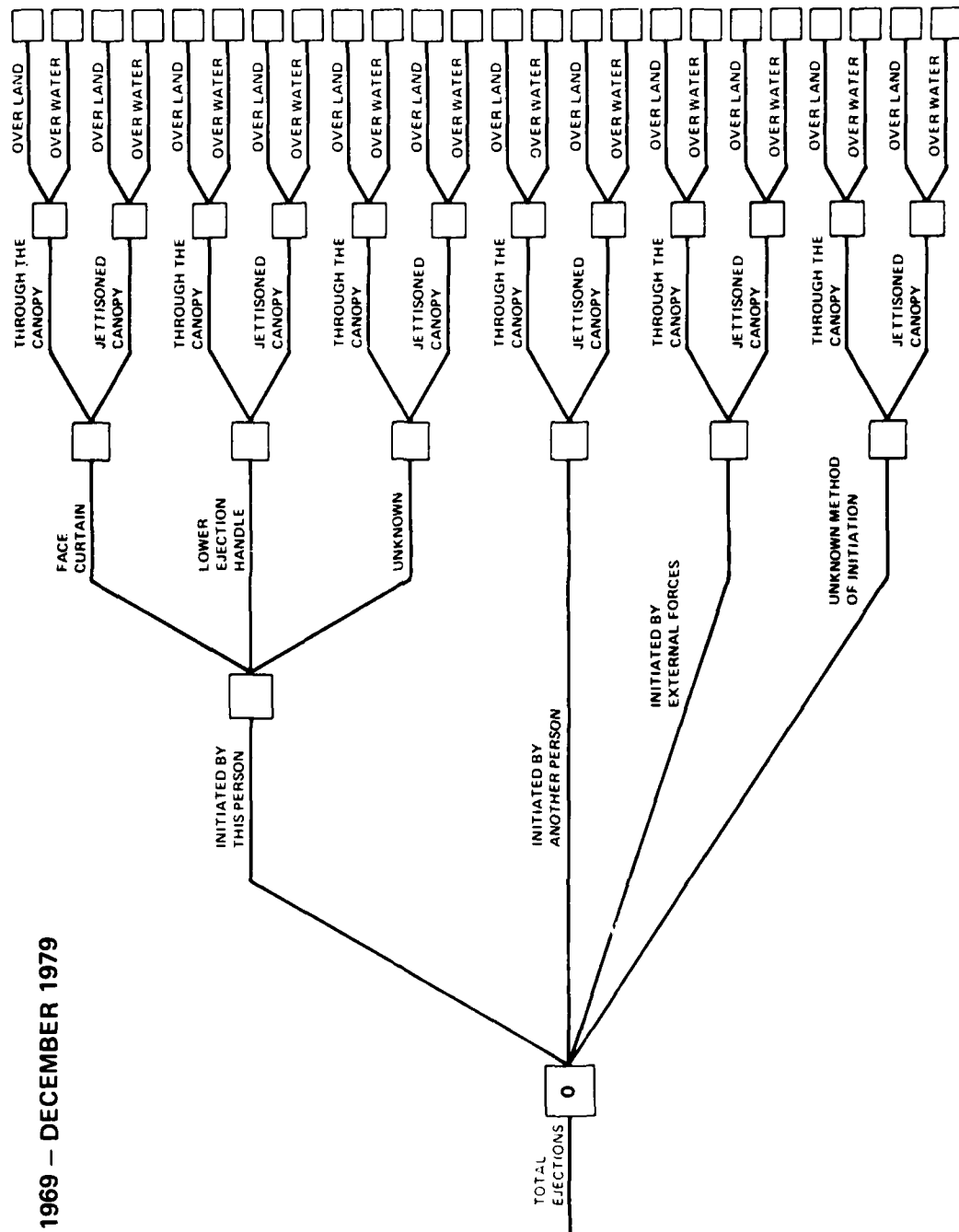
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-9/MARTIN-BAKER MK A5

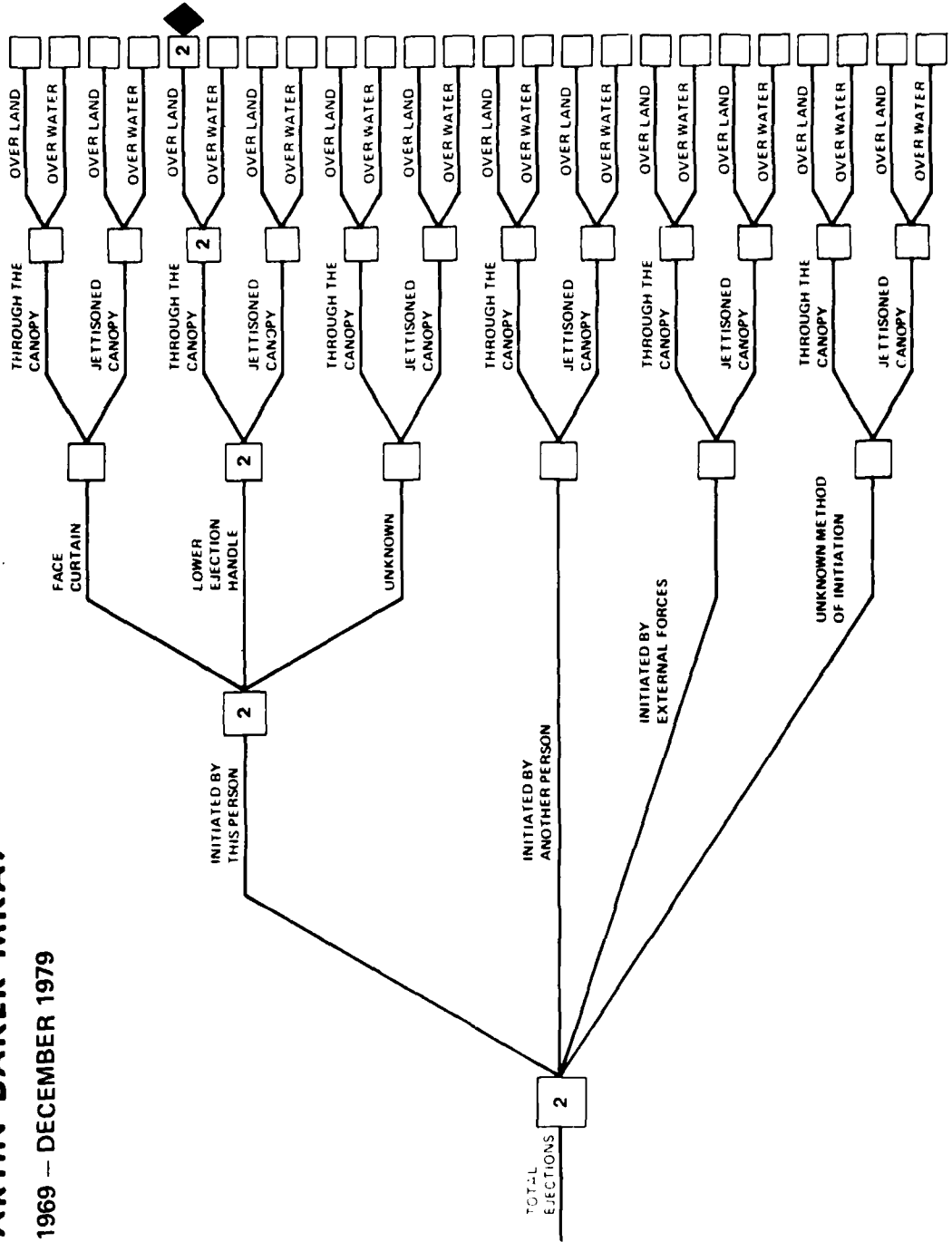
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-9 / MARTIN-BAKER MKA7

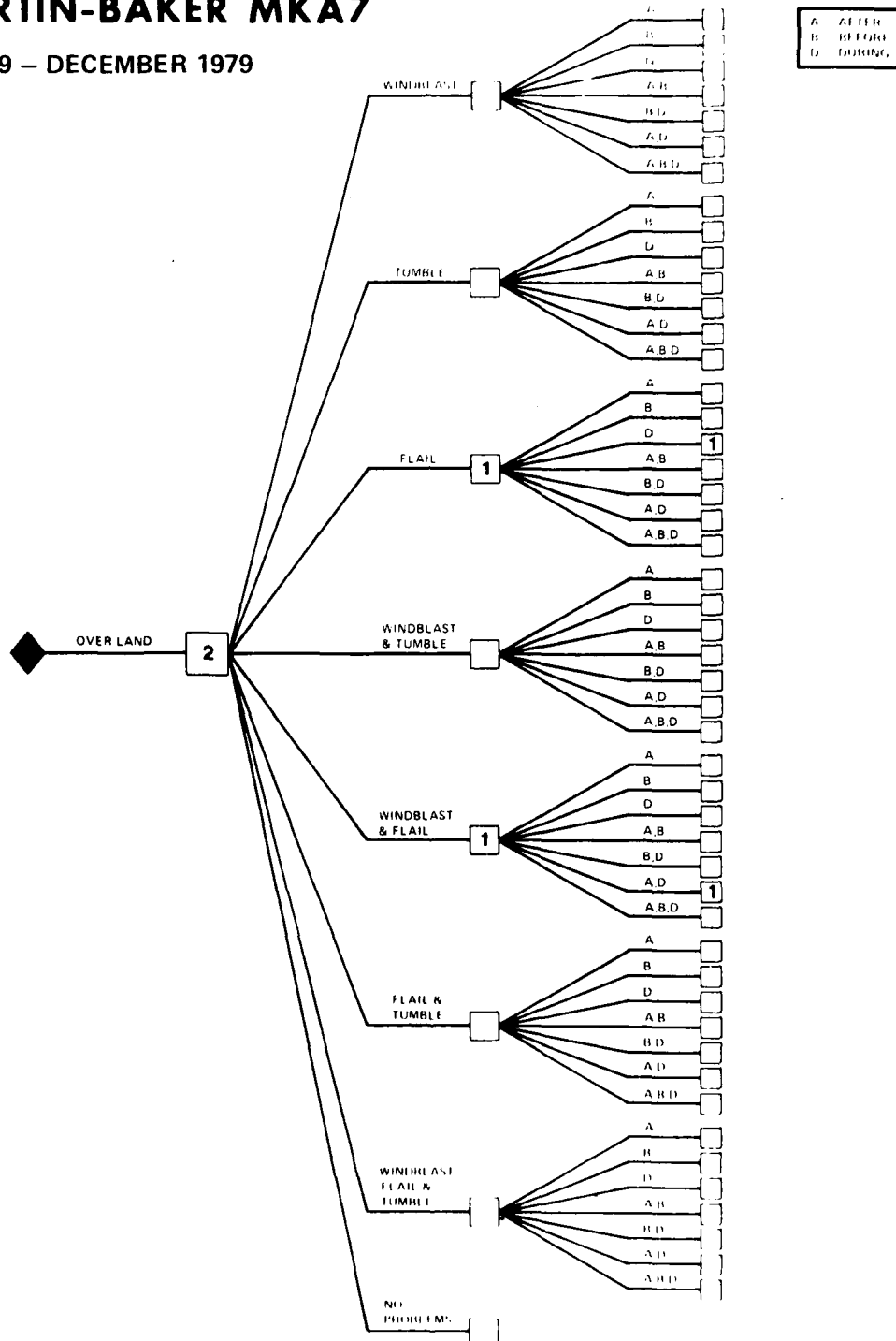
JANUARY 1969 -- DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-9/MARTIN-BAKER MKA7

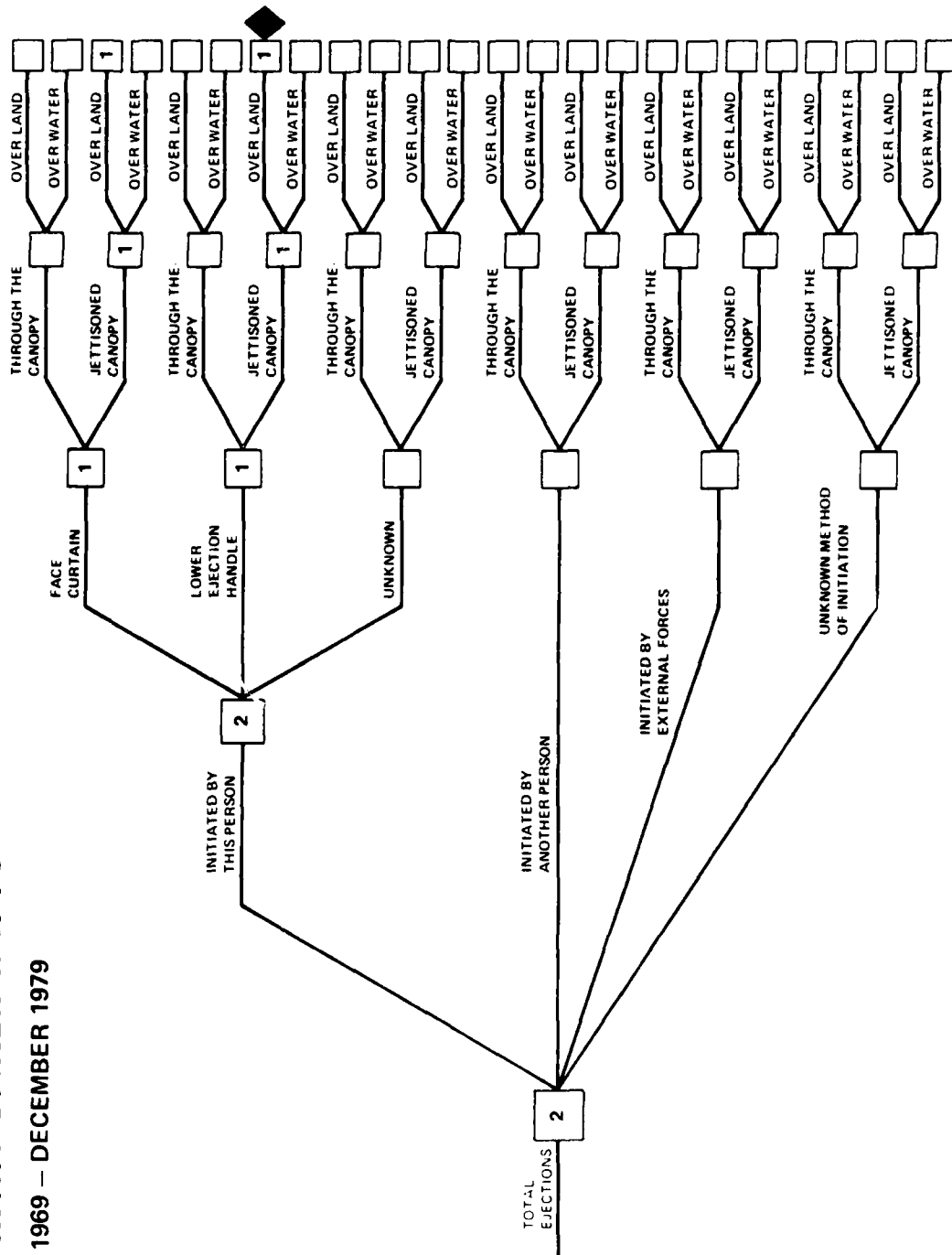
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-8/MARTIN-BAKER MK F5

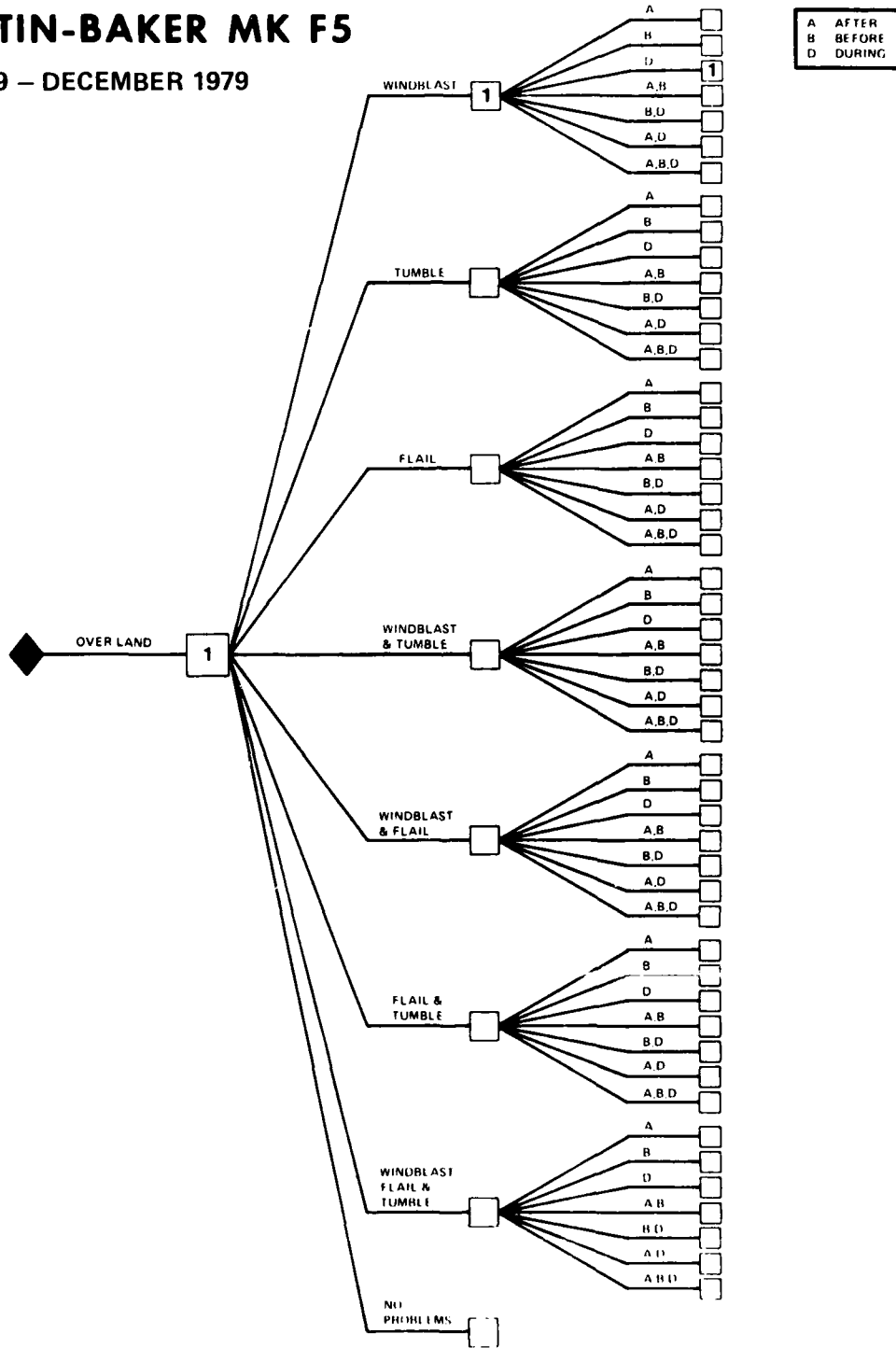
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-8/MARTIN-BAKER MK F5

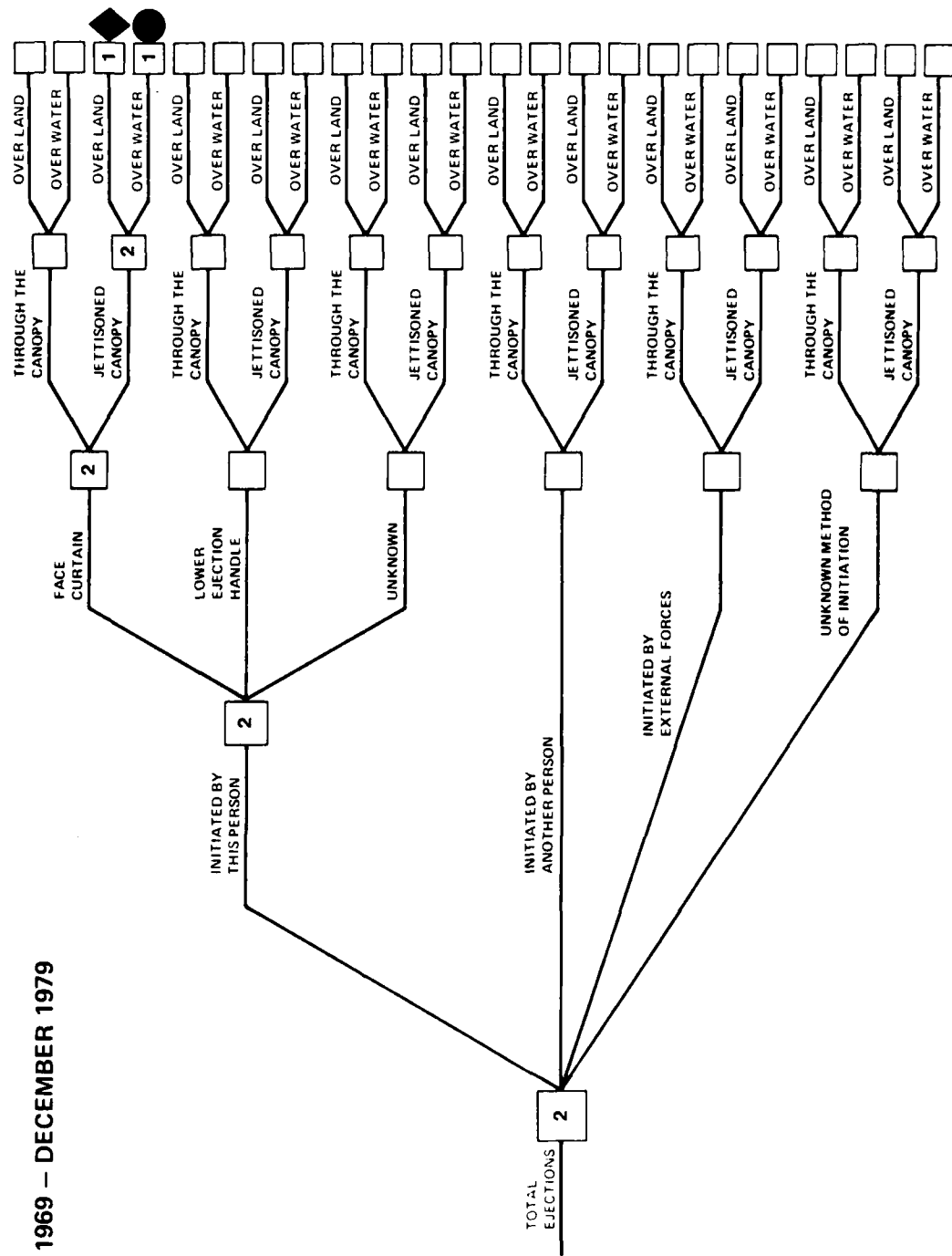
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-8 / MARTIN-BAKER MK F7

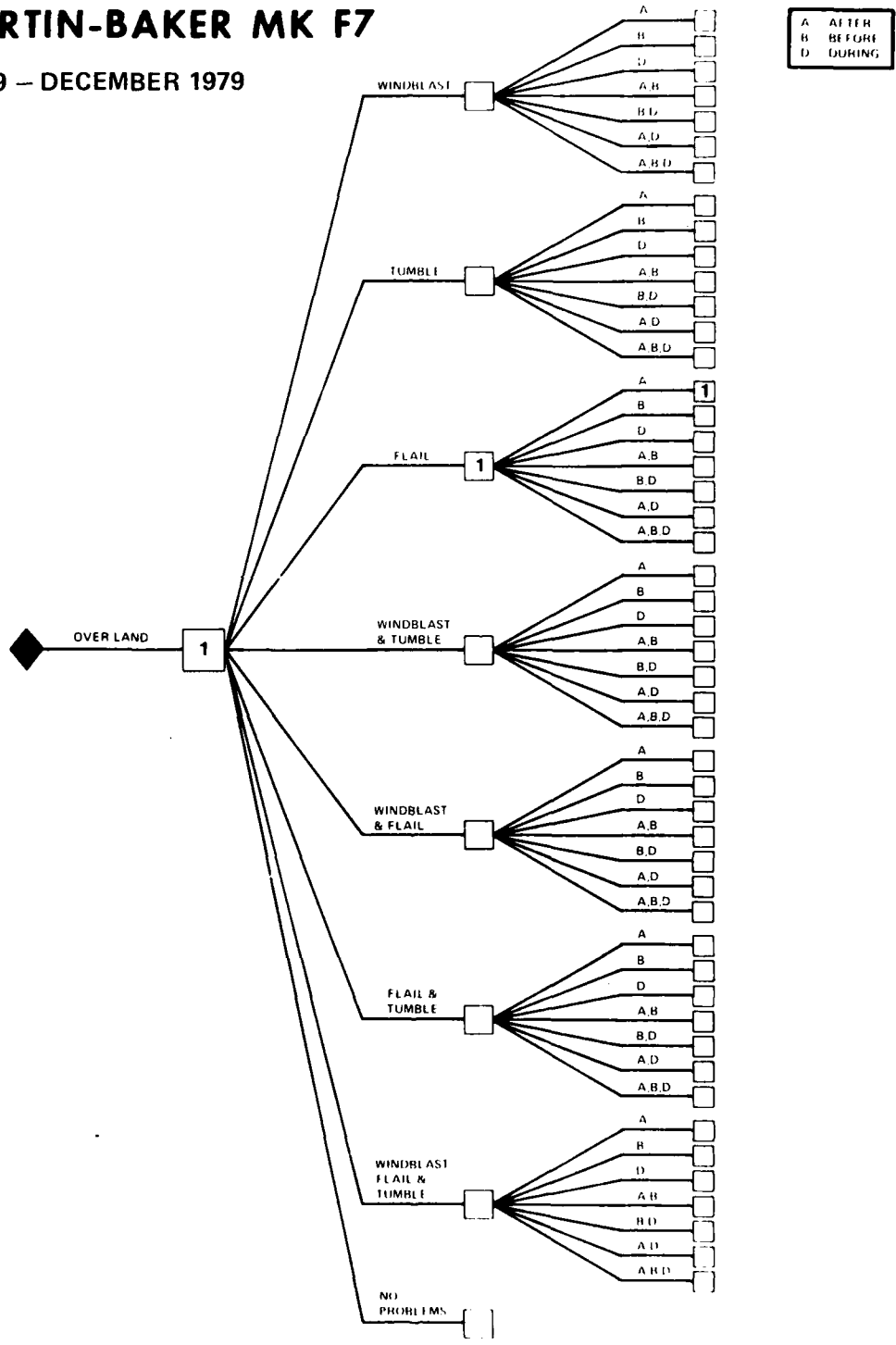
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-8 /MARTIN-BAKER MK F7

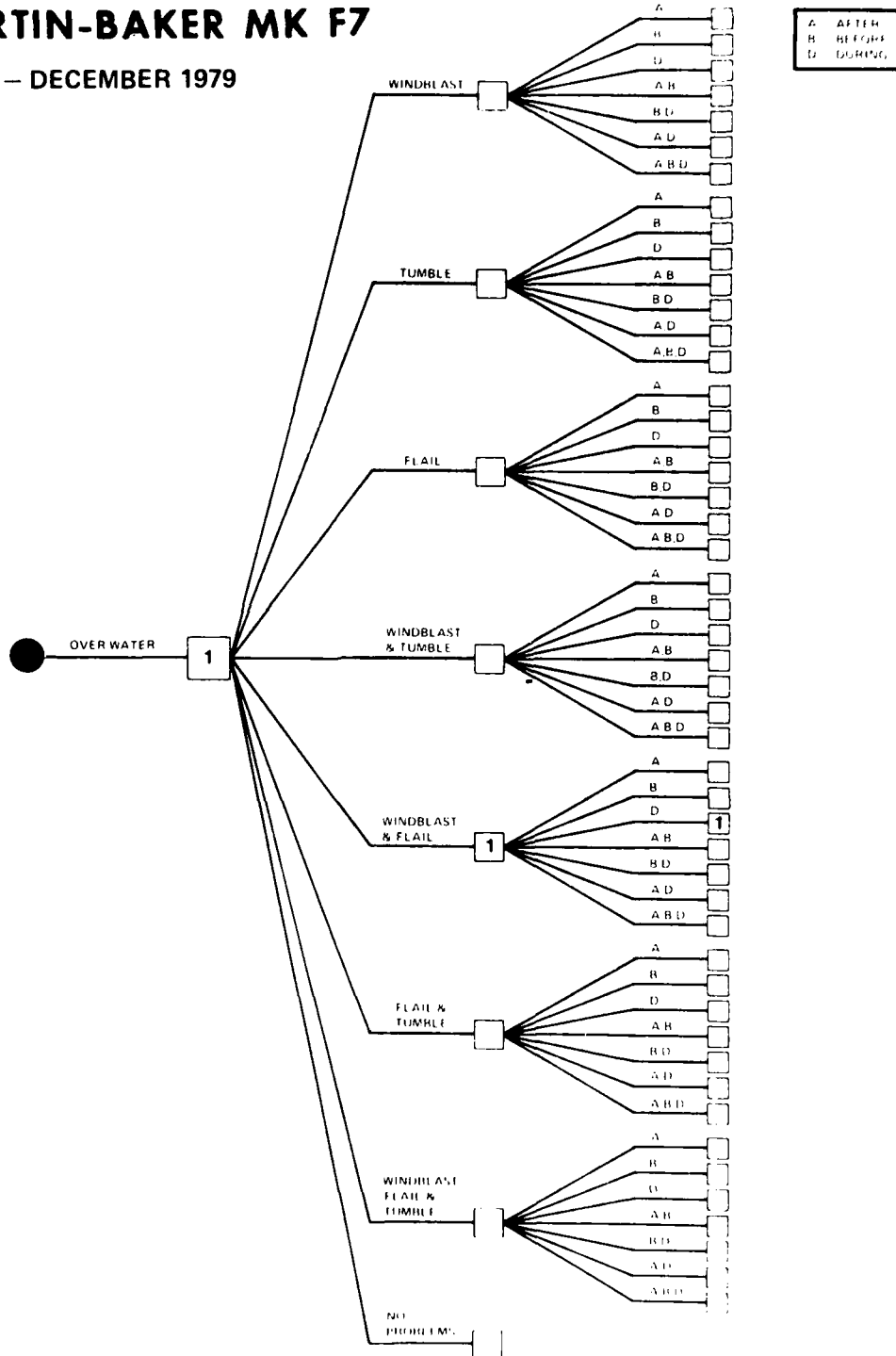
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-8 / MARTIN-BAKER MK F7

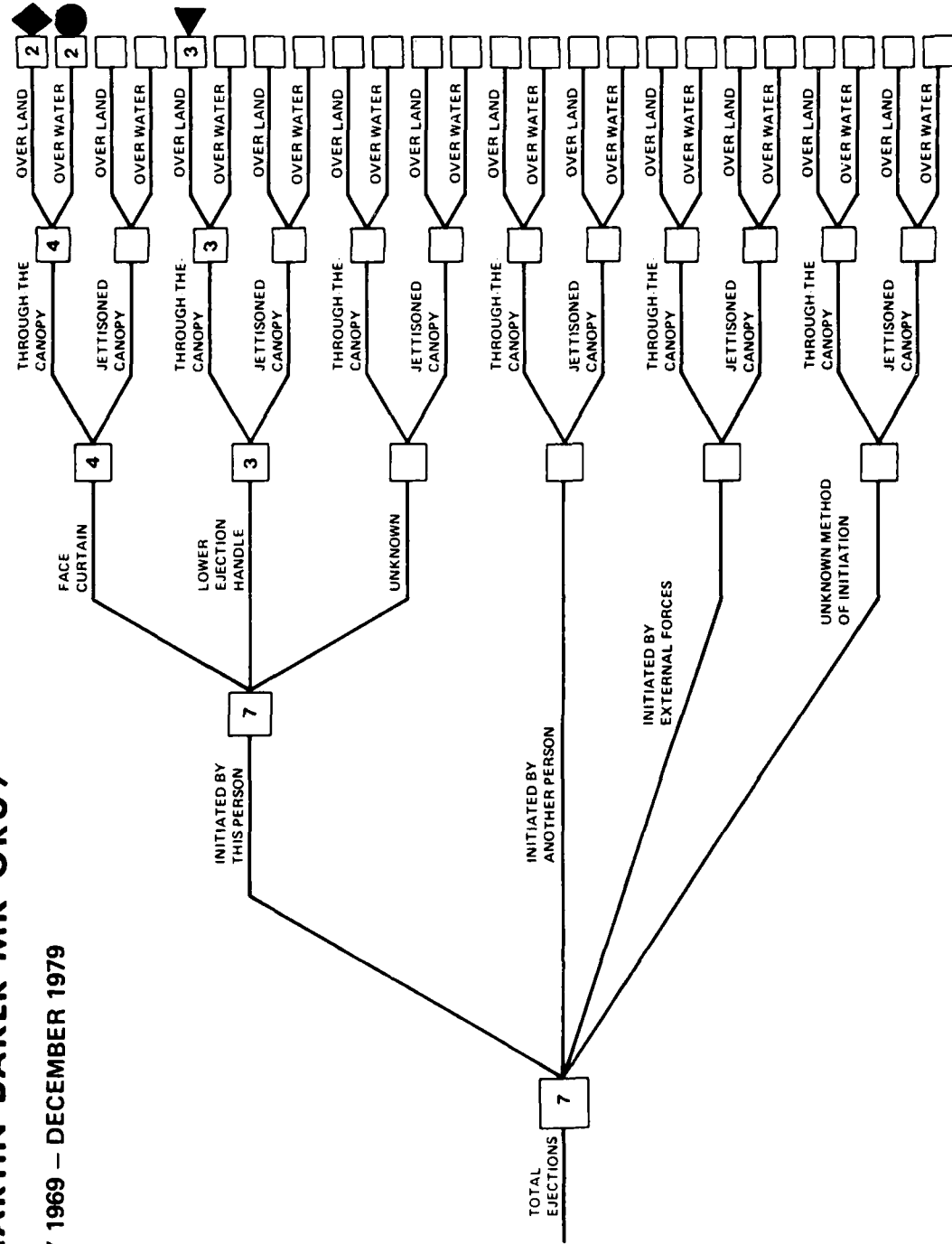
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-6/MARTIN-BAKER MK GRU 7

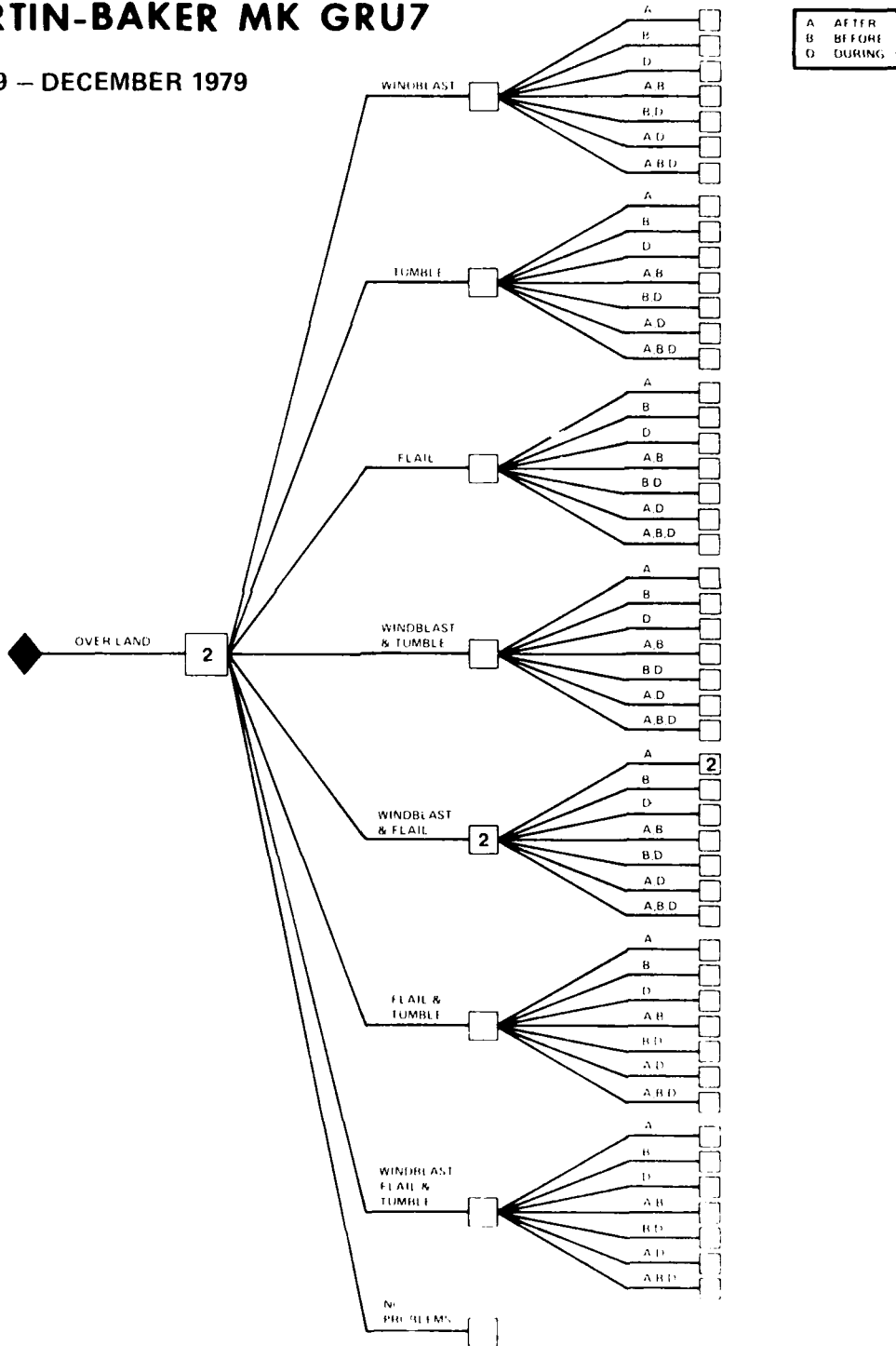
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-6/MARTIN-BAKER MK GRU7

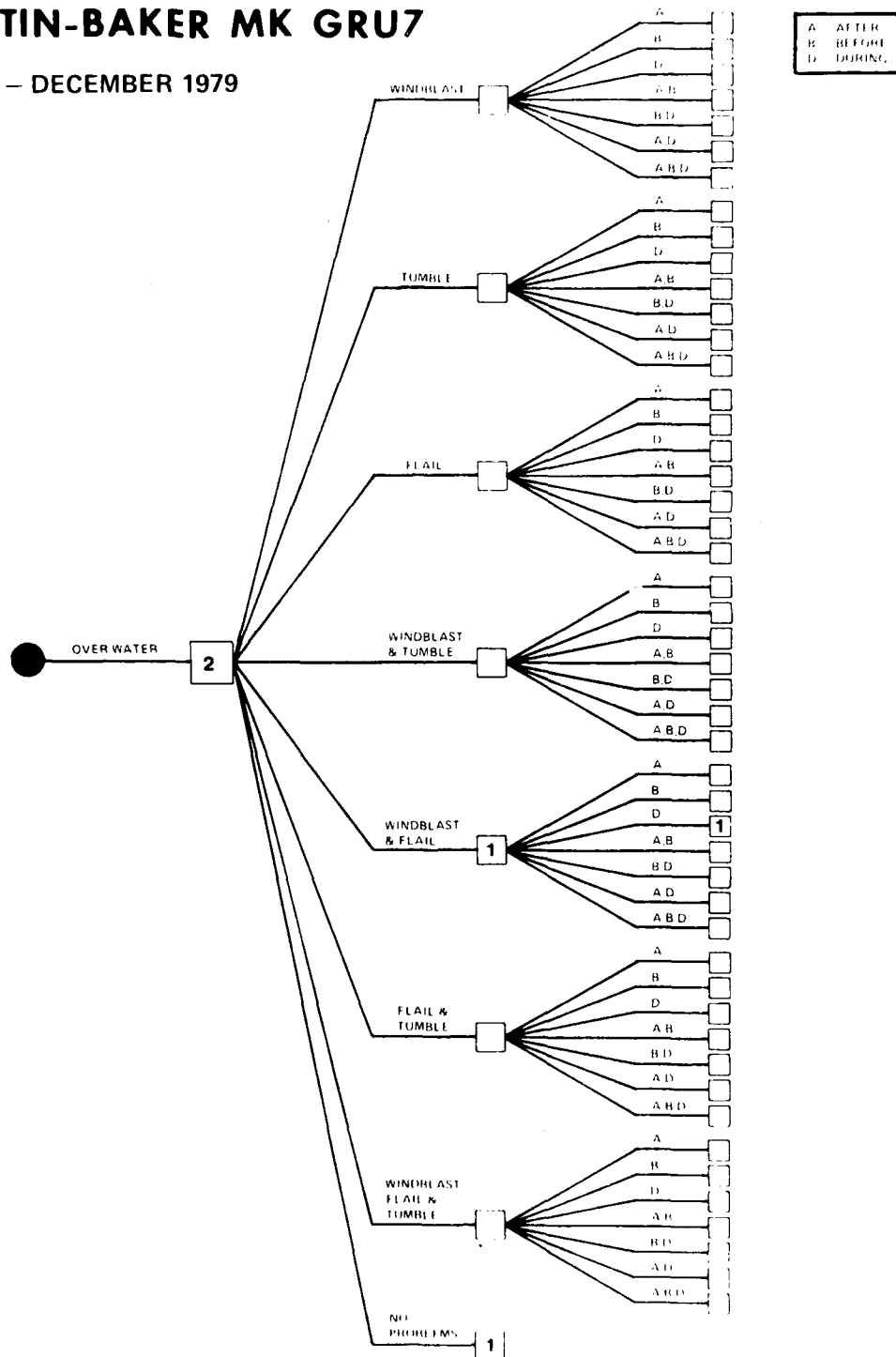
JANUARY 1969 – DECEMBER 1979

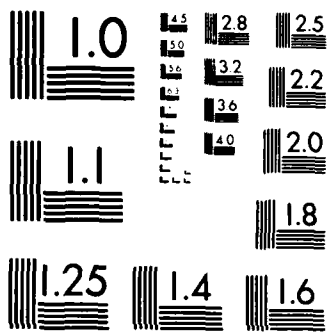


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-6/MARTIN-BAKER MK GRU7

JANUARY 1969 – DECEMBER 1979



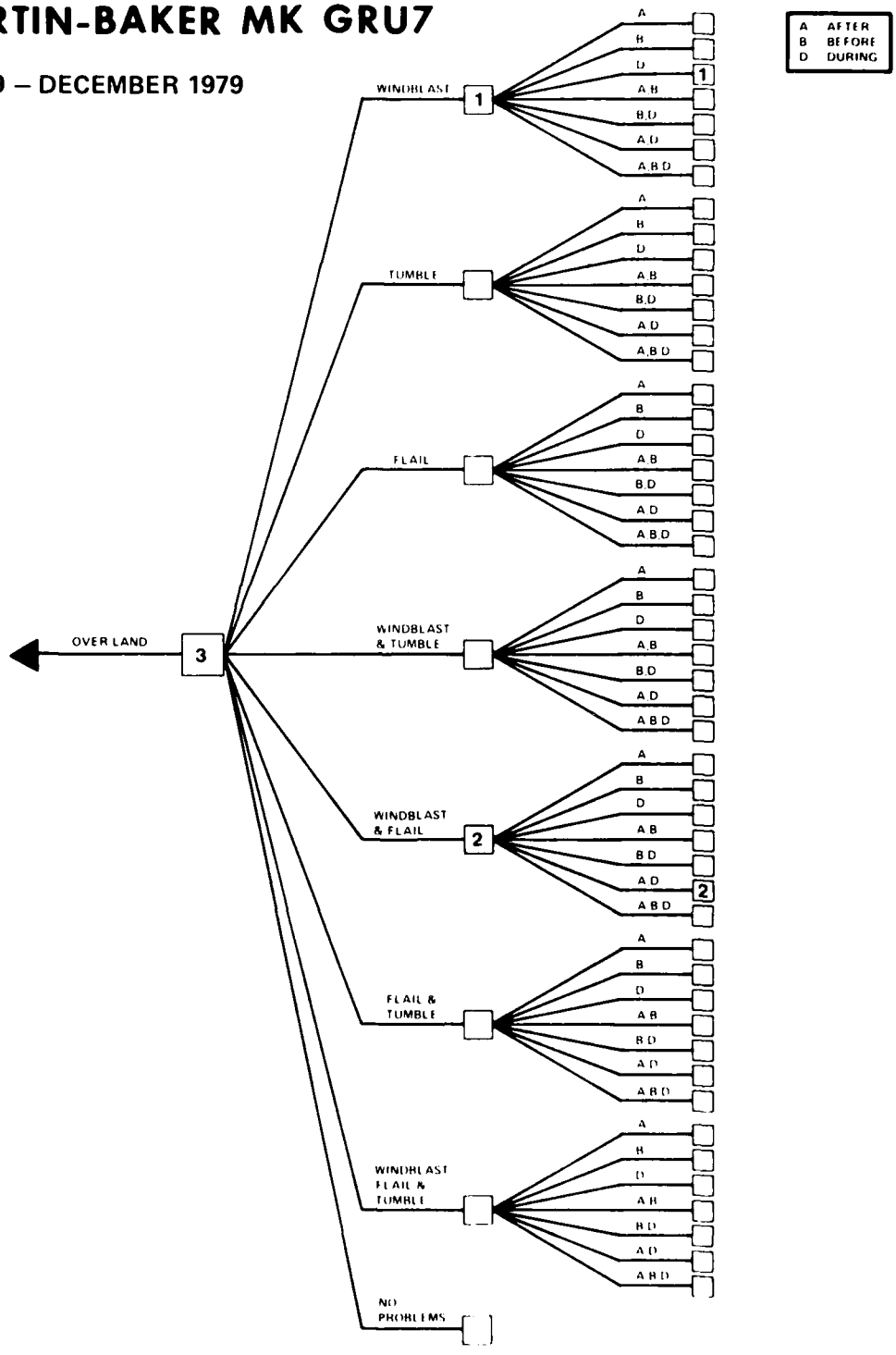


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DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-6/MARTIN-BAKER MK GRU7

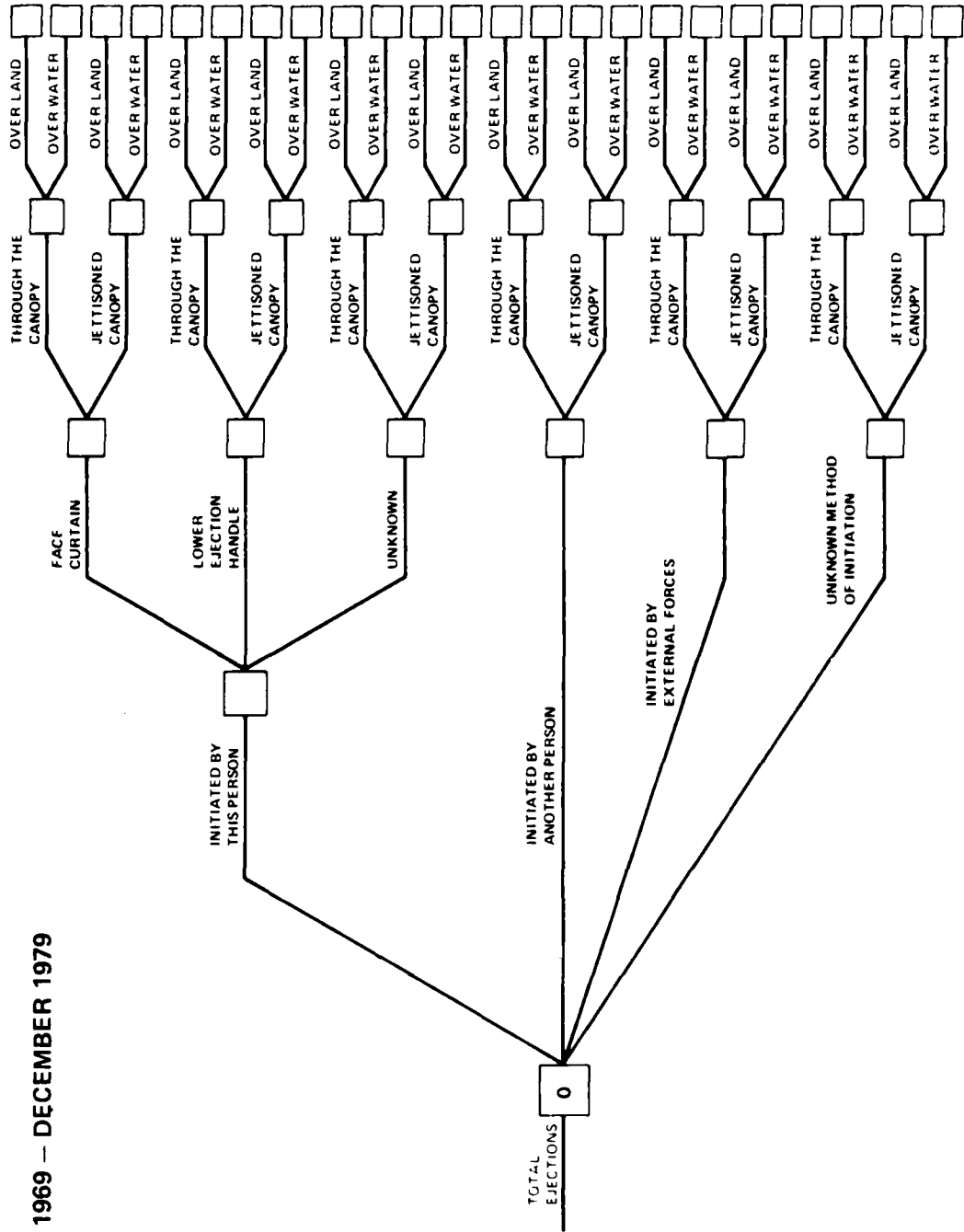
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

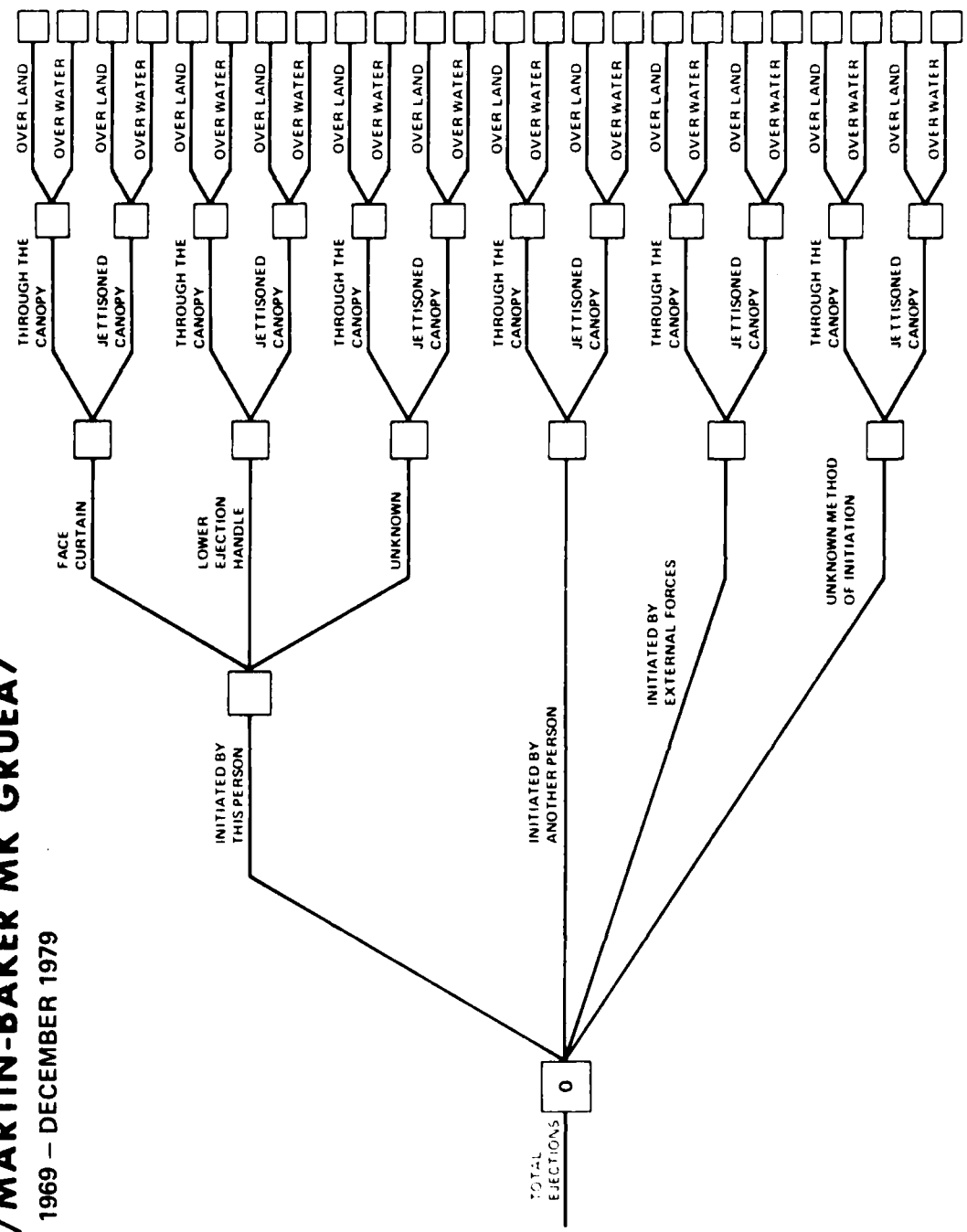
EA-6B / MASTIN-BAKER MK GRUS

JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

EA-6B / MARTIN-BAKER MK GRUEA7
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-14 / MARTIN-BAKER MK GRU7A

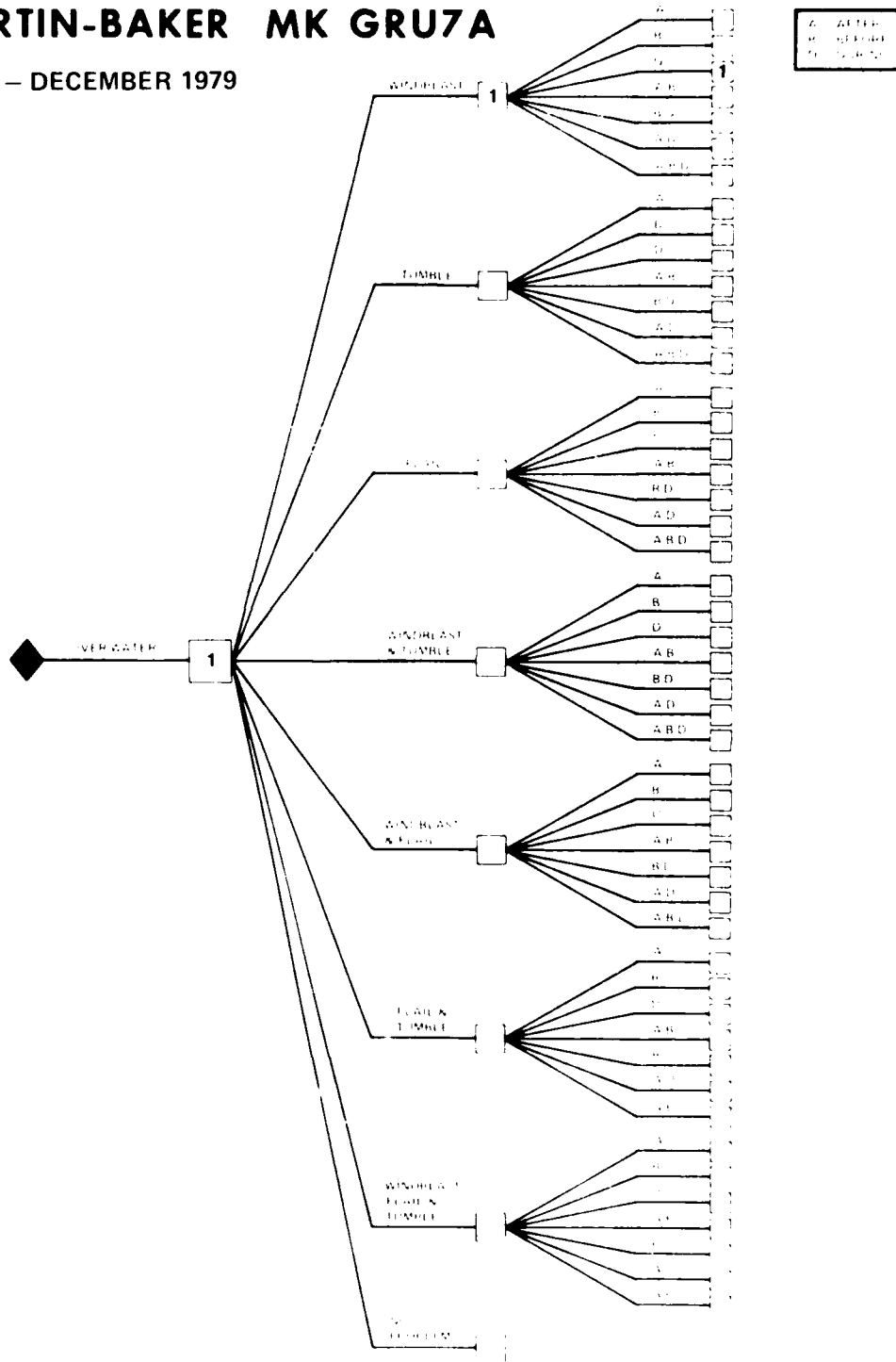
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-14/MARTIN-BAKER MK GRU7A

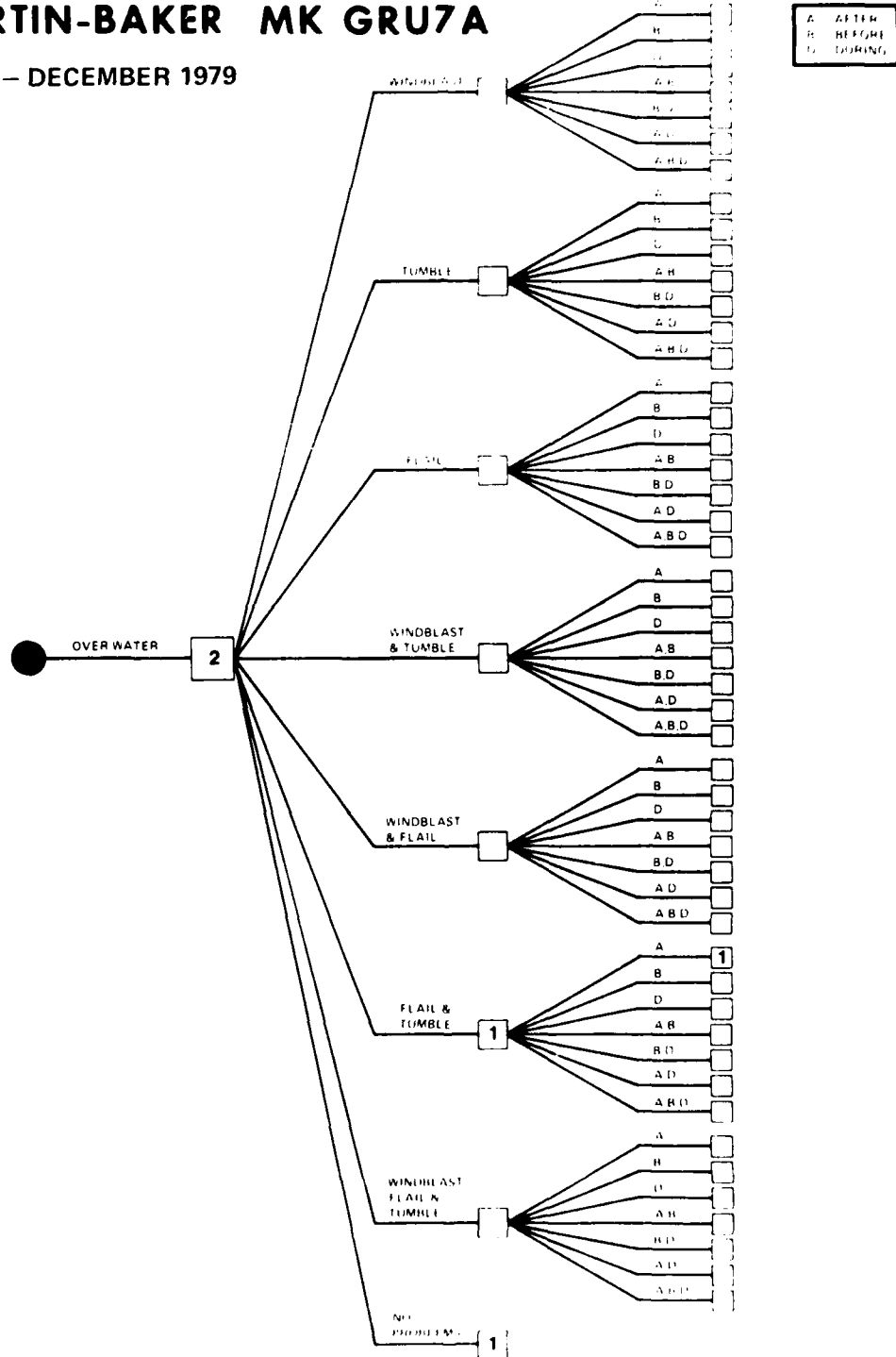
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-14/MARTIN-BAKER MK GRU7A

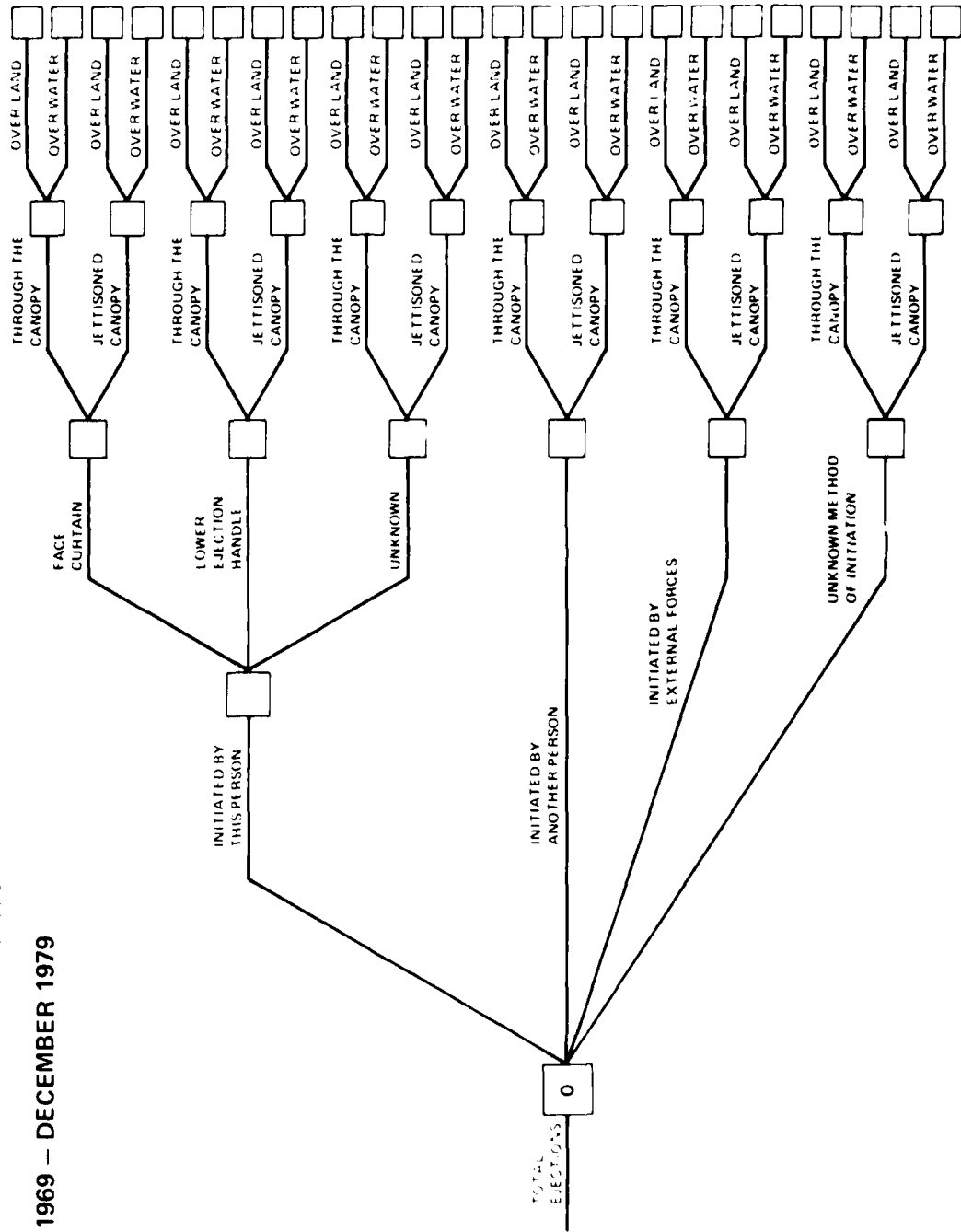
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-4/MARTIN-BAKER MK H5

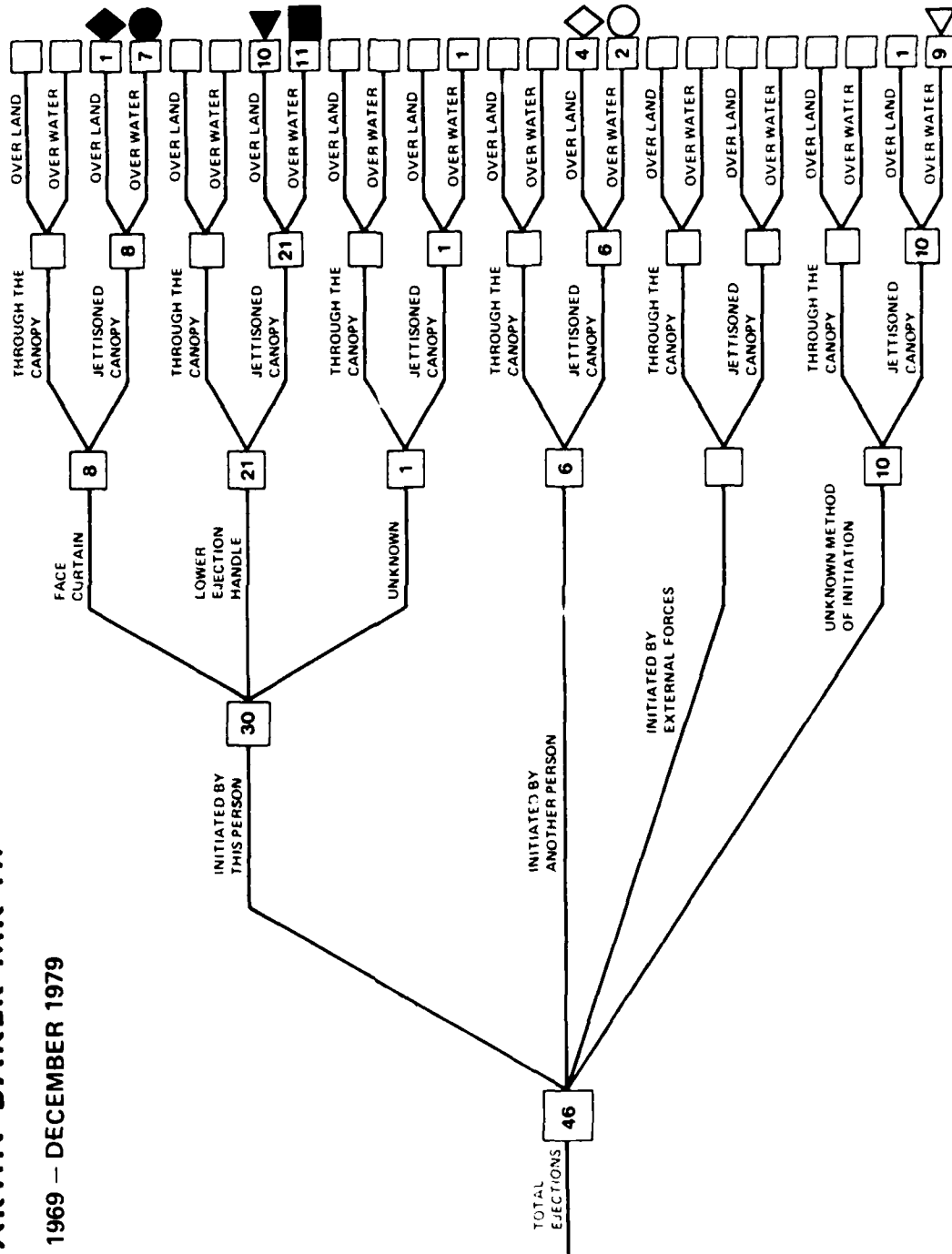
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-4 / MARTIN-BAKER MK H7

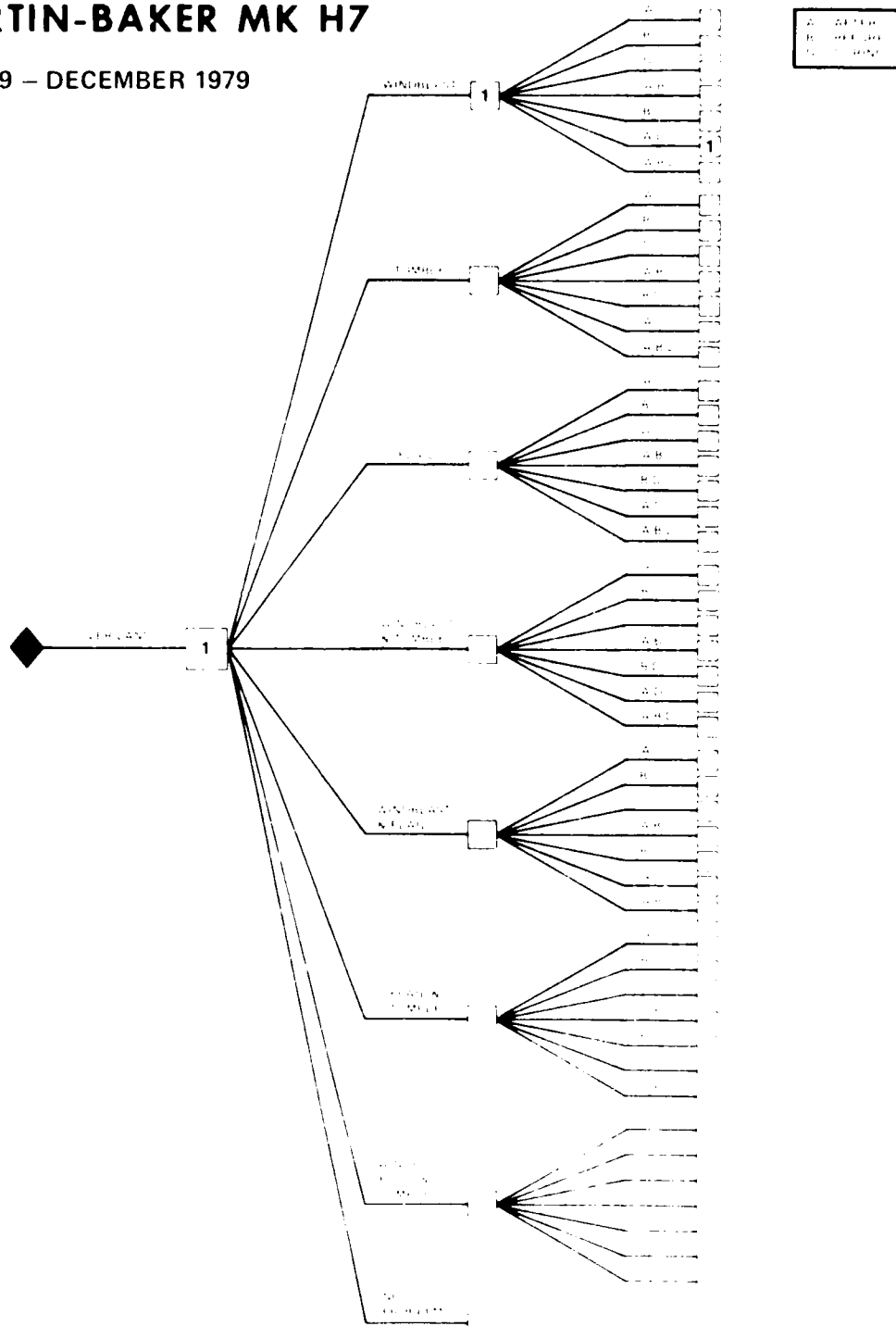
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-4/MARTIN-BAKER MK H7

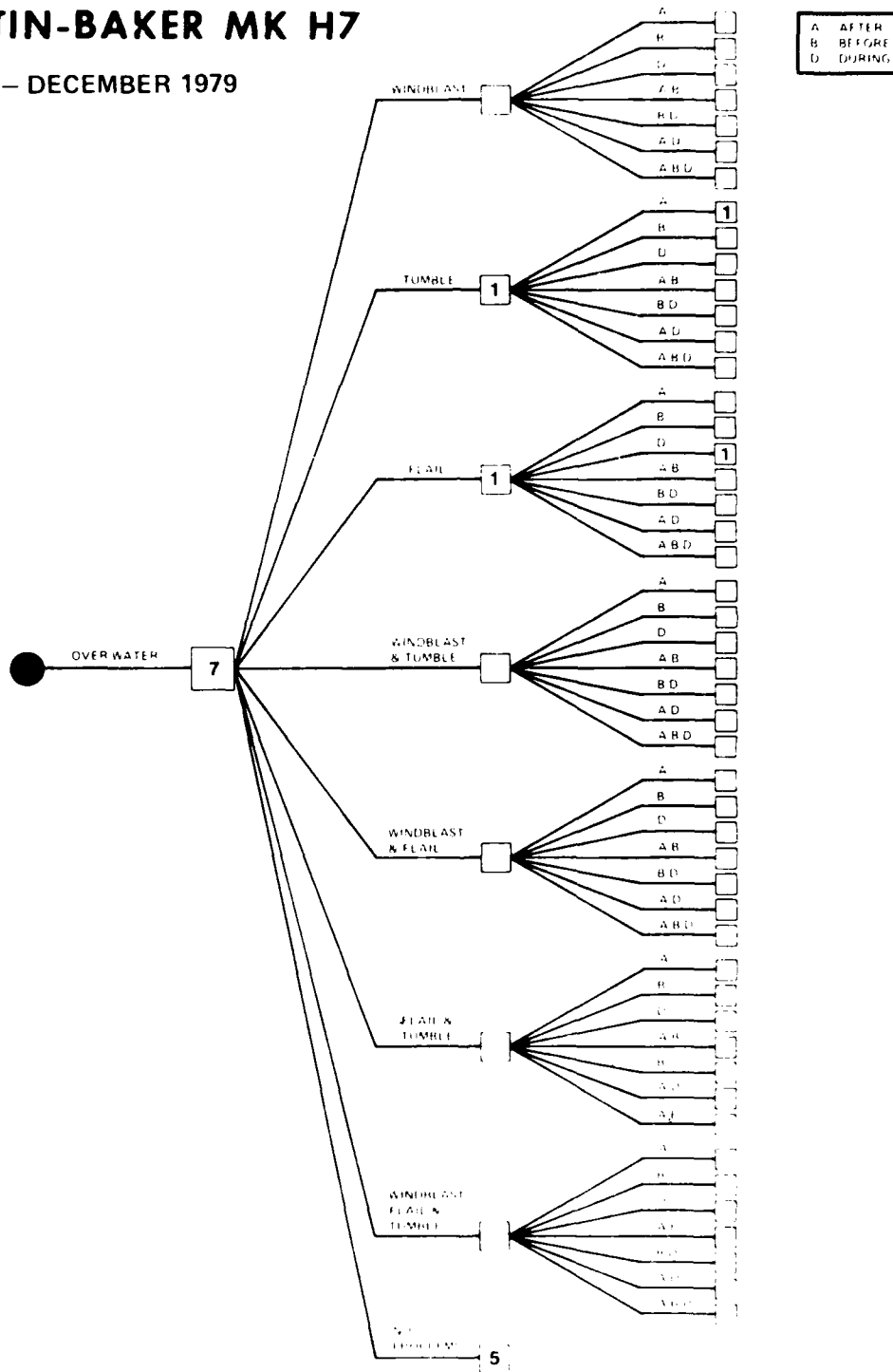
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-4/MARTIN-BAKER MK H7

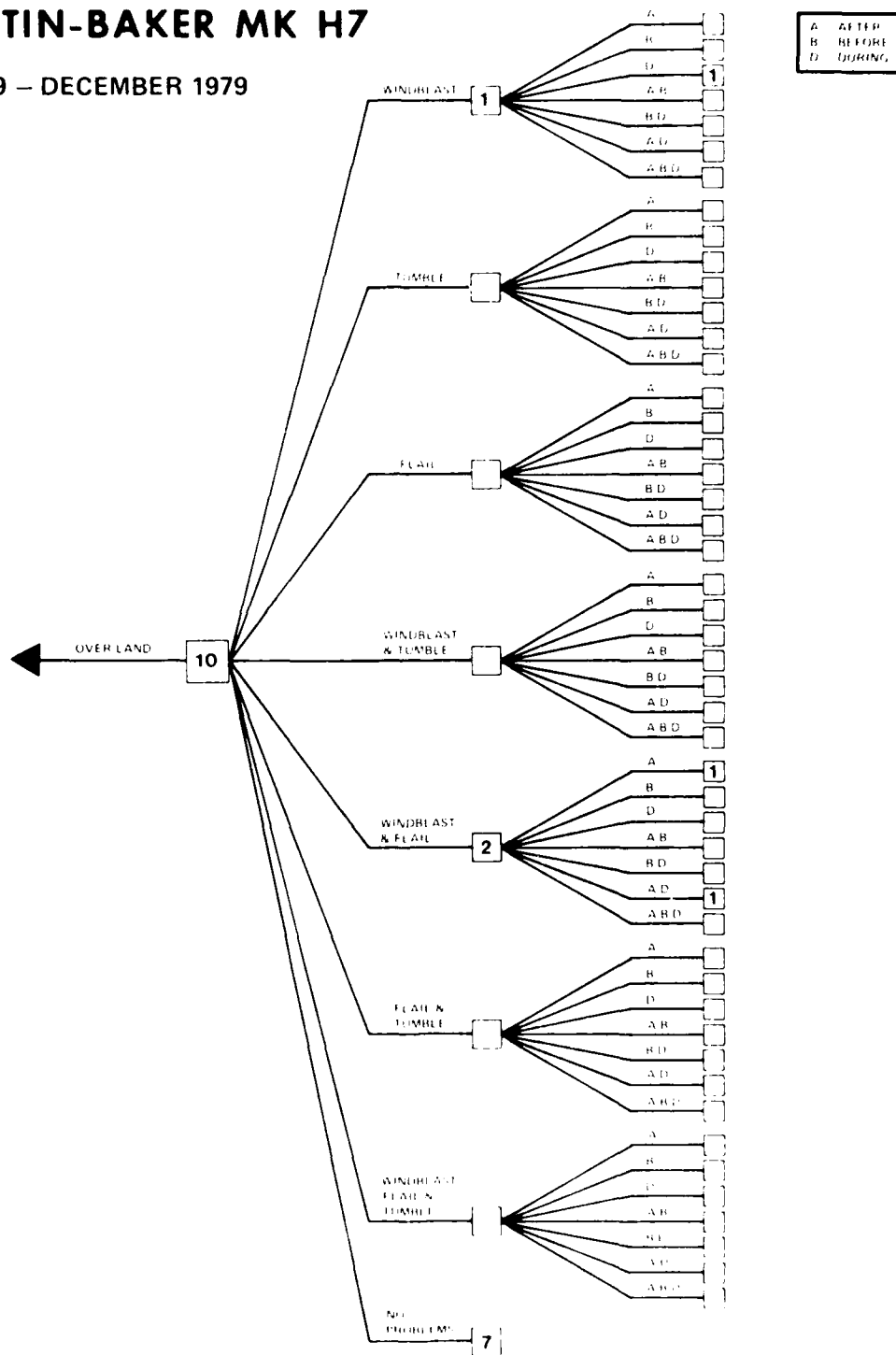
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-4/MARTIN-BAKER MK H7

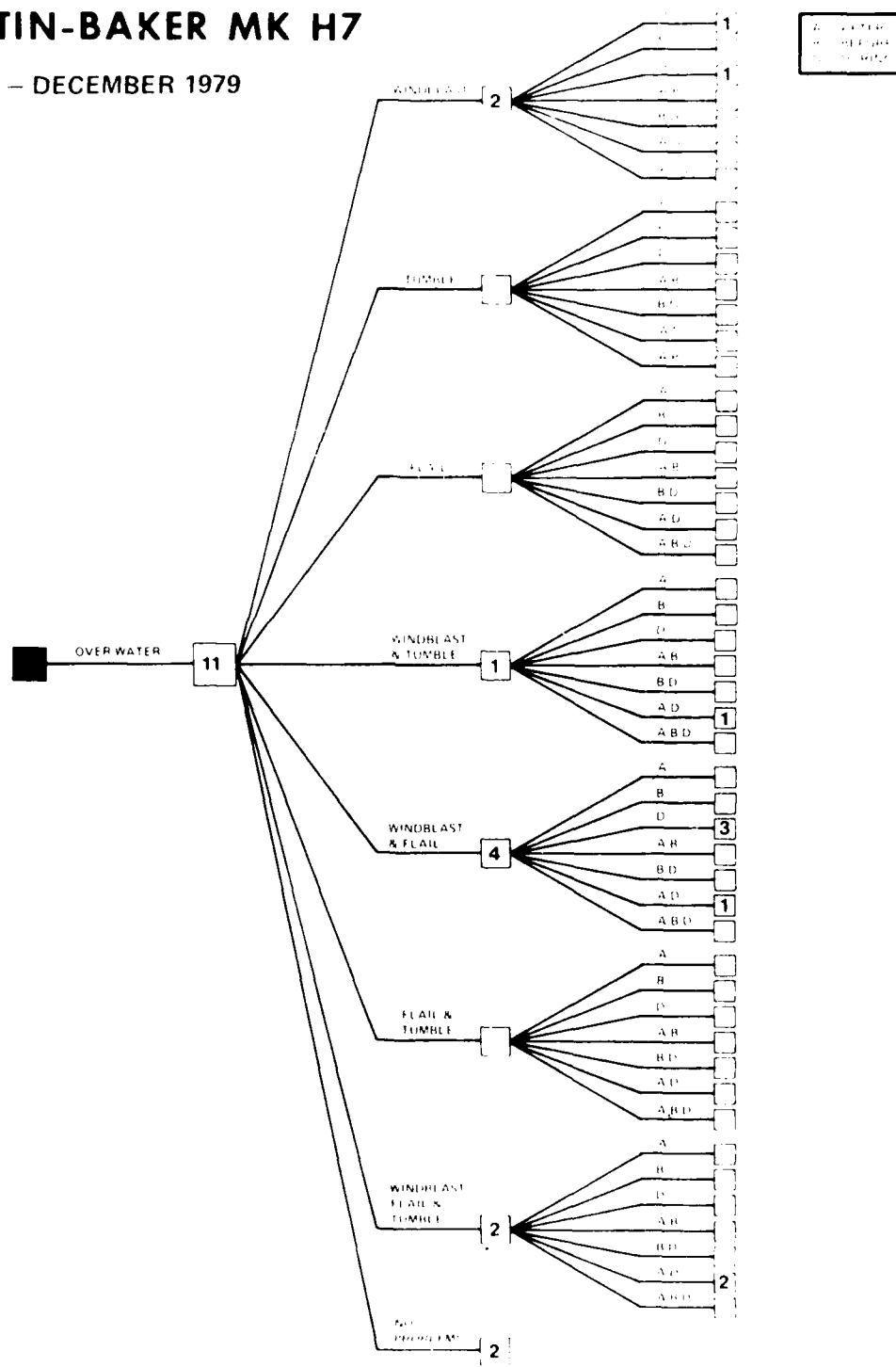
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-4/MARTIN-BAKER MK H7

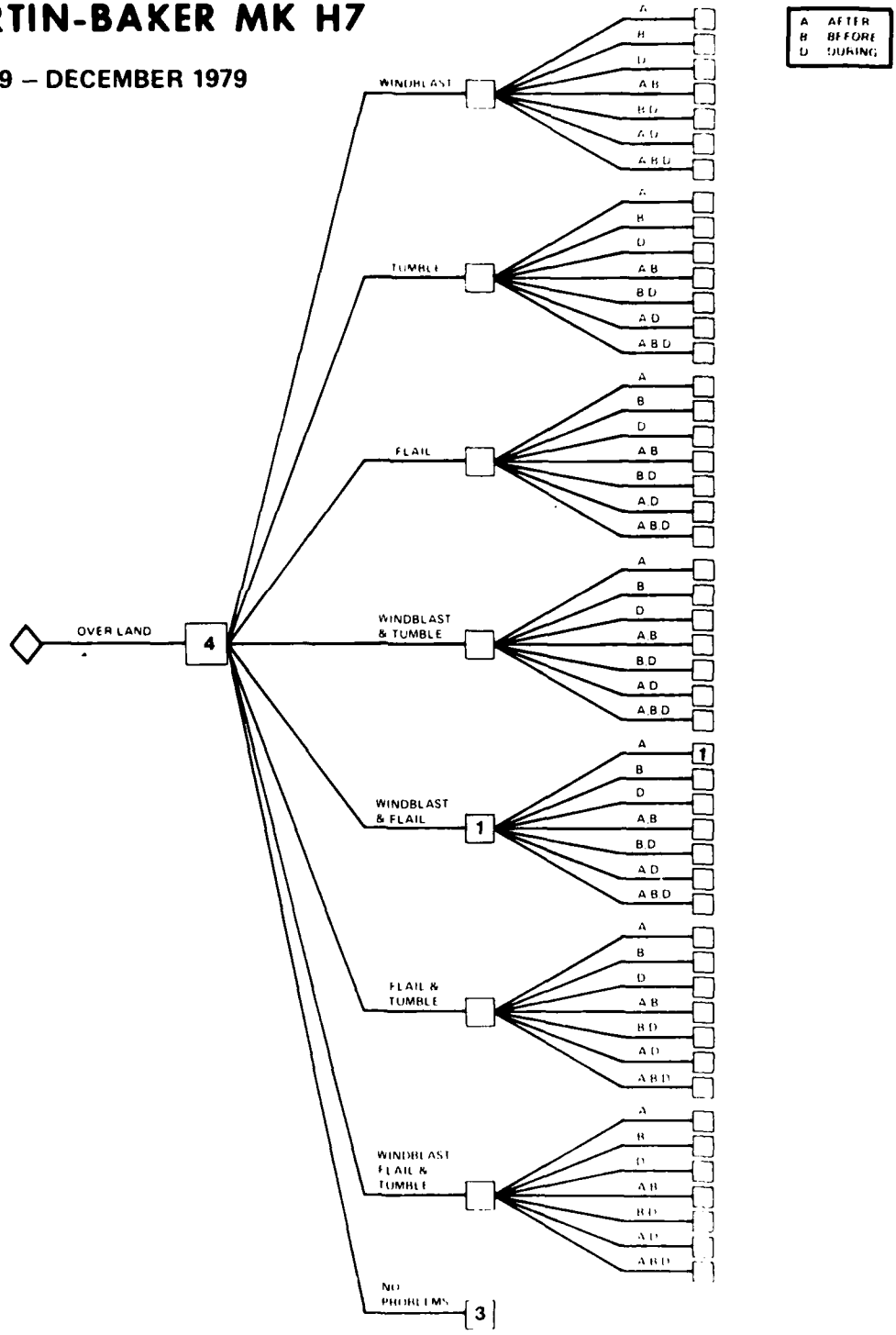
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-4/MARTIN-BAKER MK H7

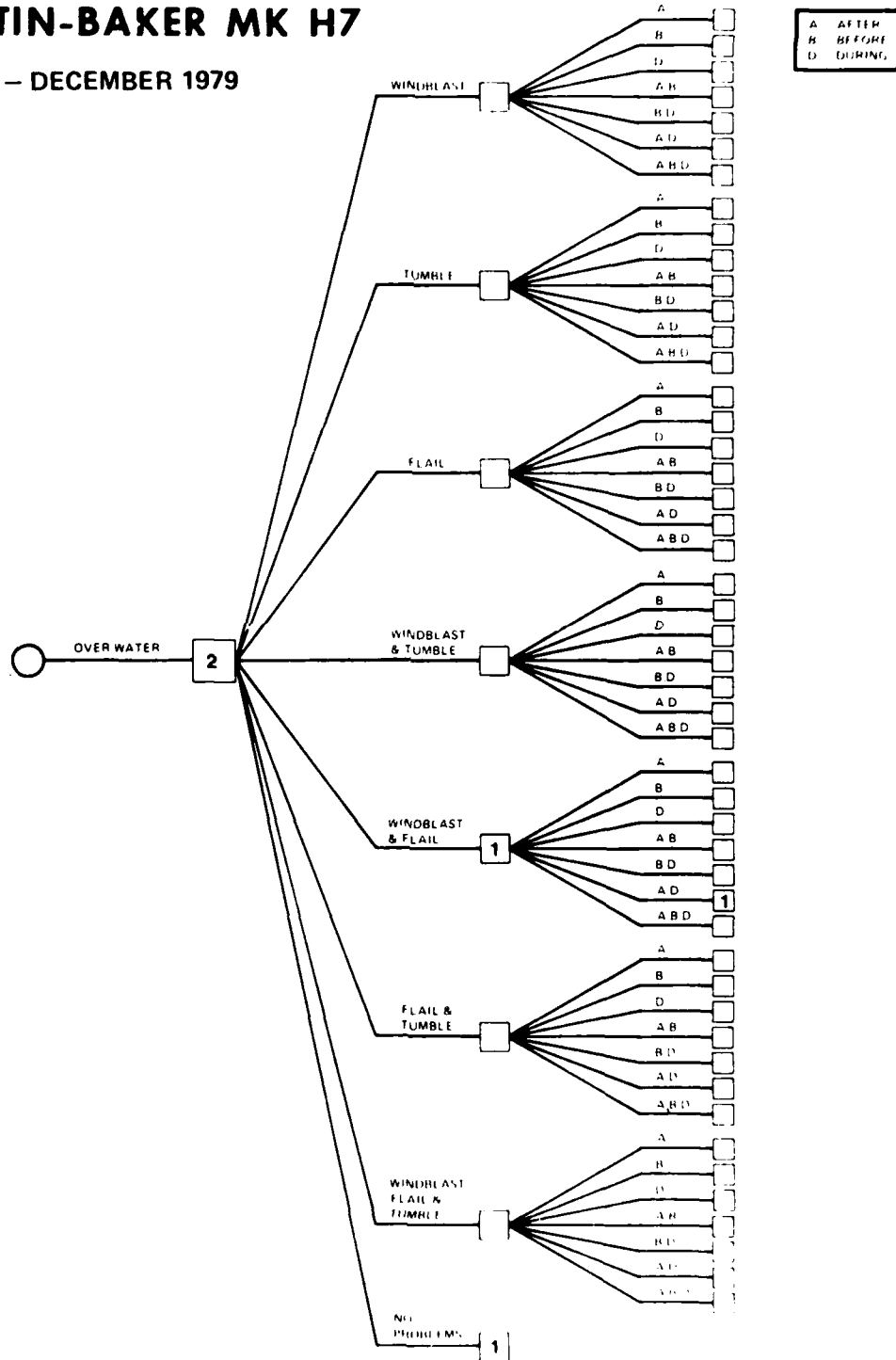
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-4/MARTIN-BAKER MK H7

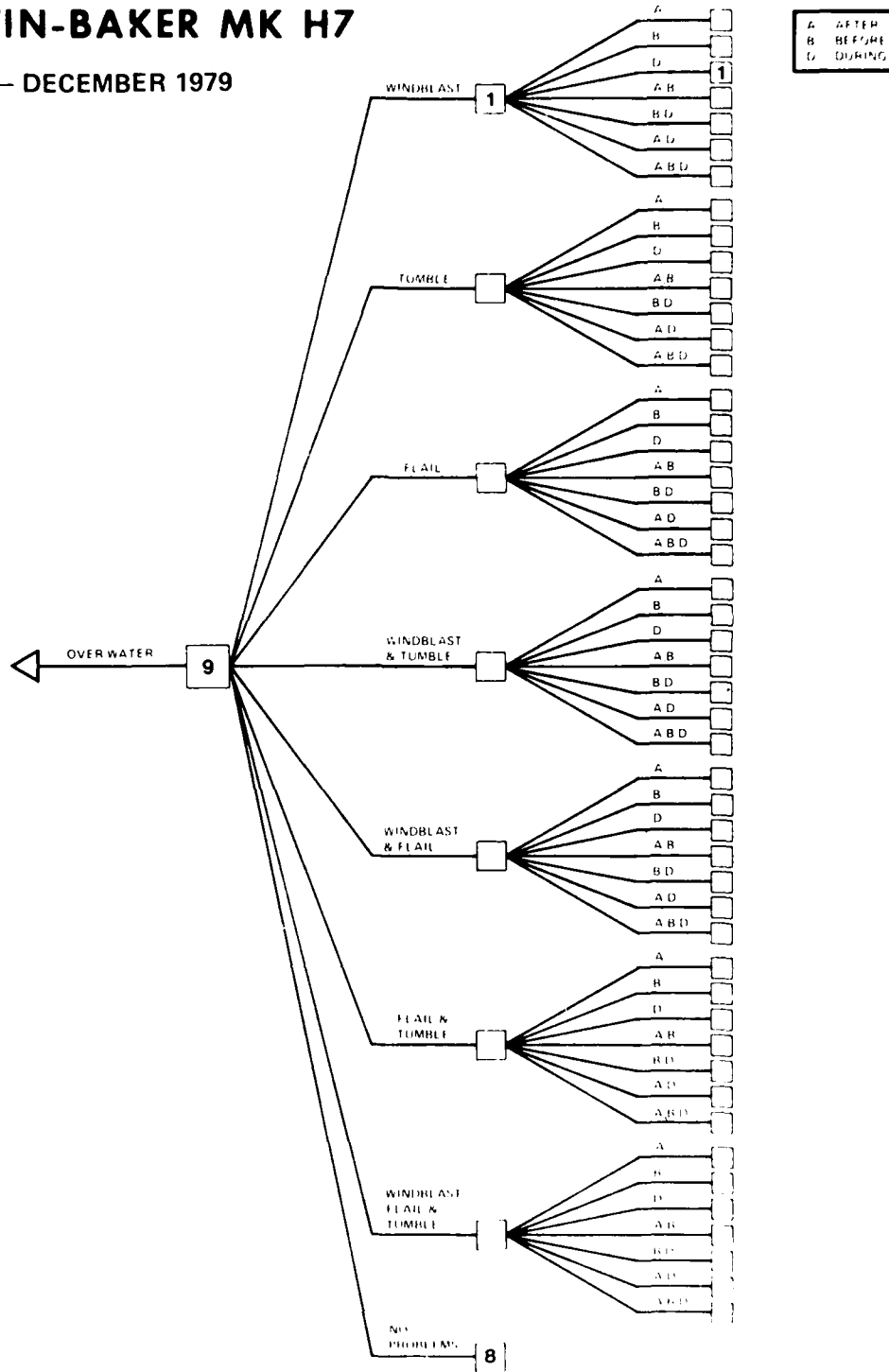
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-4/MARTIN-BAKER MK H7

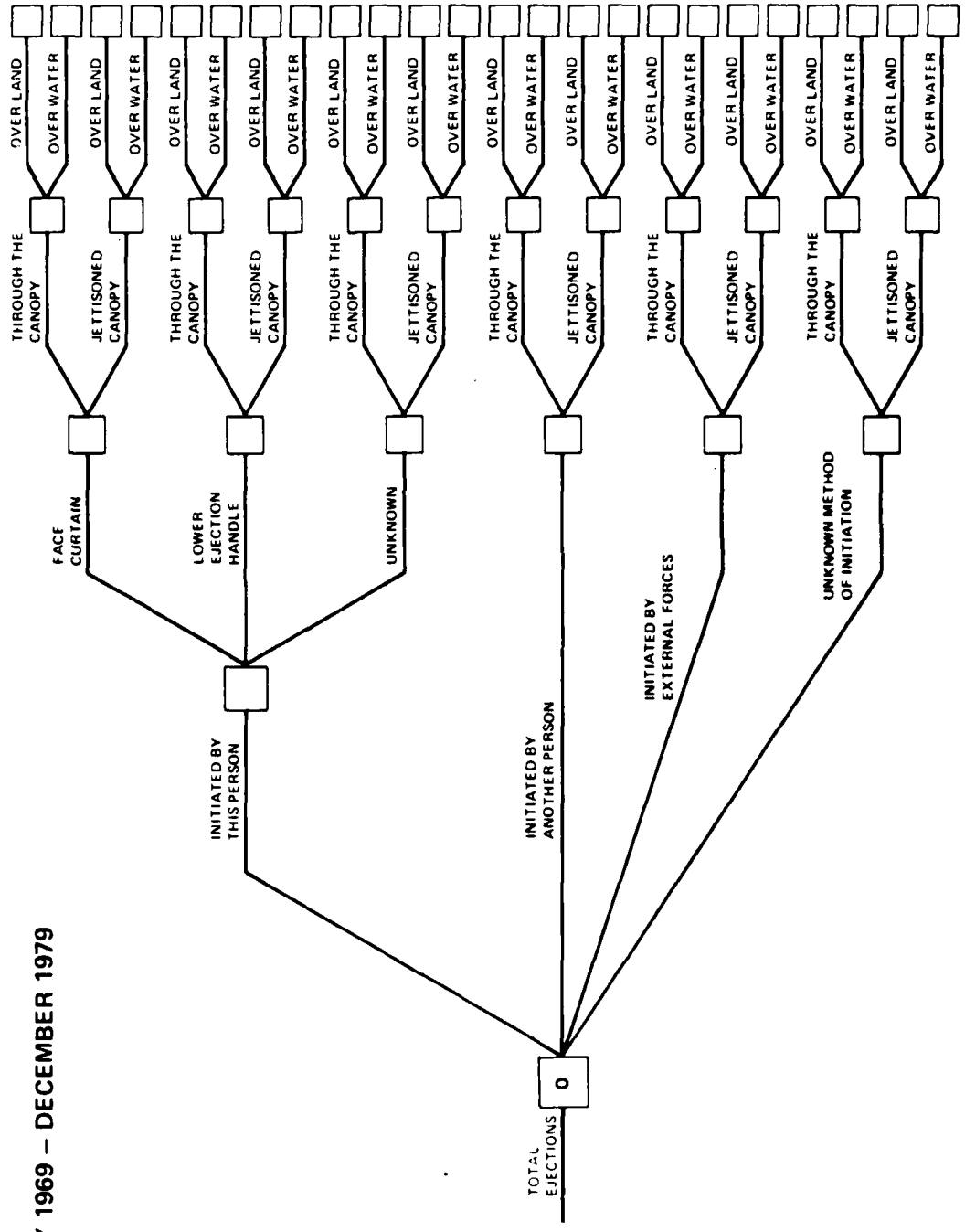
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

T-1/MARTIN-BAKER MKL5

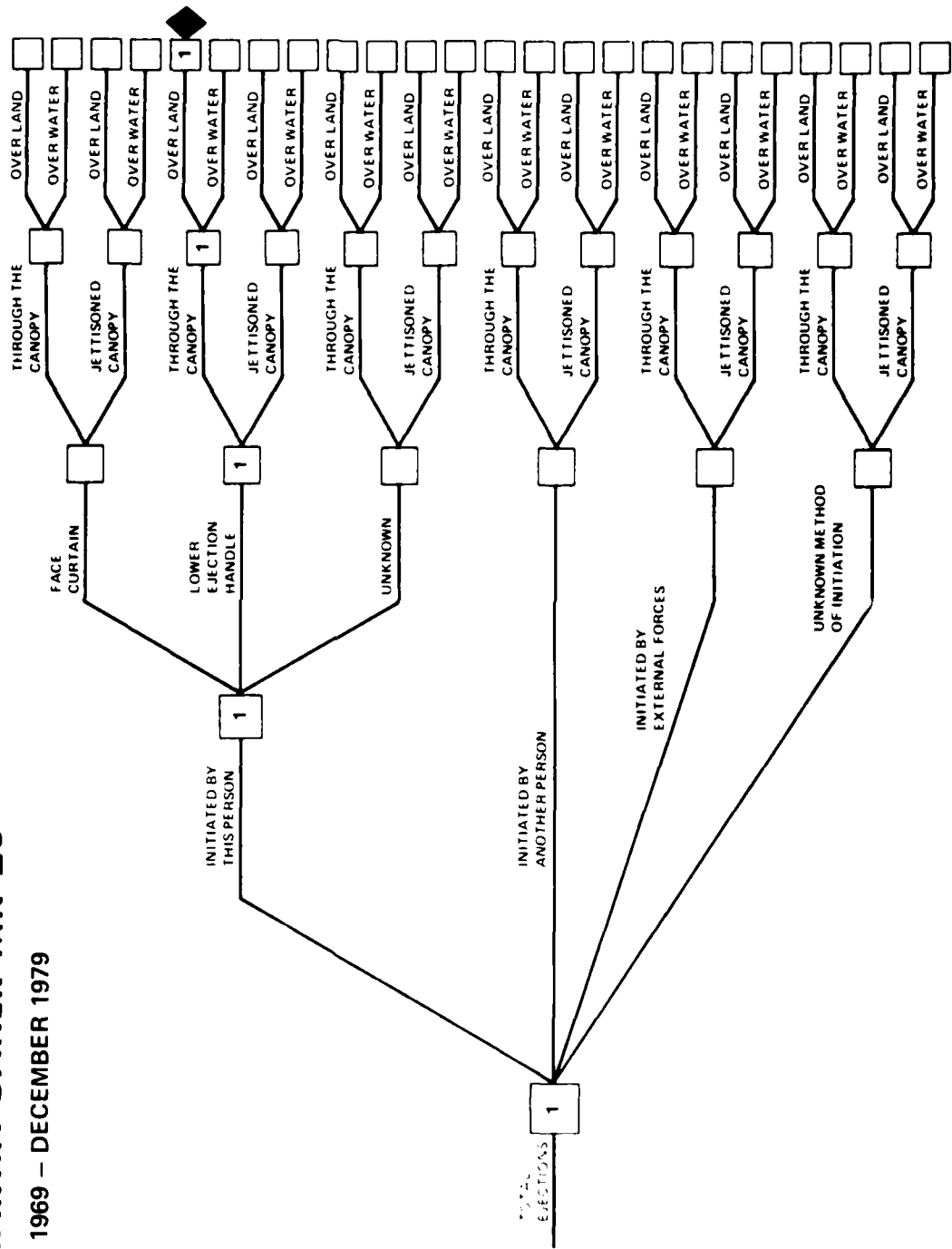
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-9/MARTIN-BAKER MK Z5

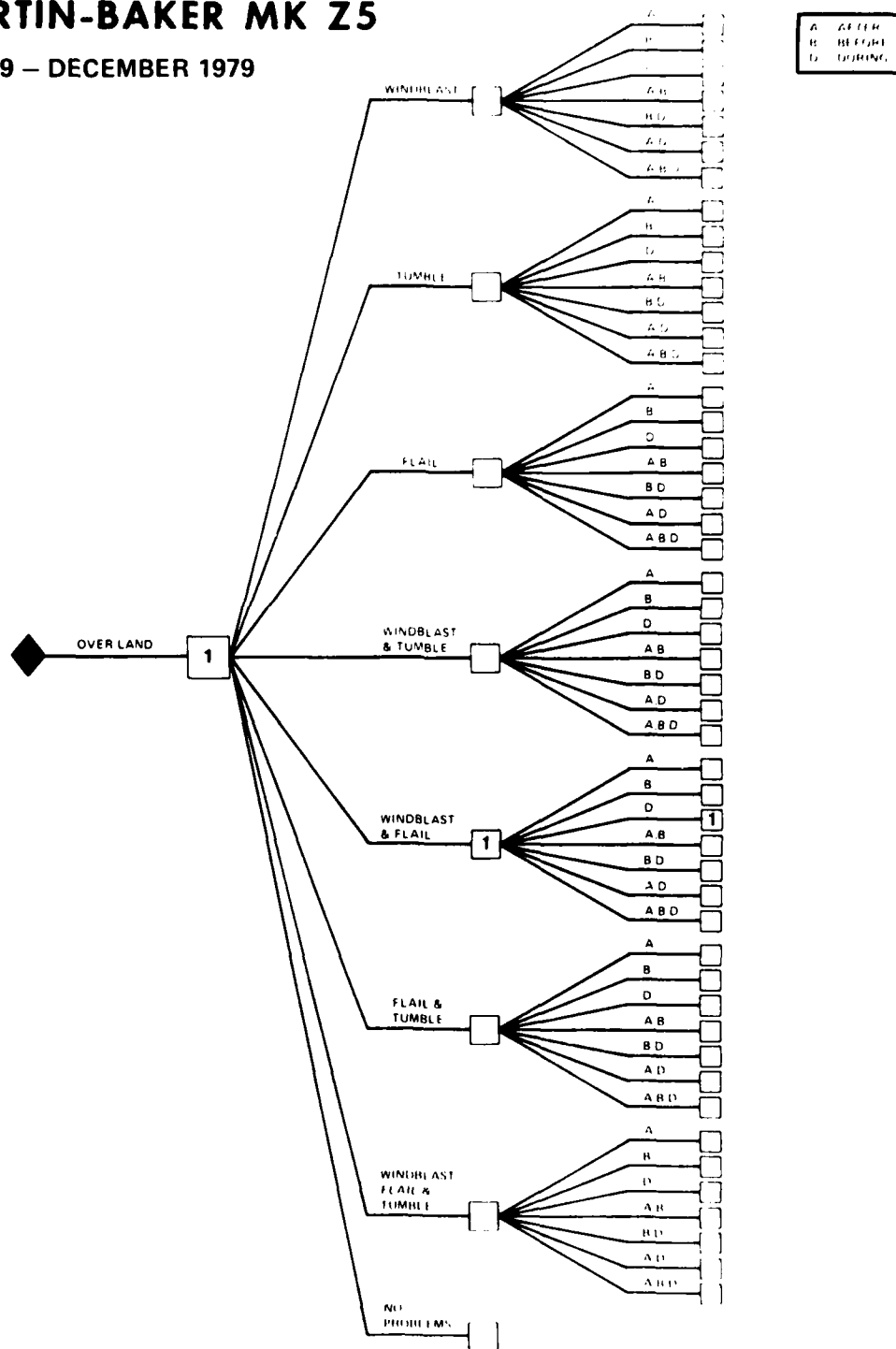
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

F-9/MARTIN-BAKER MK Z5

JANUARY 1969 – DECEMBER 1979

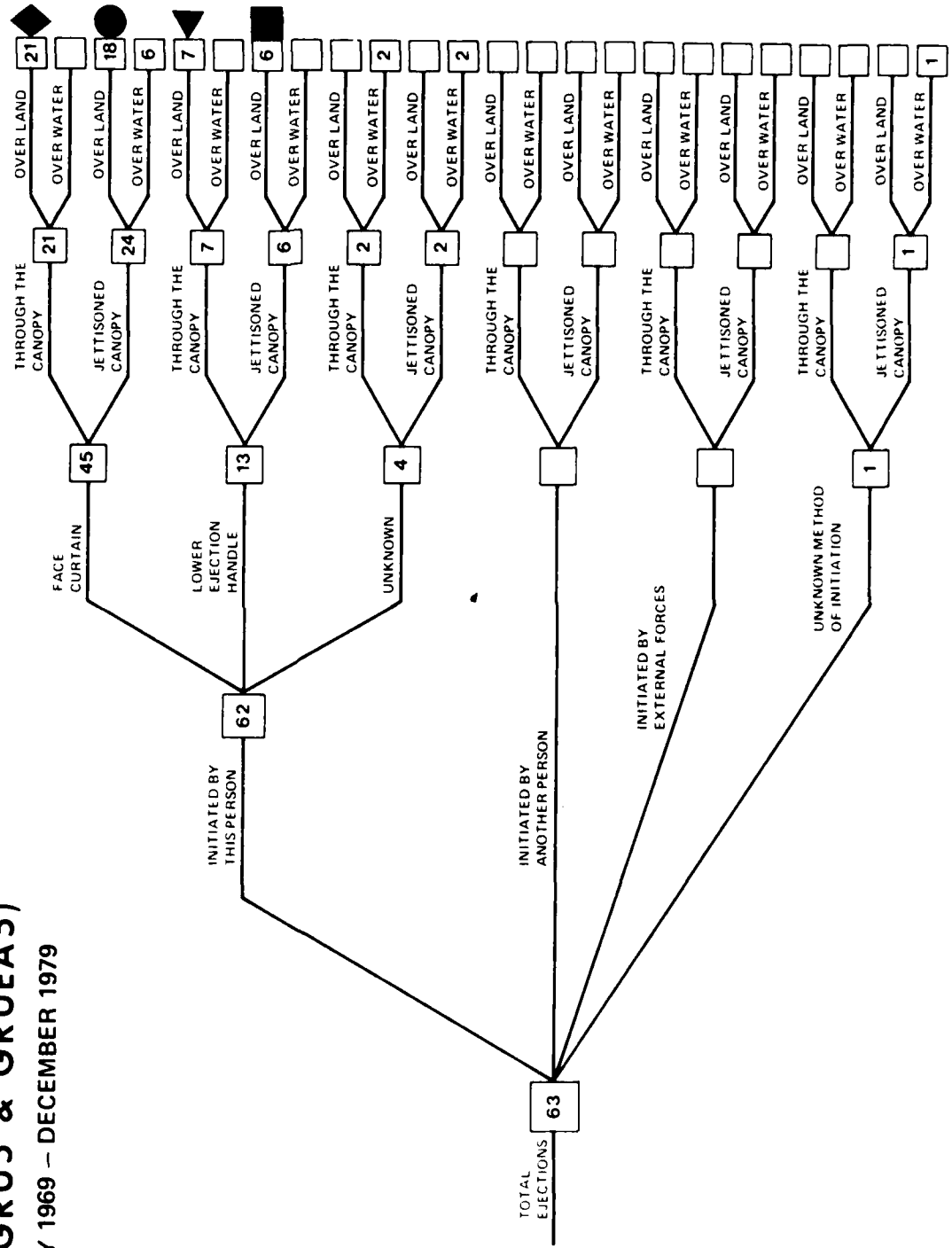


DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED

350 TO 600+ KTS

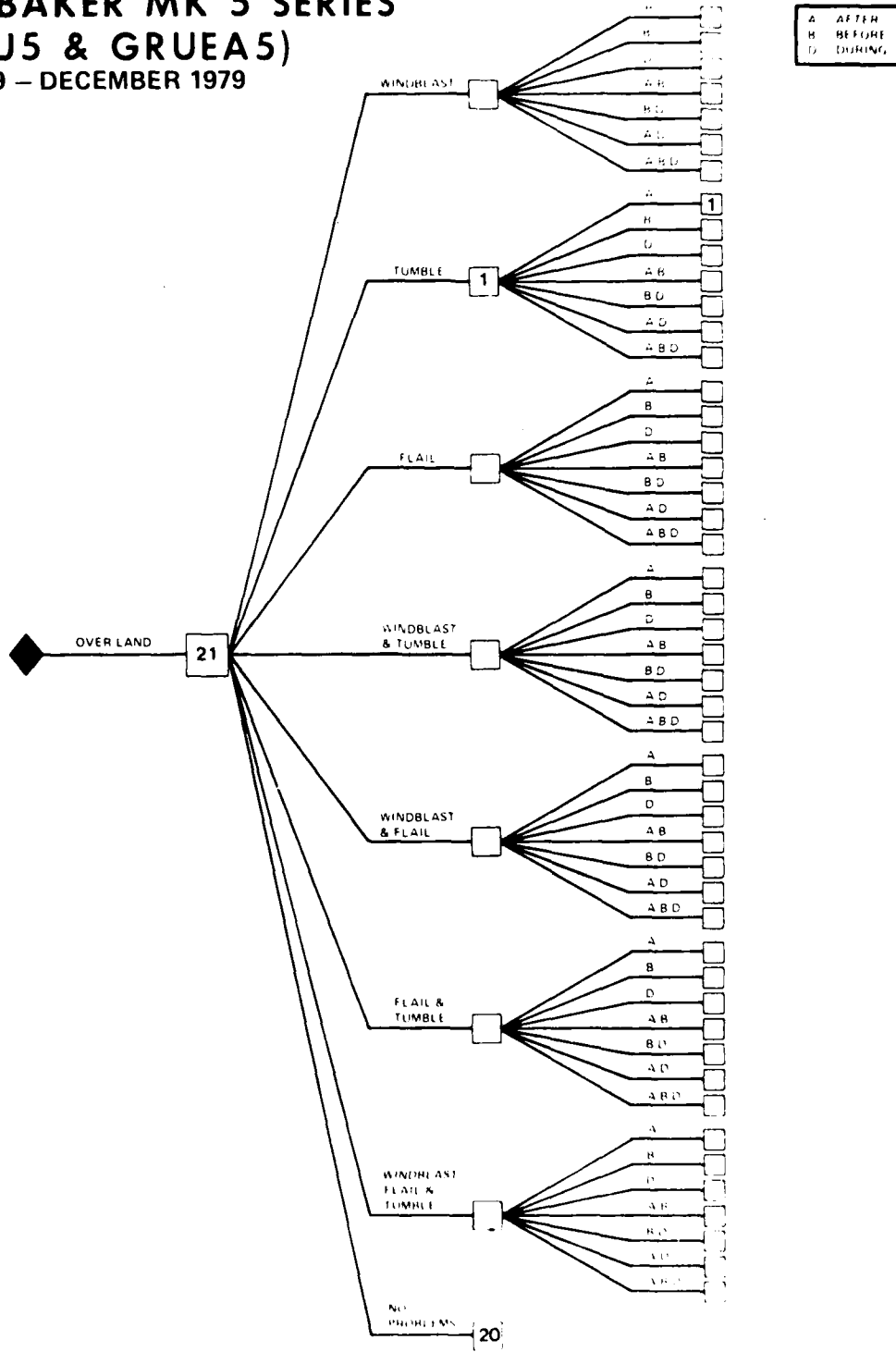
MARTIN-BAKER MK 5 SERIES
(LESS GRU5 & GRUEA5)

JANUARY 1969 - DECEMBER 1979



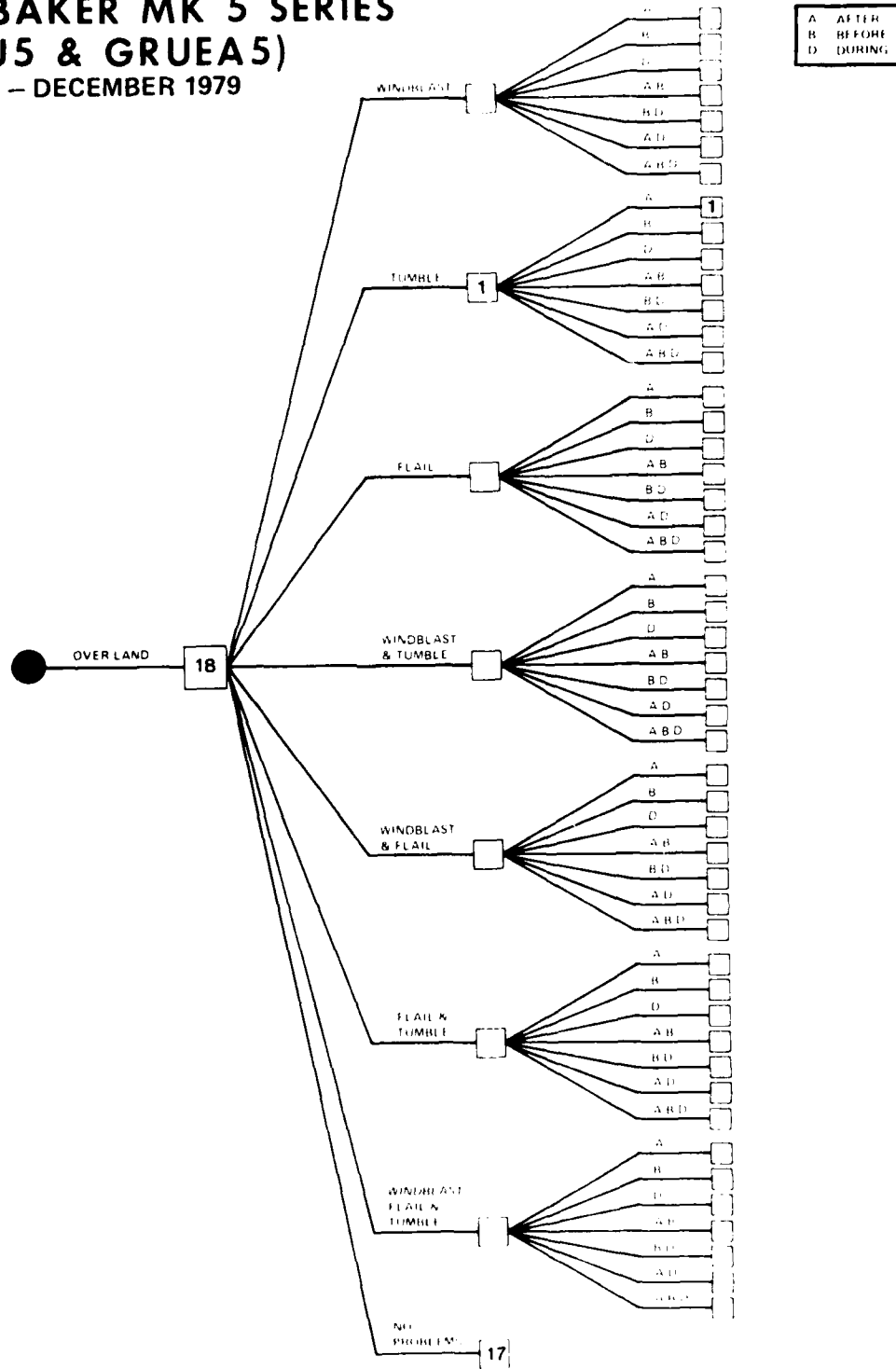
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

**MARTIN-BAKER MK 5 SERIES
(LESS GRU5 & GRUEA5)
JANUARY 1969 - DECEMBER 1979**



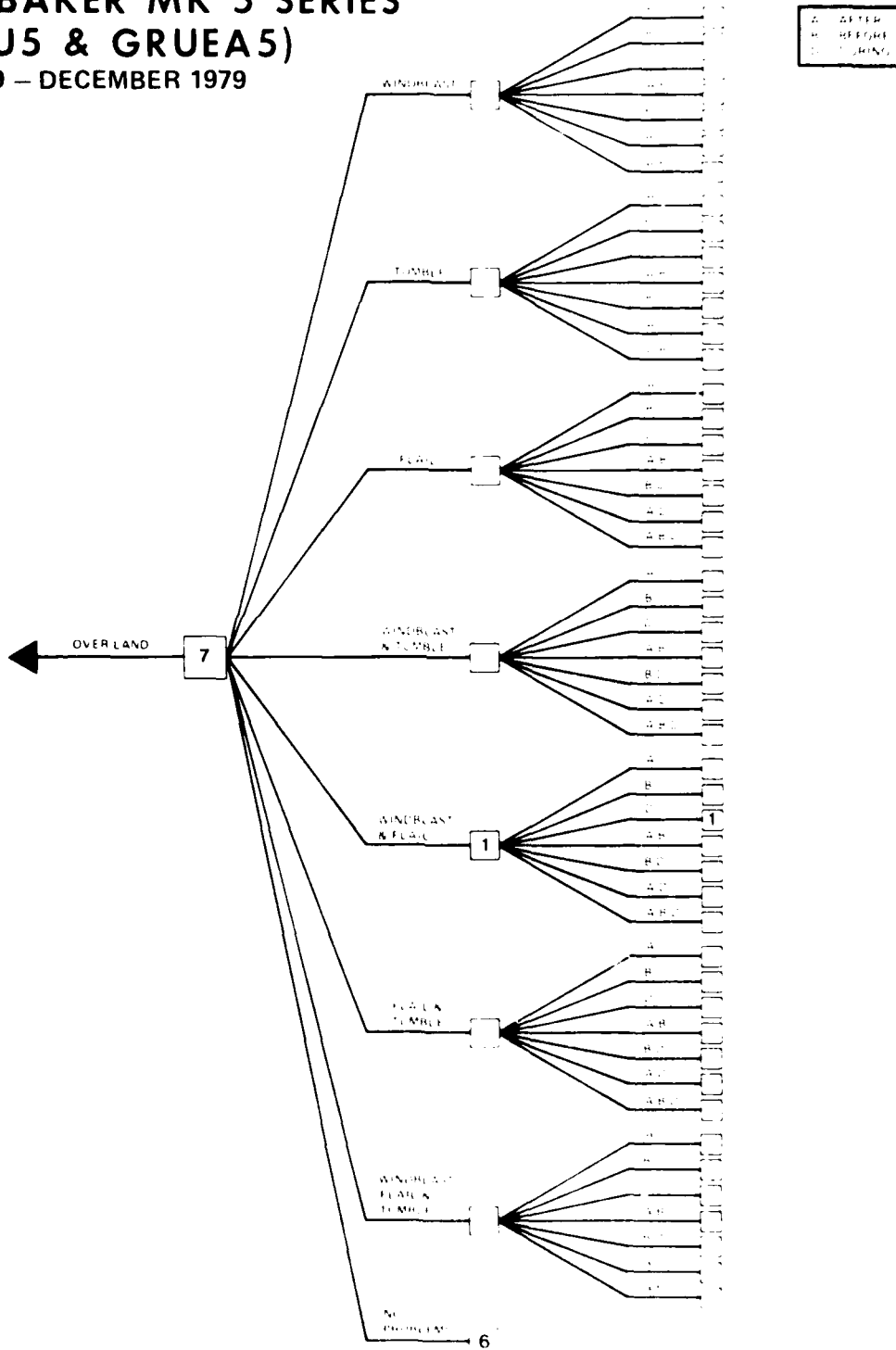
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

**MARTIN-BAKER MK 5 SERIES
(LESS GRU5 & GRUEA5)
JANUARY 1969 - DECEMBER 1979**



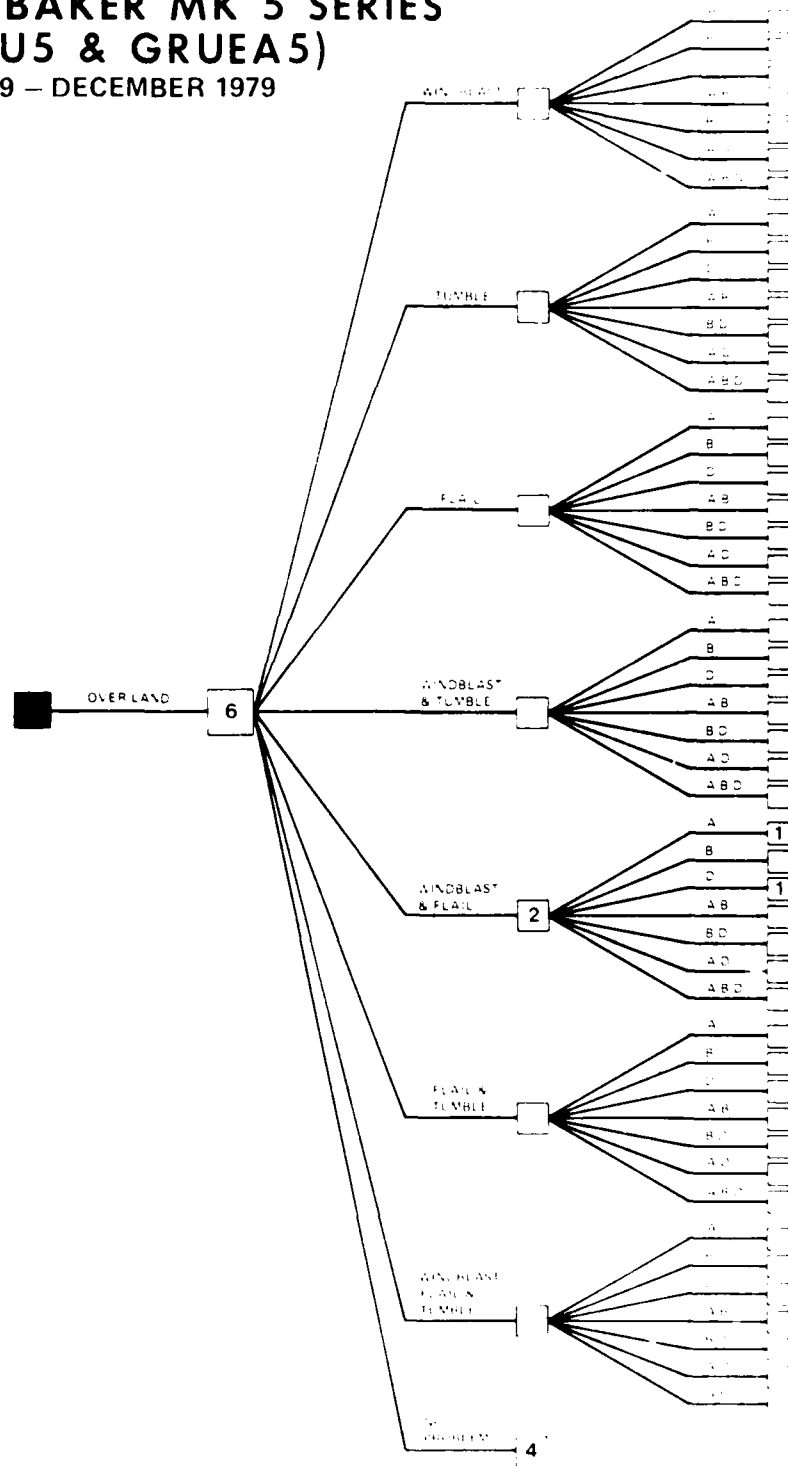
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES
(LESS GRU5 & GRUEA5)
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

**MARTIN-BAKER MK 5 SERIES
(LESS GRU5 & GRUEA5)
JANUARY 1969 - DECEMBER 1979**

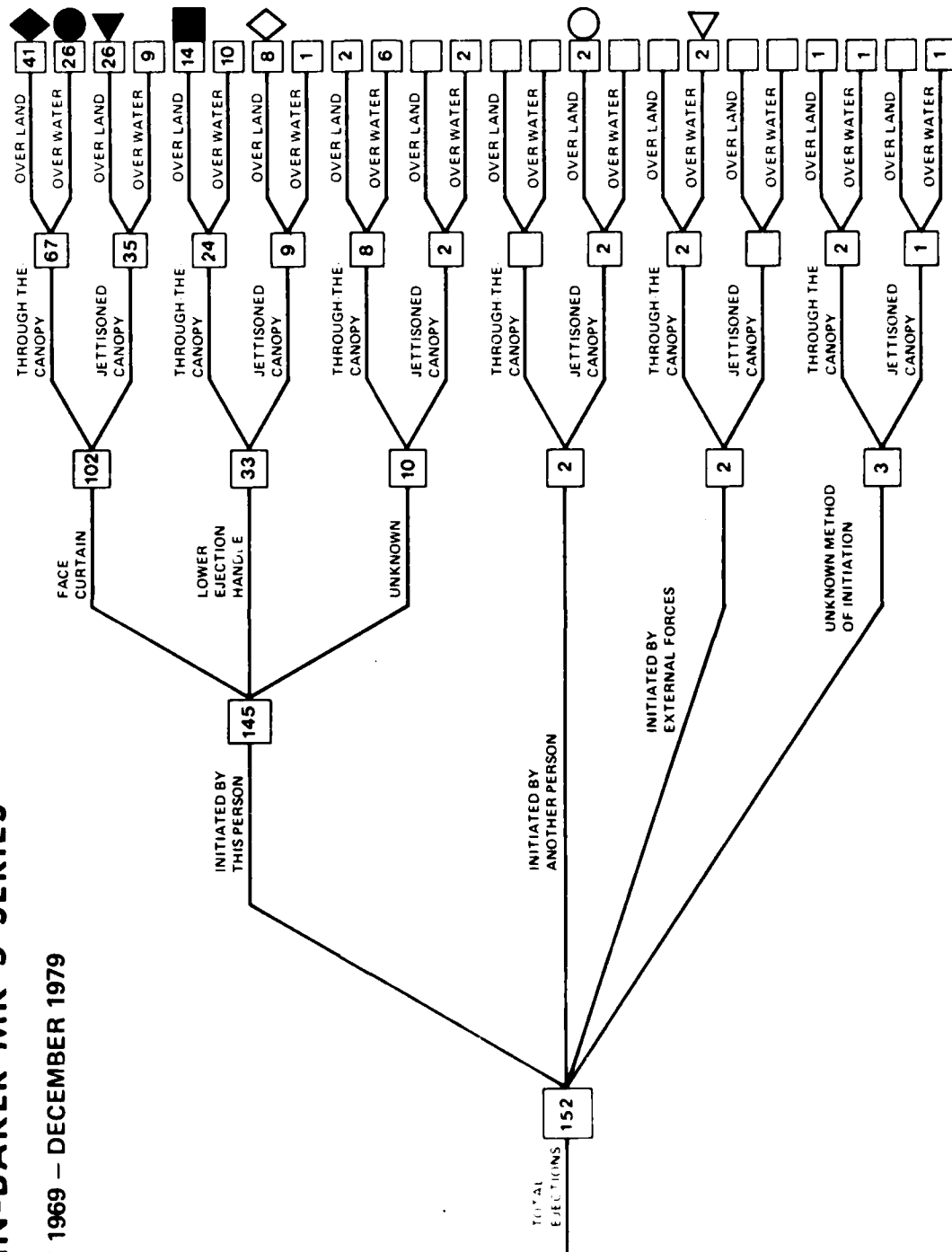


A - AFTER
B - BEFORE
C - DURING
D - UNKNOWN

DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES

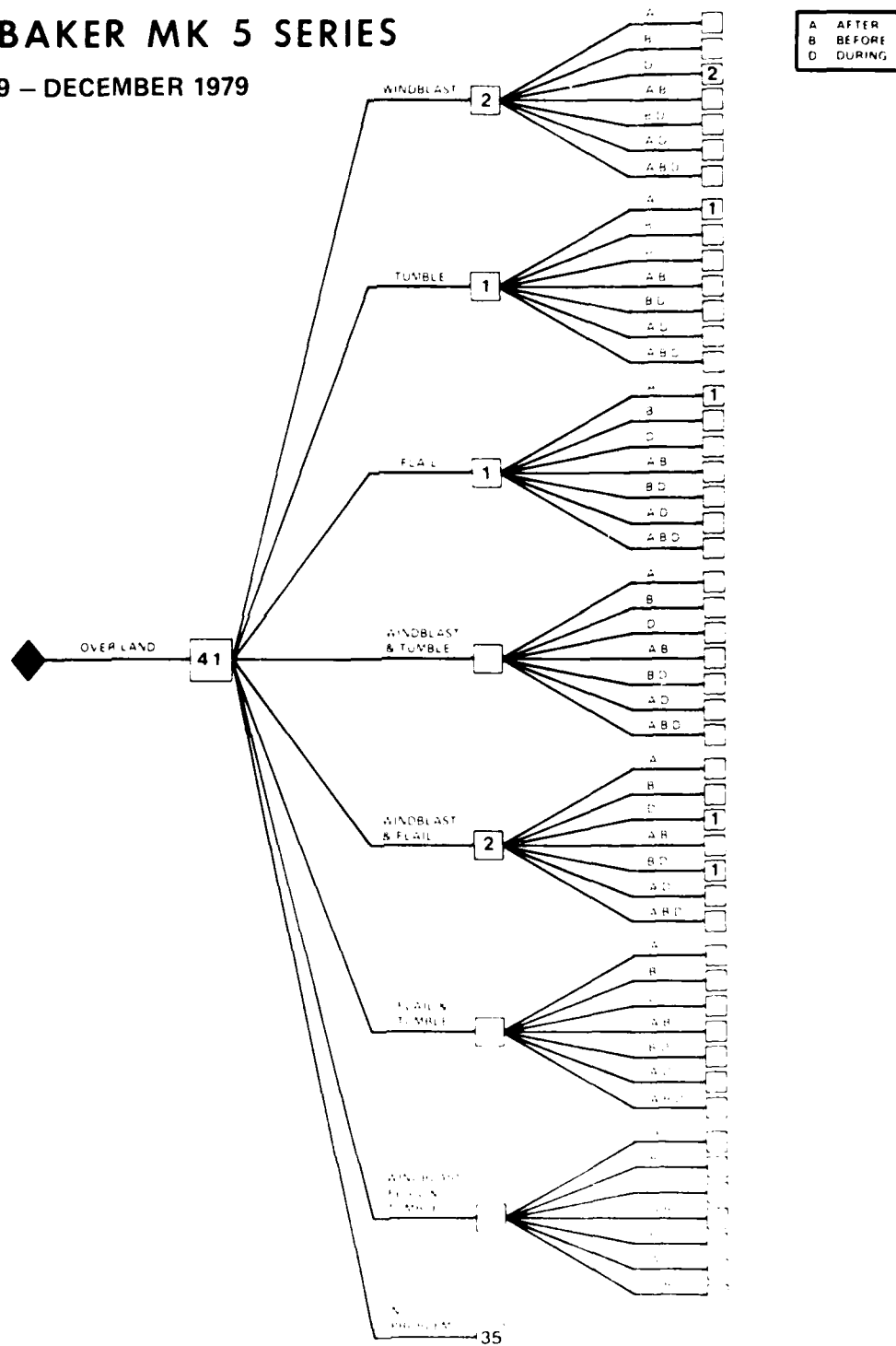
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES

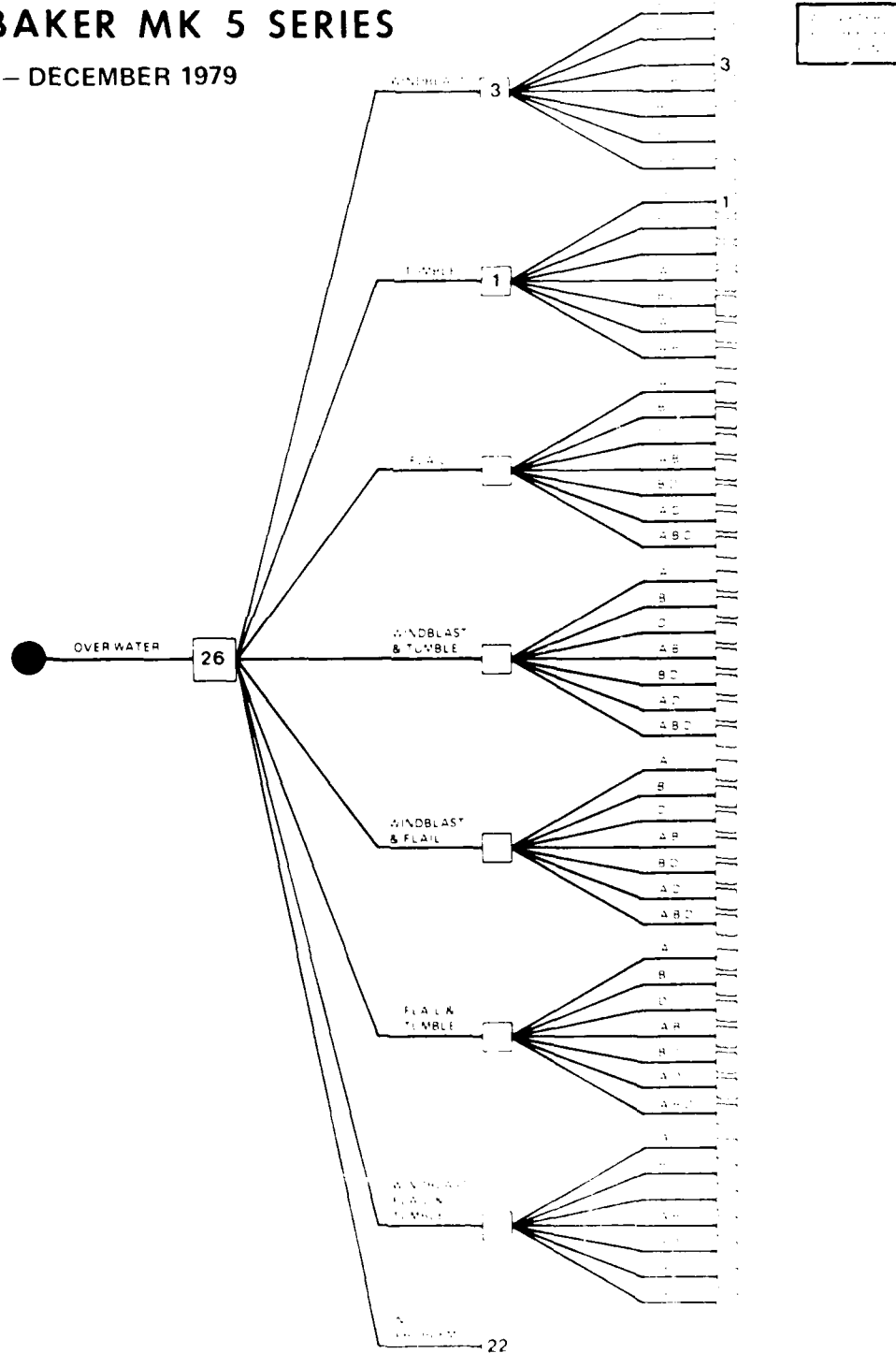
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES

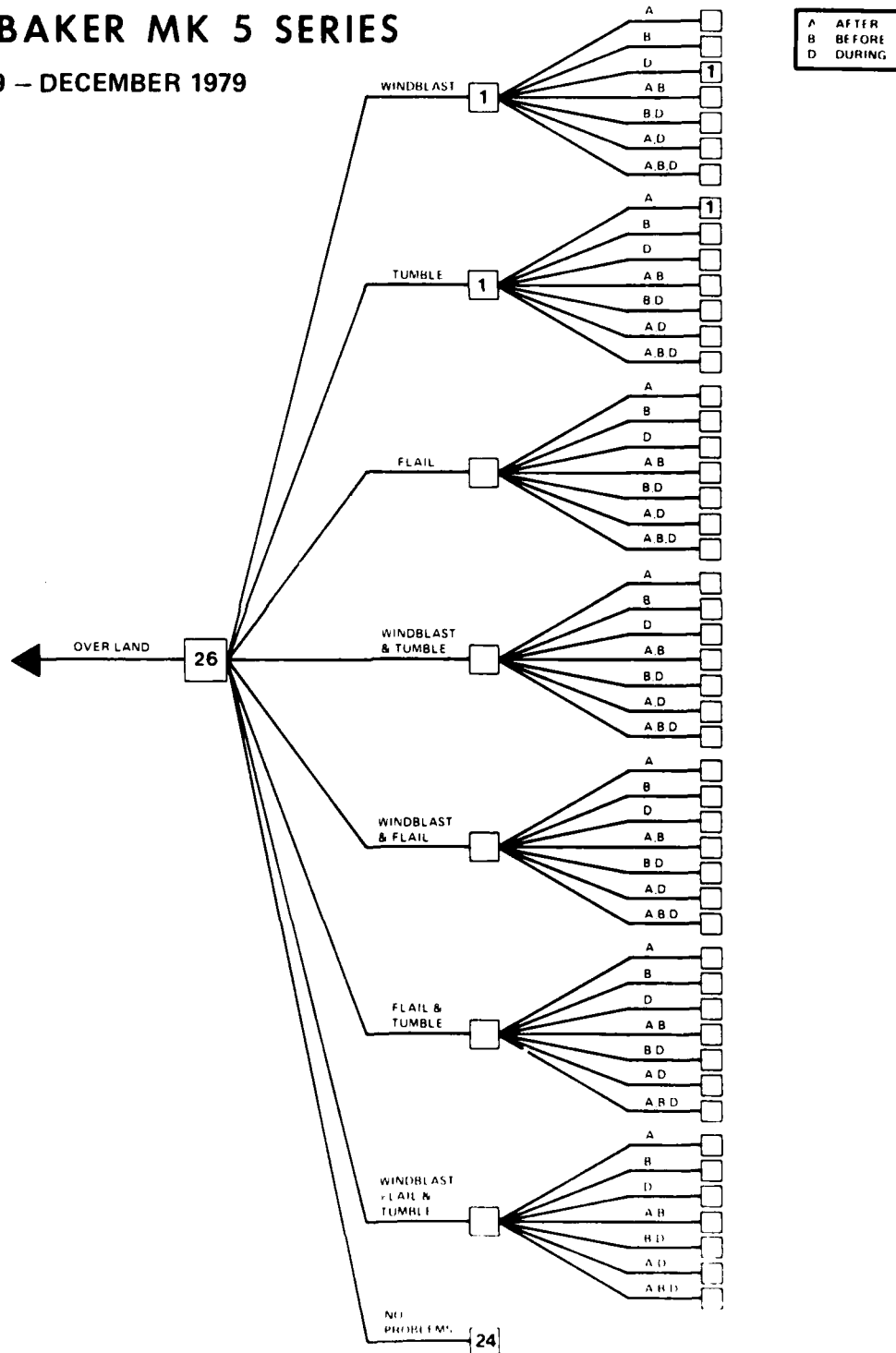
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES

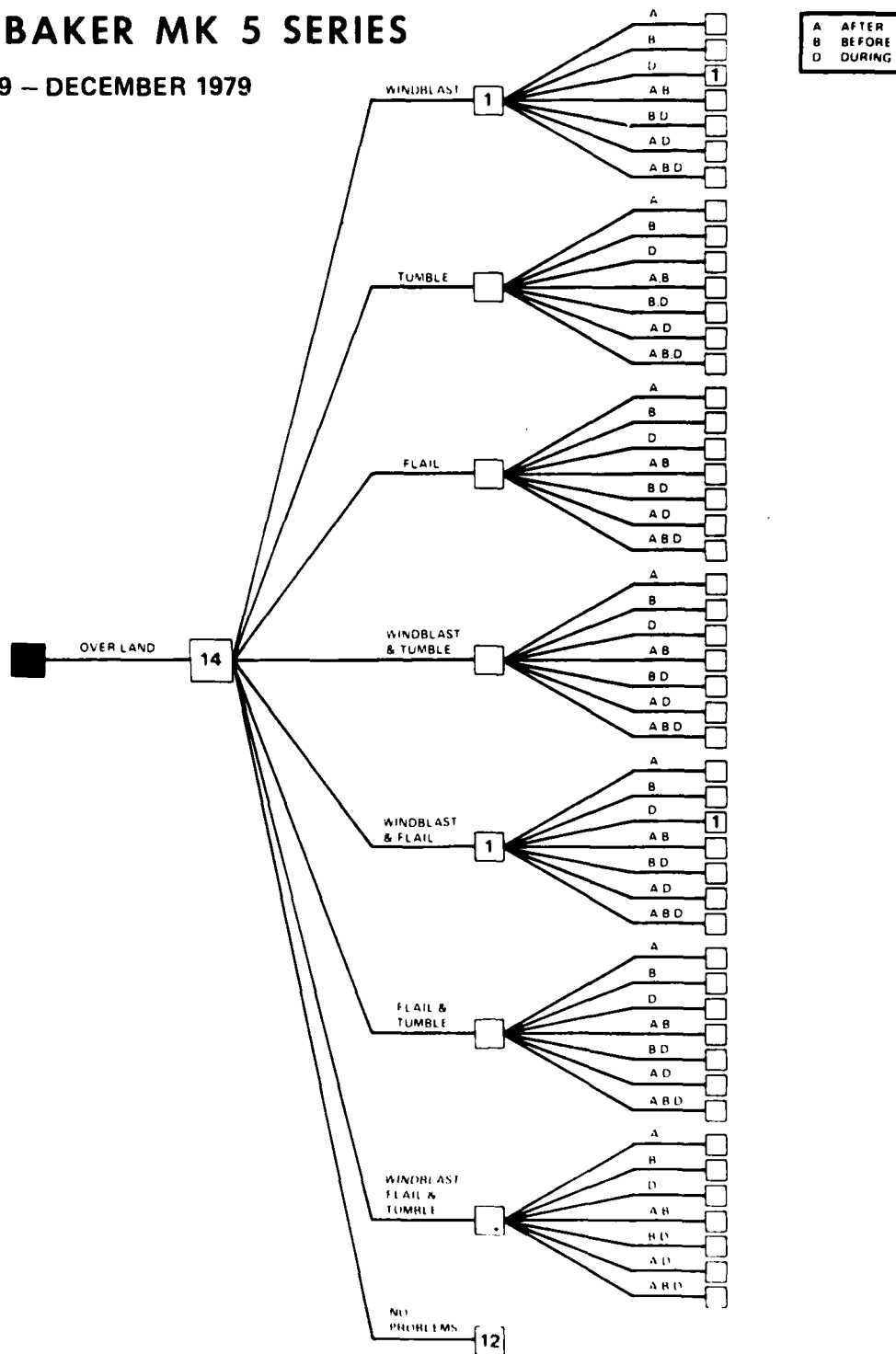
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES

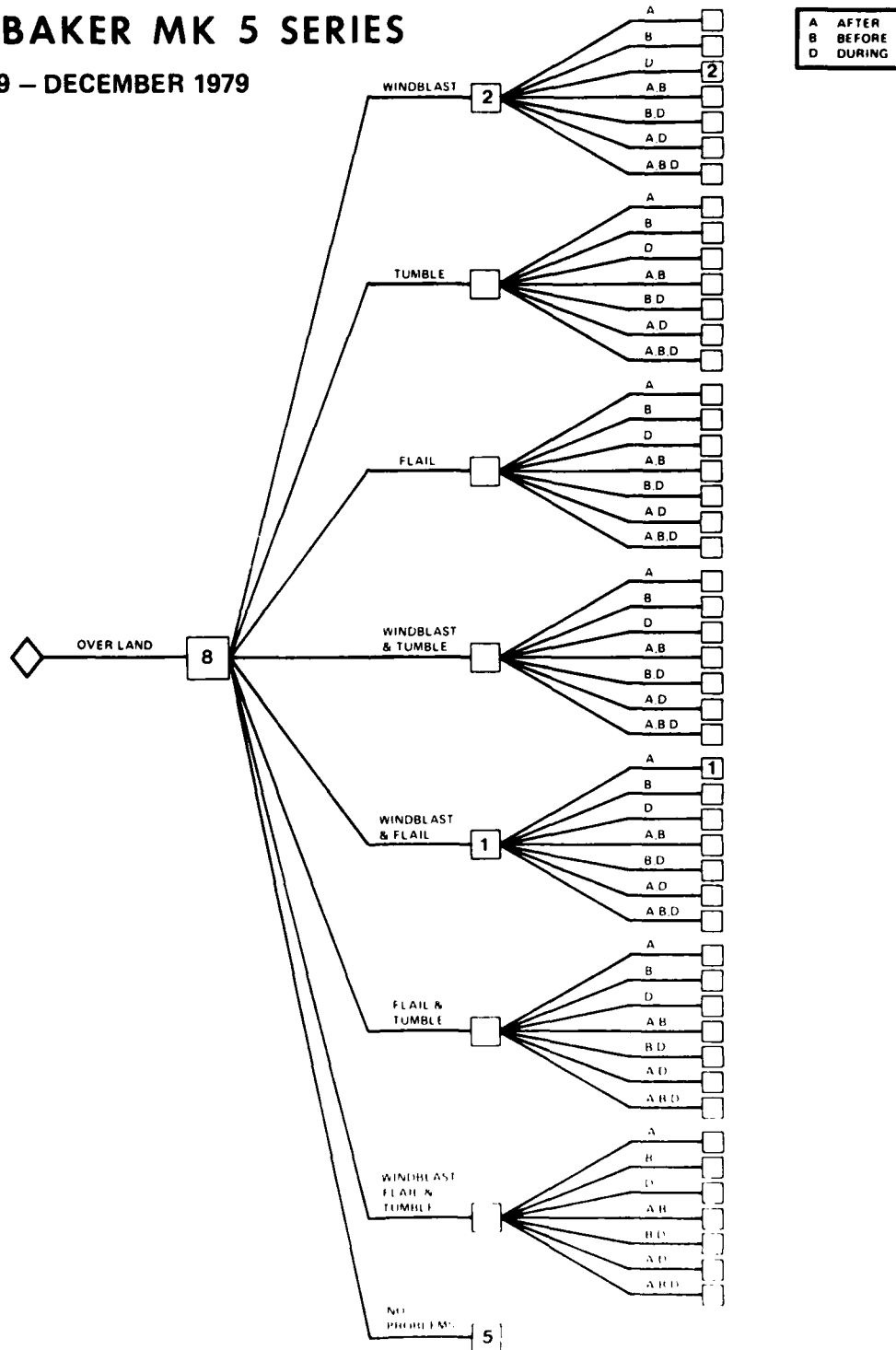
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES

JANUARY 1969 – DECEMBER 1979

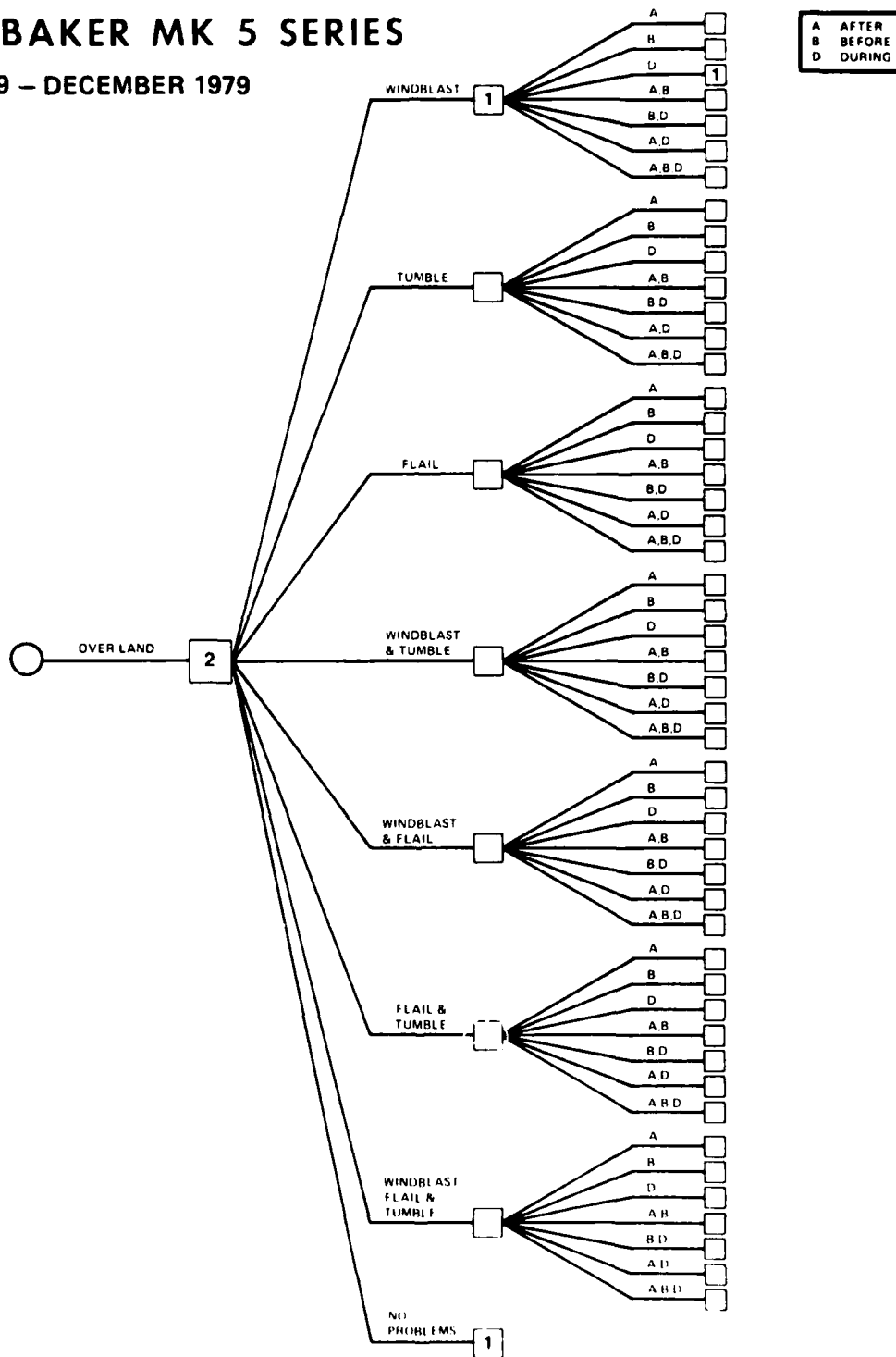


A AFTER
B BEFORE
D DURING

DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES

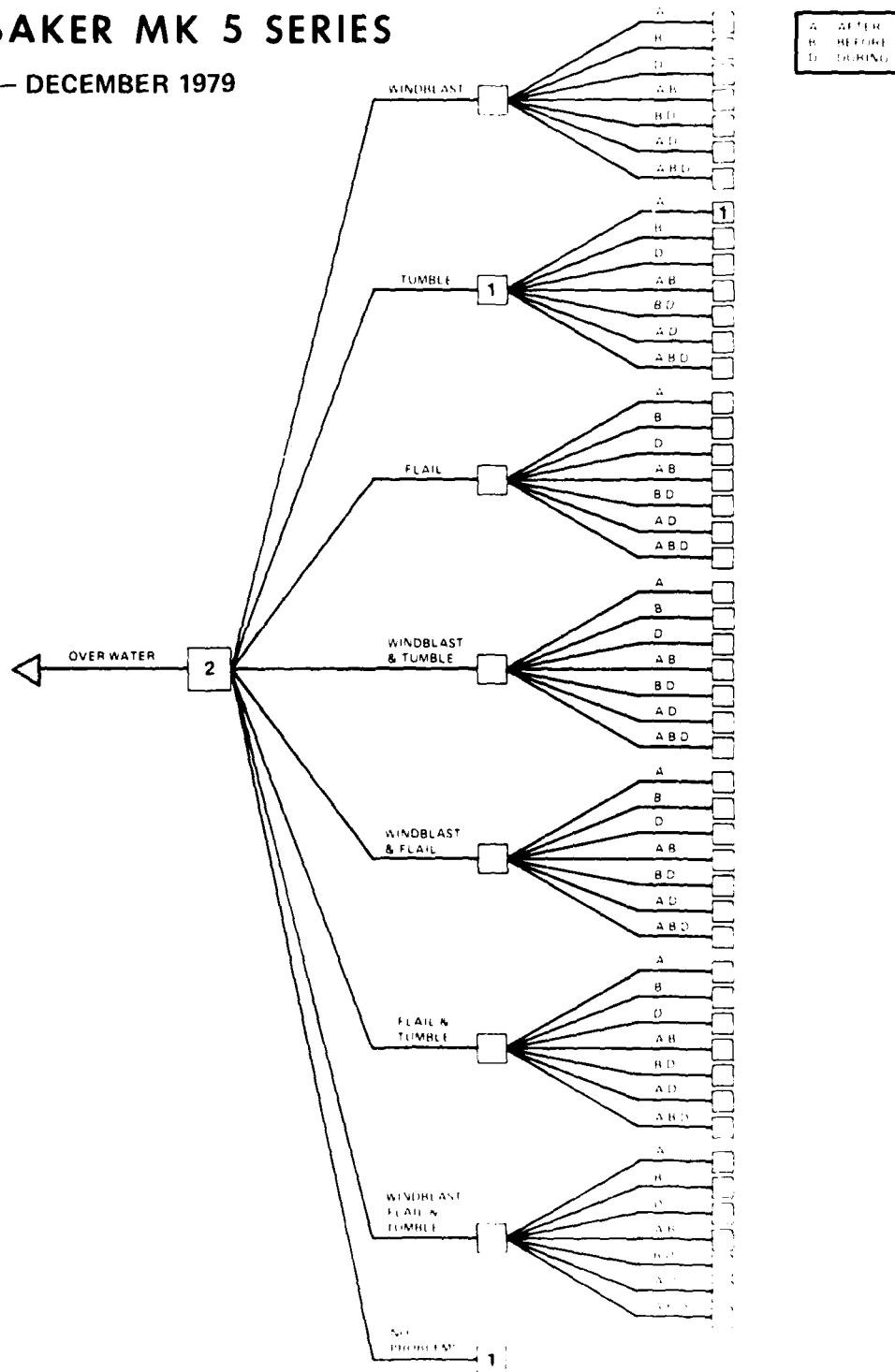
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 5 SERIES

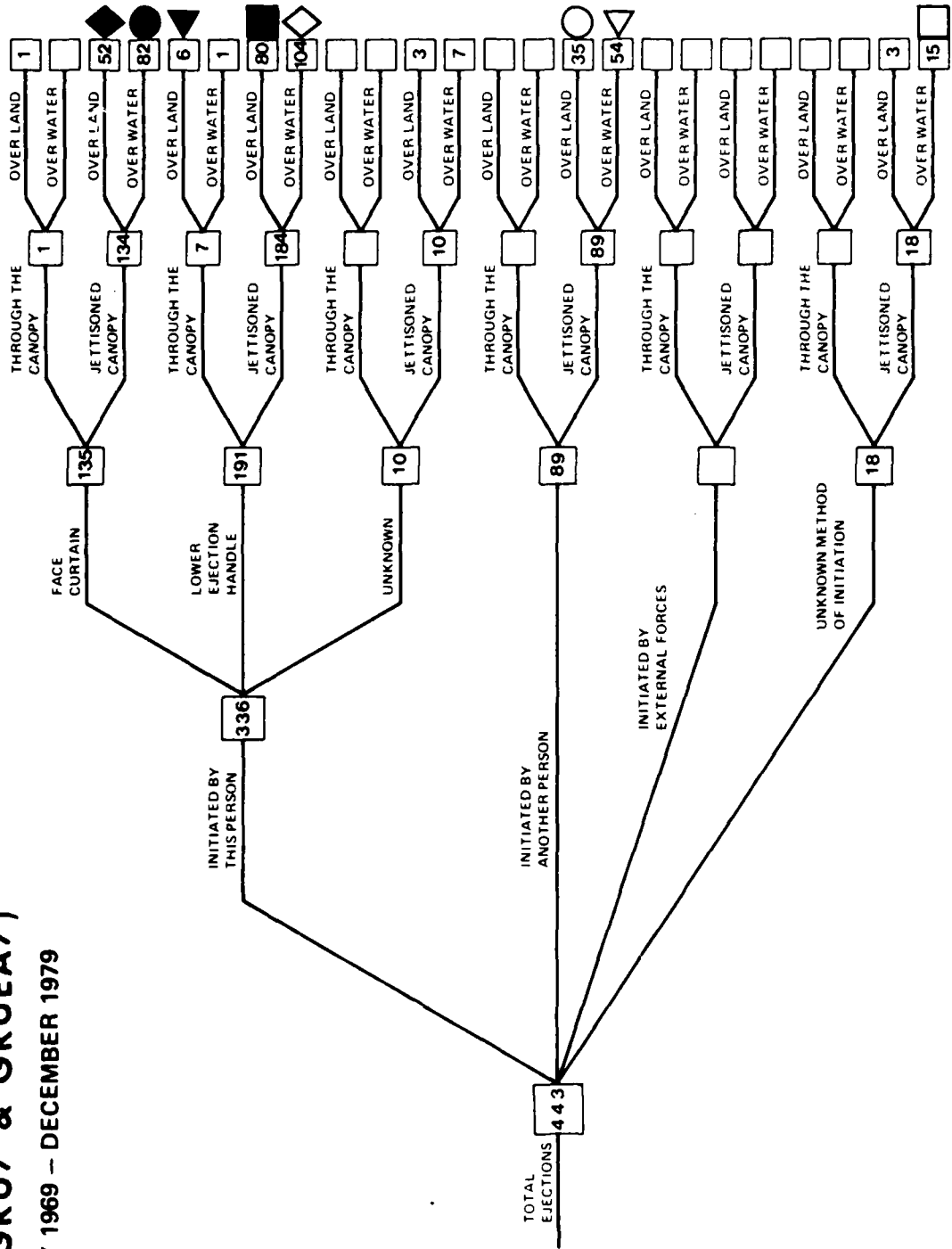
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

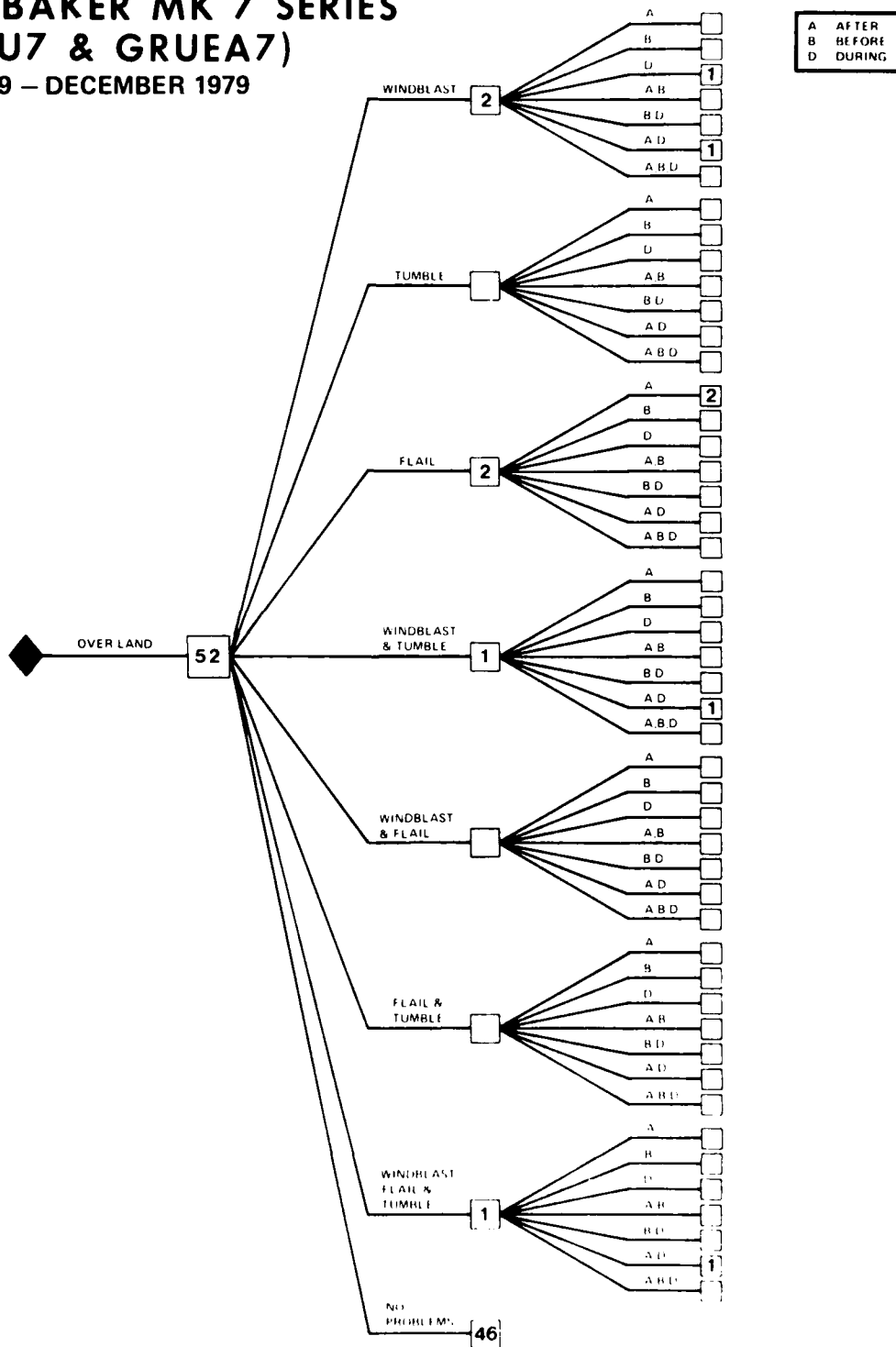
**MARTIN-BAKER MK 7 SERIES
(LESS GRU7 & GRUEA7)**

JANUARY 1969 - DECEMBER 1979



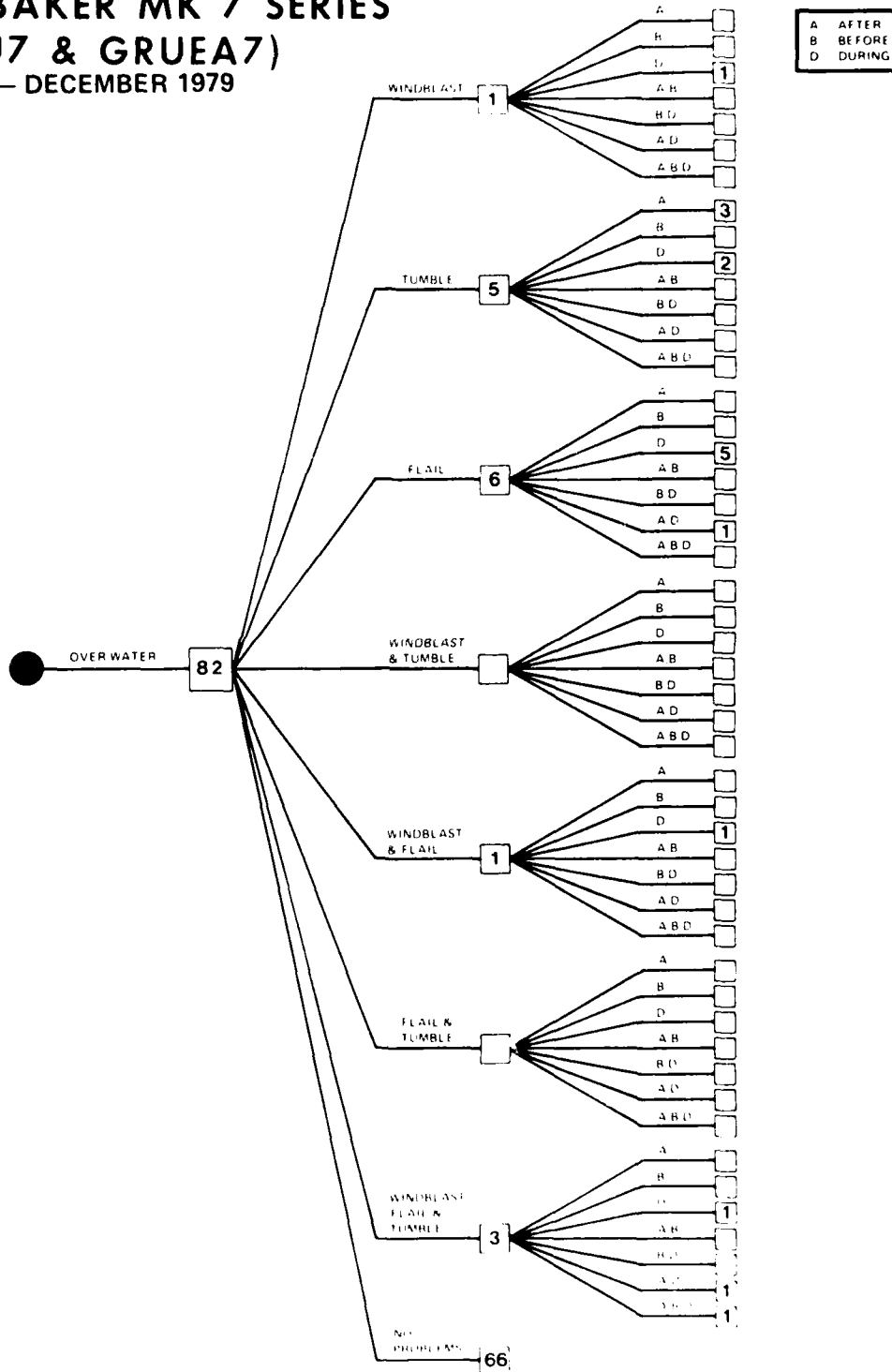
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

**MARTIN-BAKER MK 7 SERIES
(LESS GRU7 & GRUEA7)
JANUARY 1969 – DECEMBER 1979**



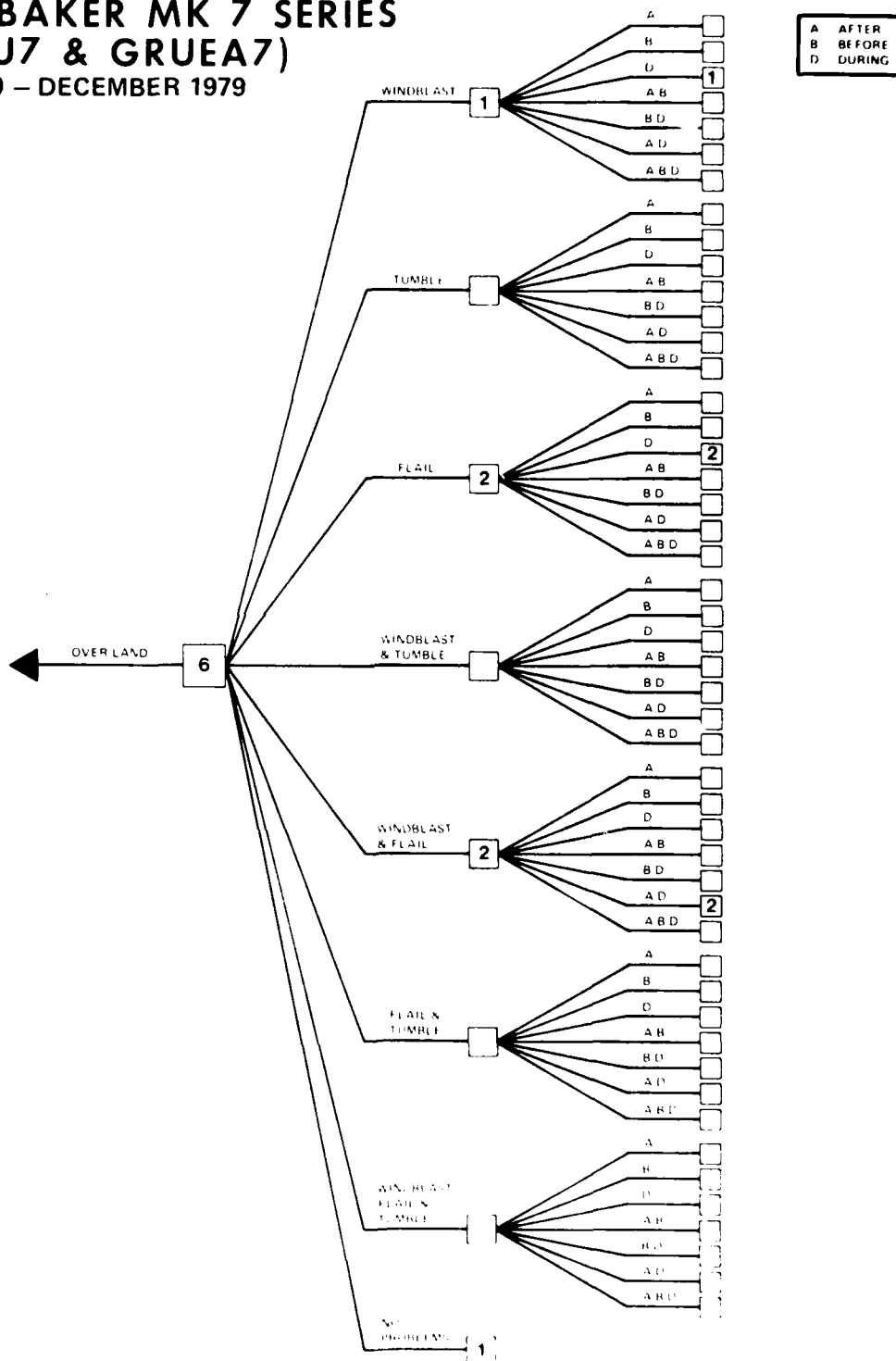
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES
(LESS GRU7 & GRUEA7)
JANUARY 1969 - DECEMBER 1979



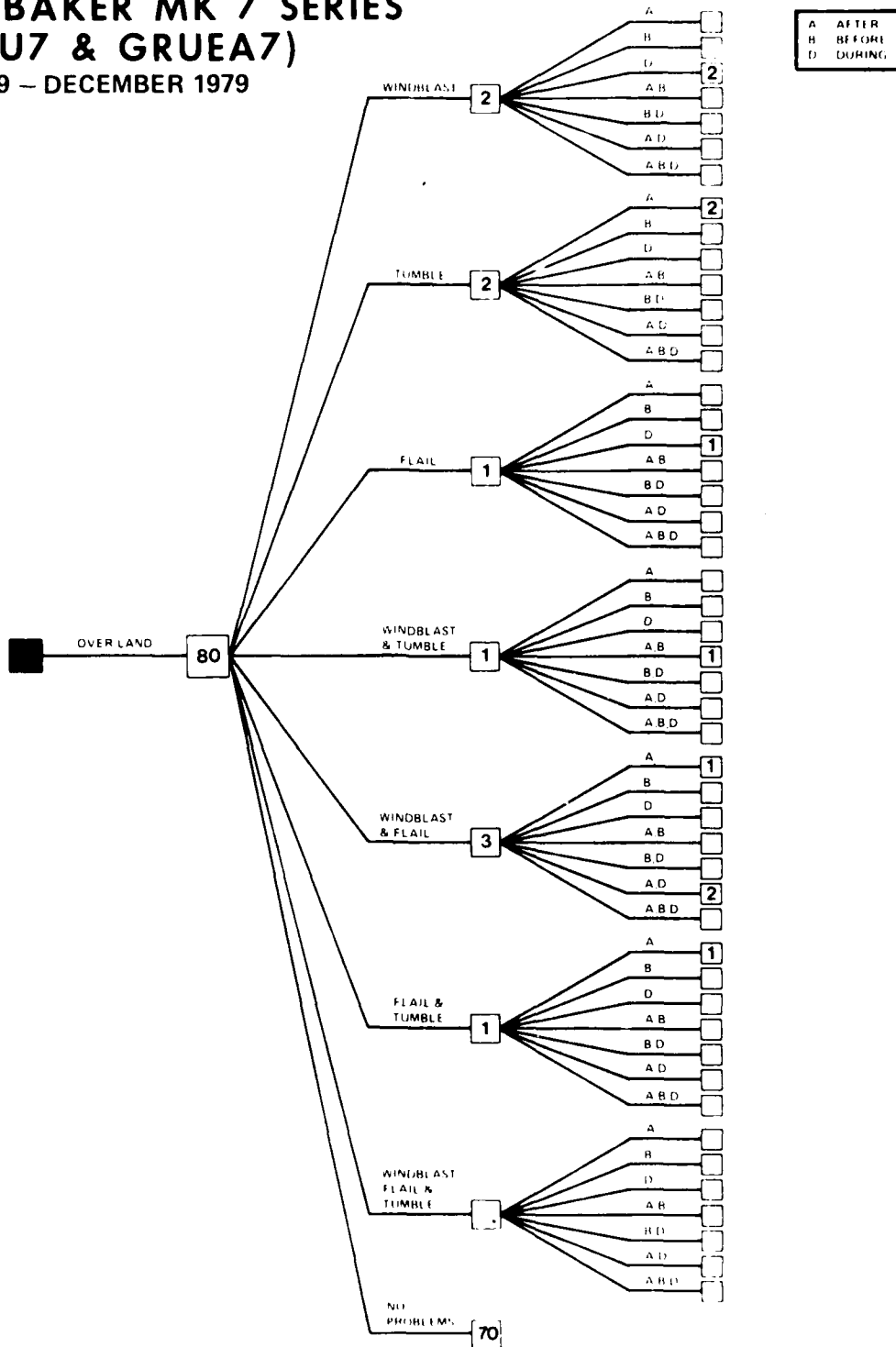
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

**MARTIN-BAKER MK 7 SERIES
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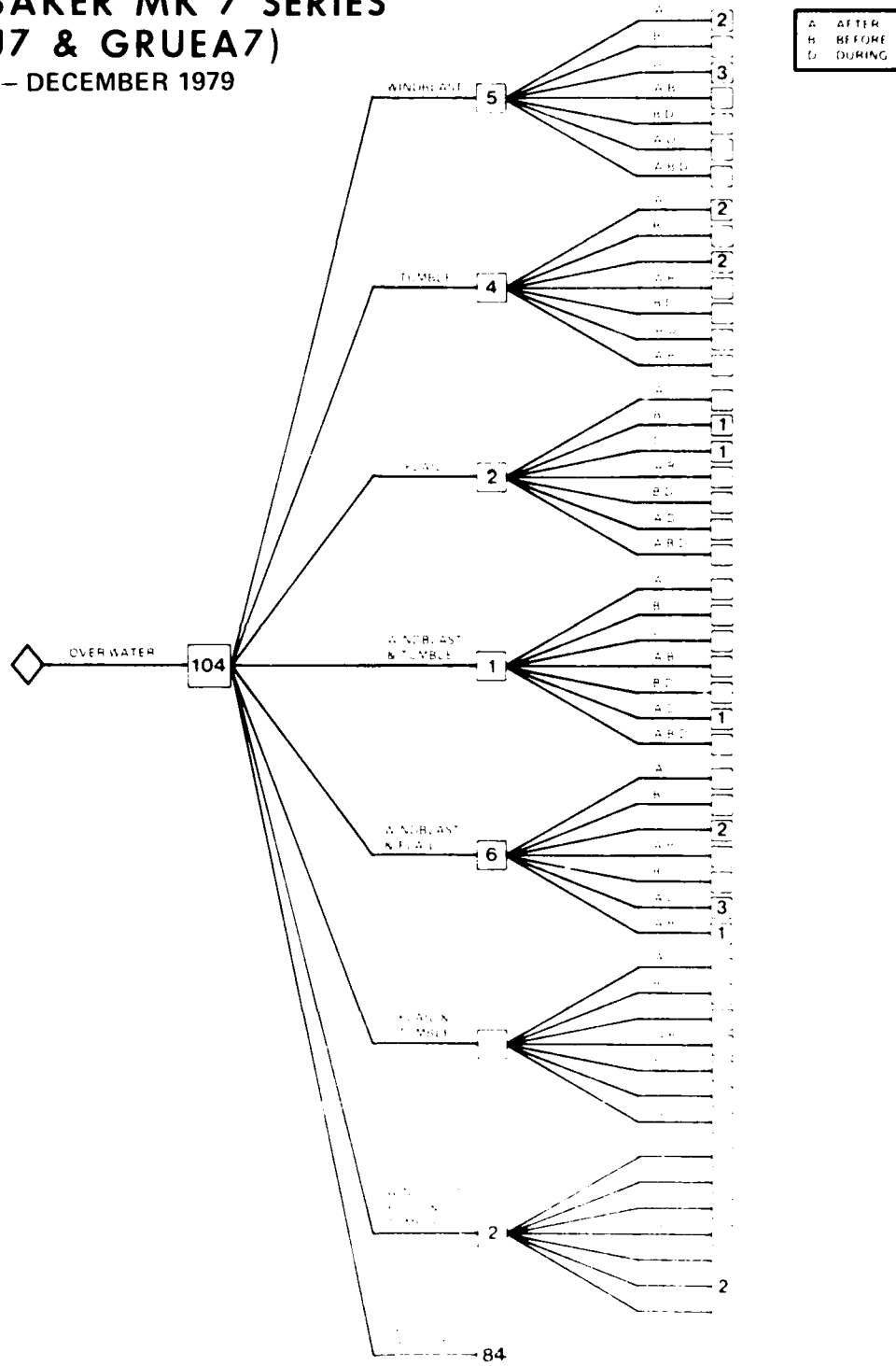
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

**MARTIN-BAKER MK 7 SERIES
(LESS GRU7 & GRUEA7)**
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

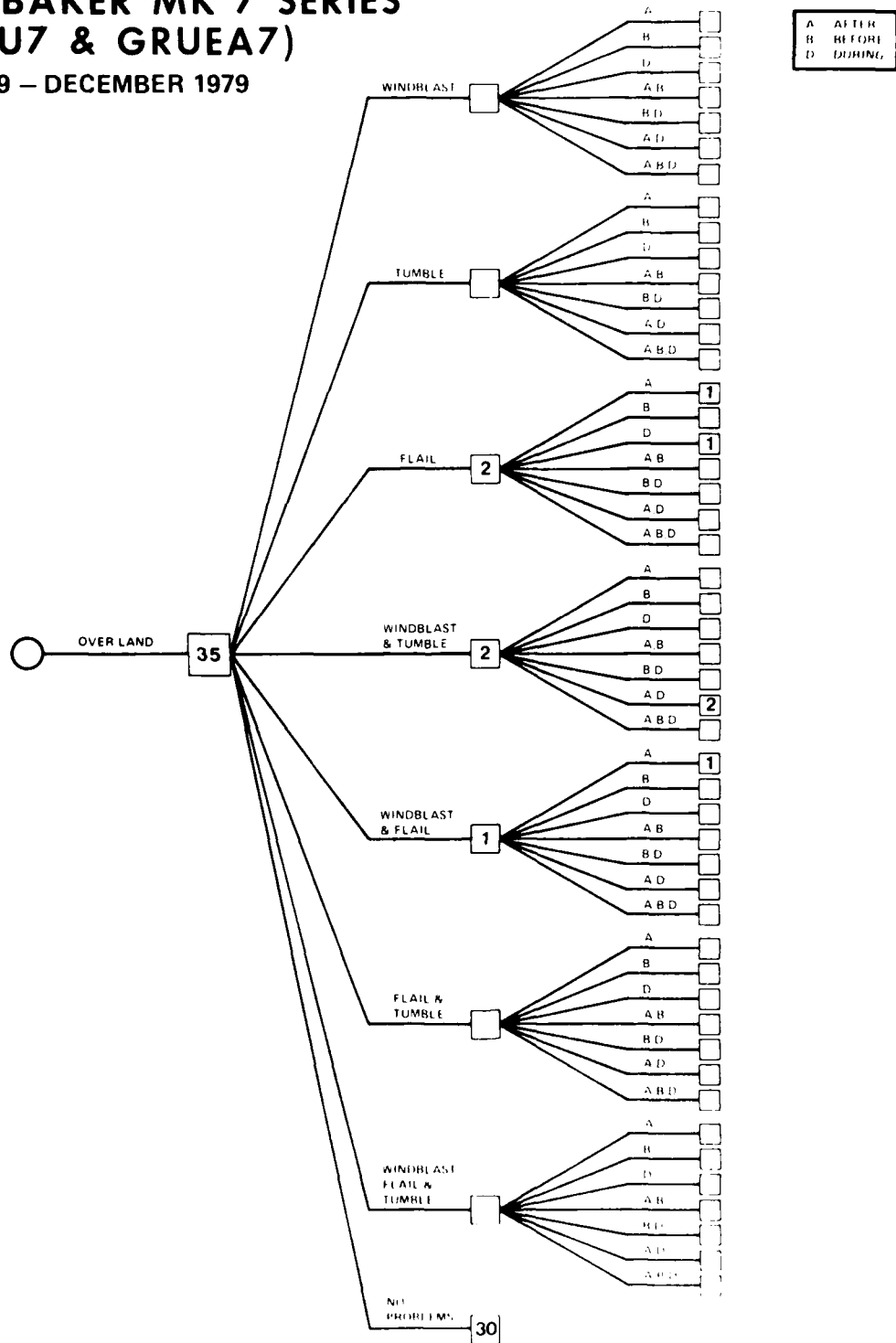
MARTIN-BAKER MK 7 SERIES
 (LESS GRU7 & GRUEA7)
 JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

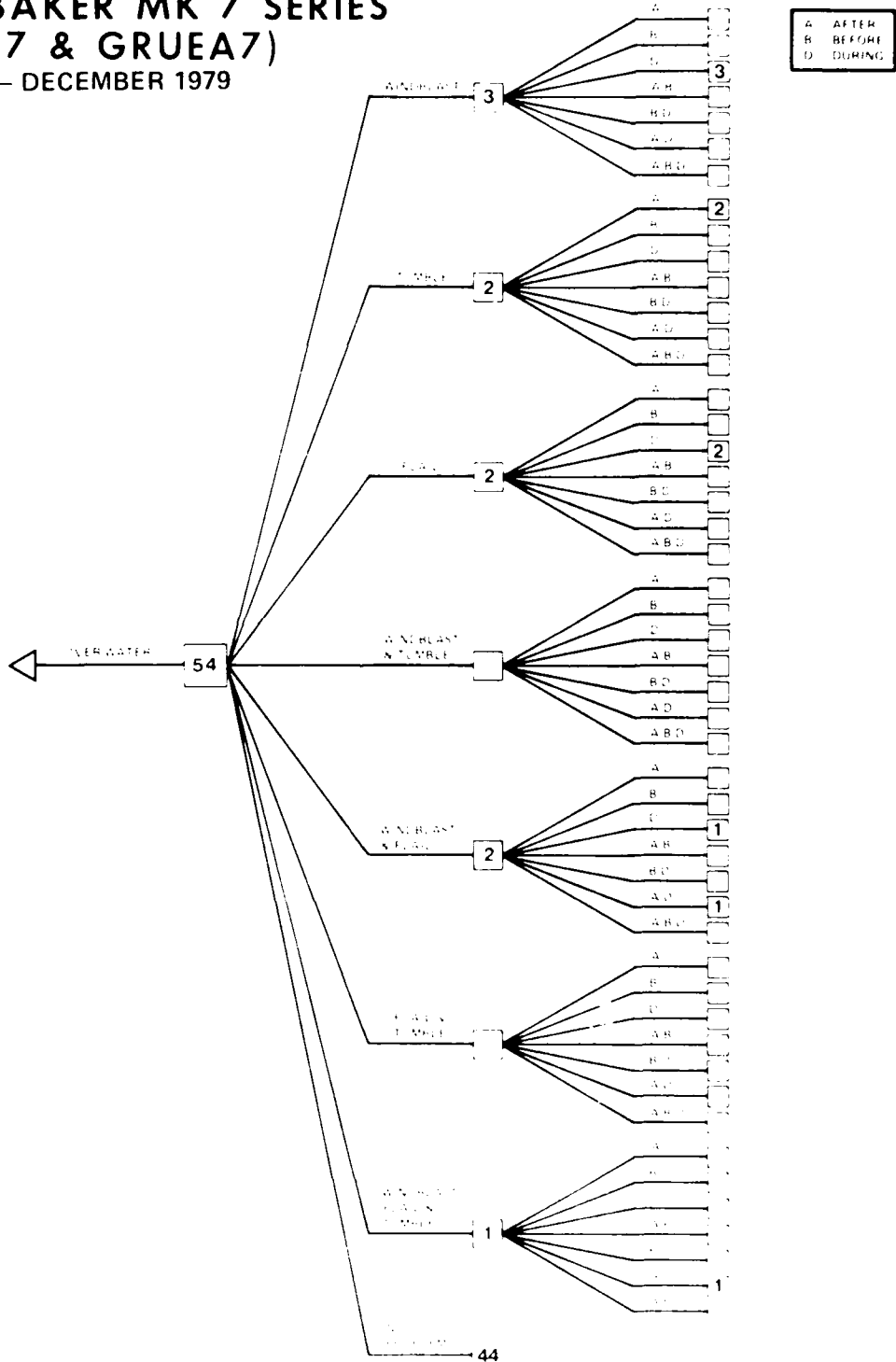
**MARTIN-BAKER MK 7 SERIES
(LESS GRU7 & GRUEA7)**

JANUARY 1969 - DECEMBER 1979



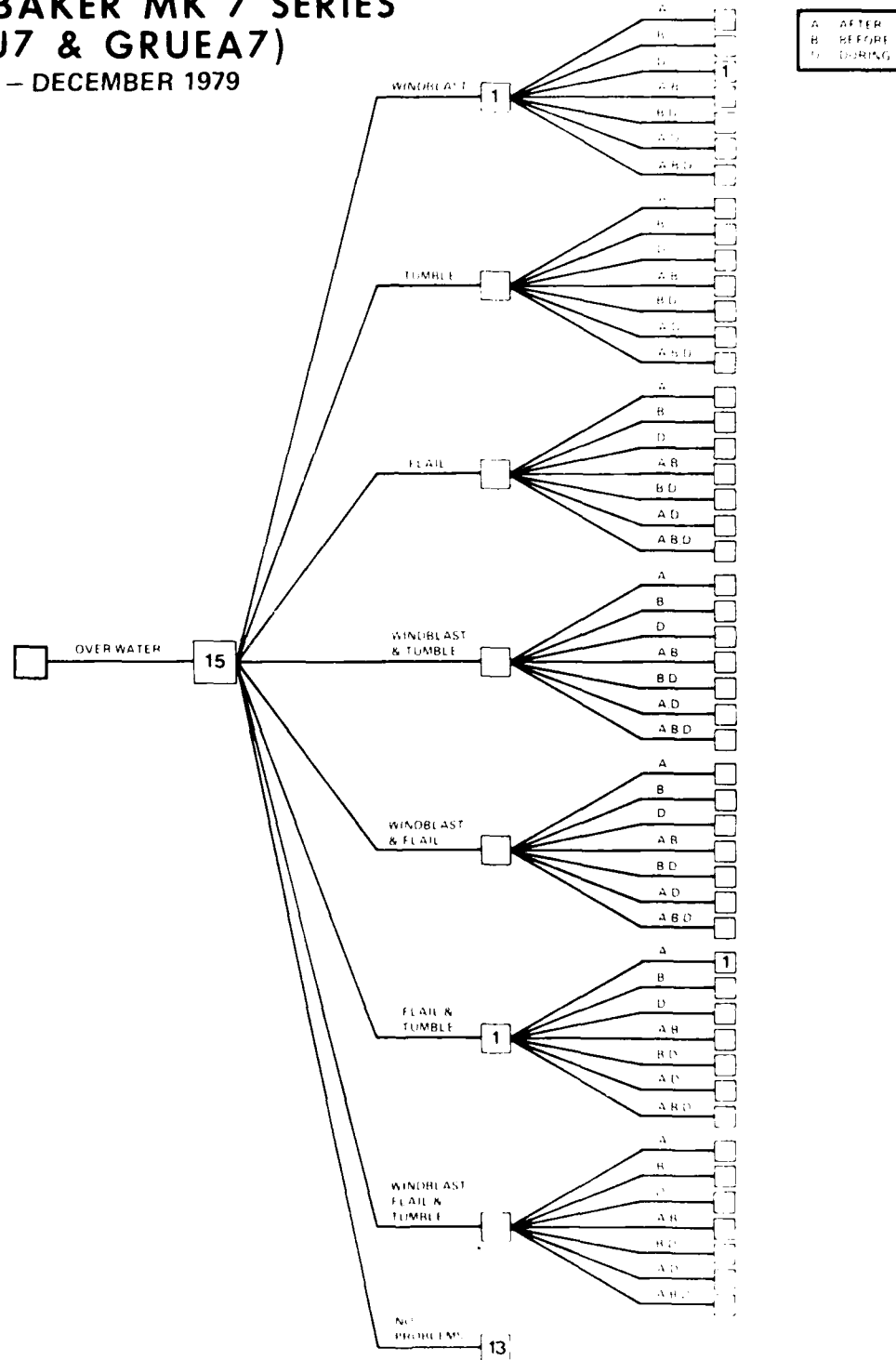
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES
(LESS GRU7 & GRUEA7)
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

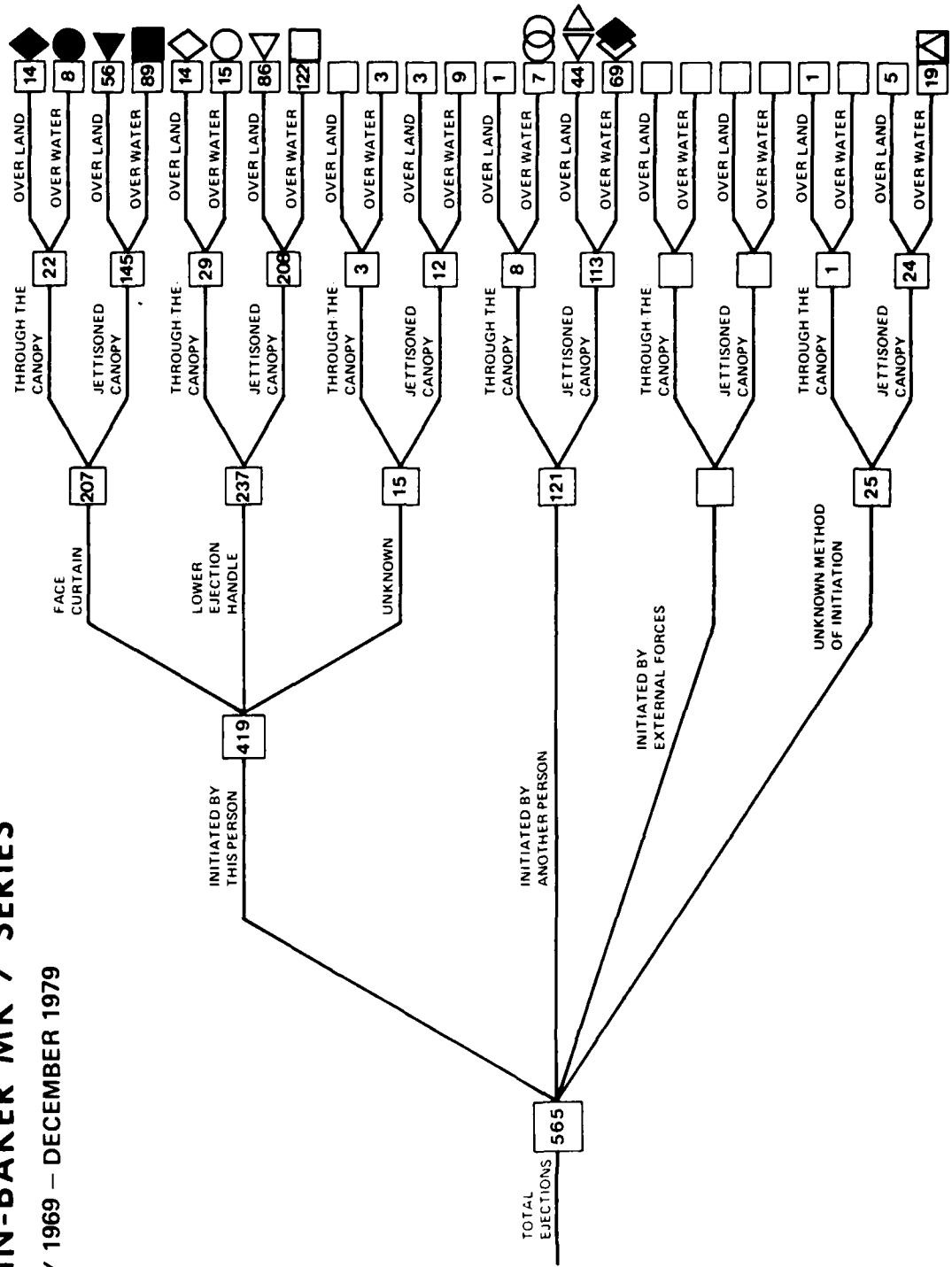
MARTIN-BAKER MK 7 SERIES
(LESS GRU7 & GRUEA7)
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

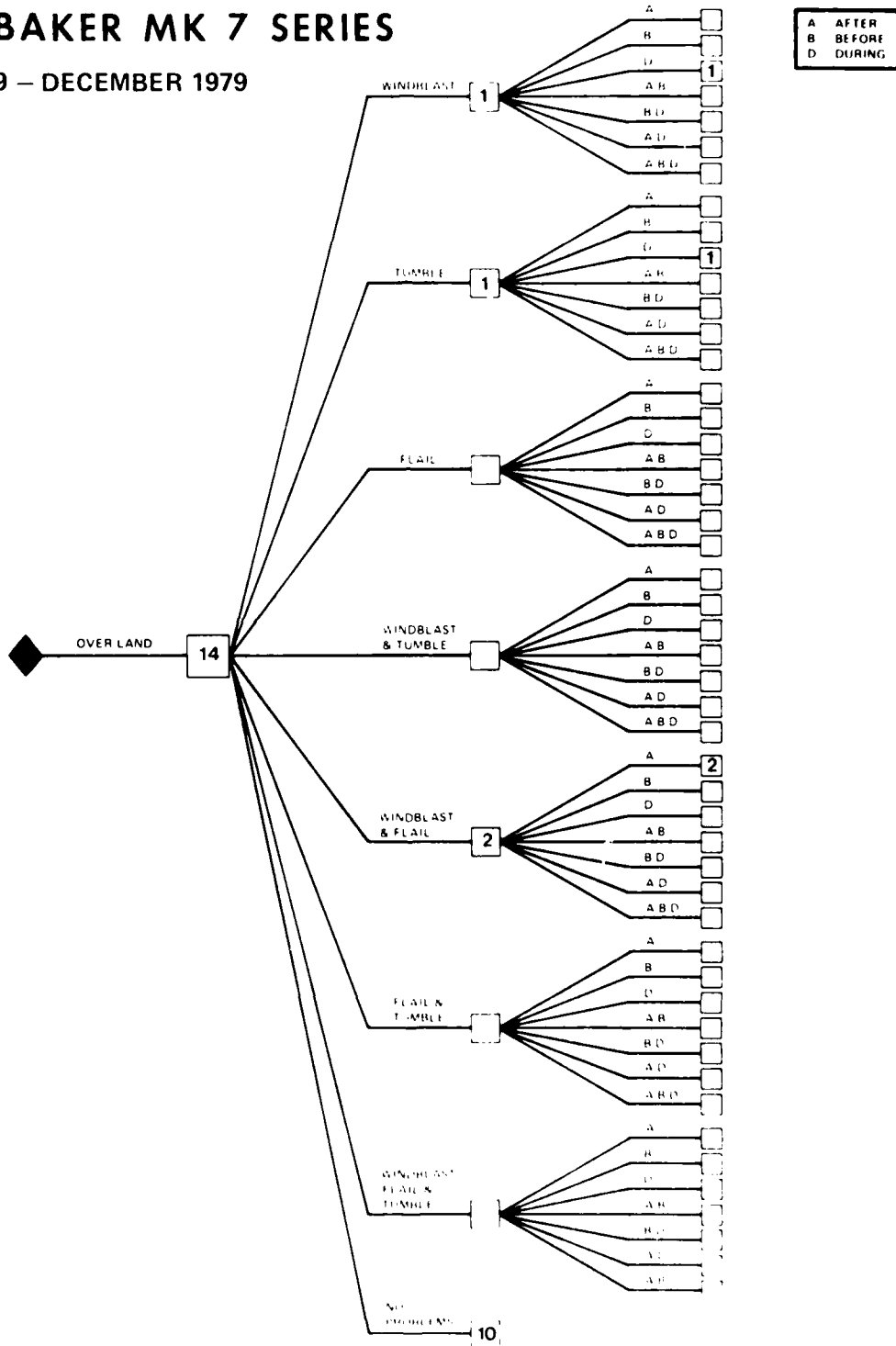
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

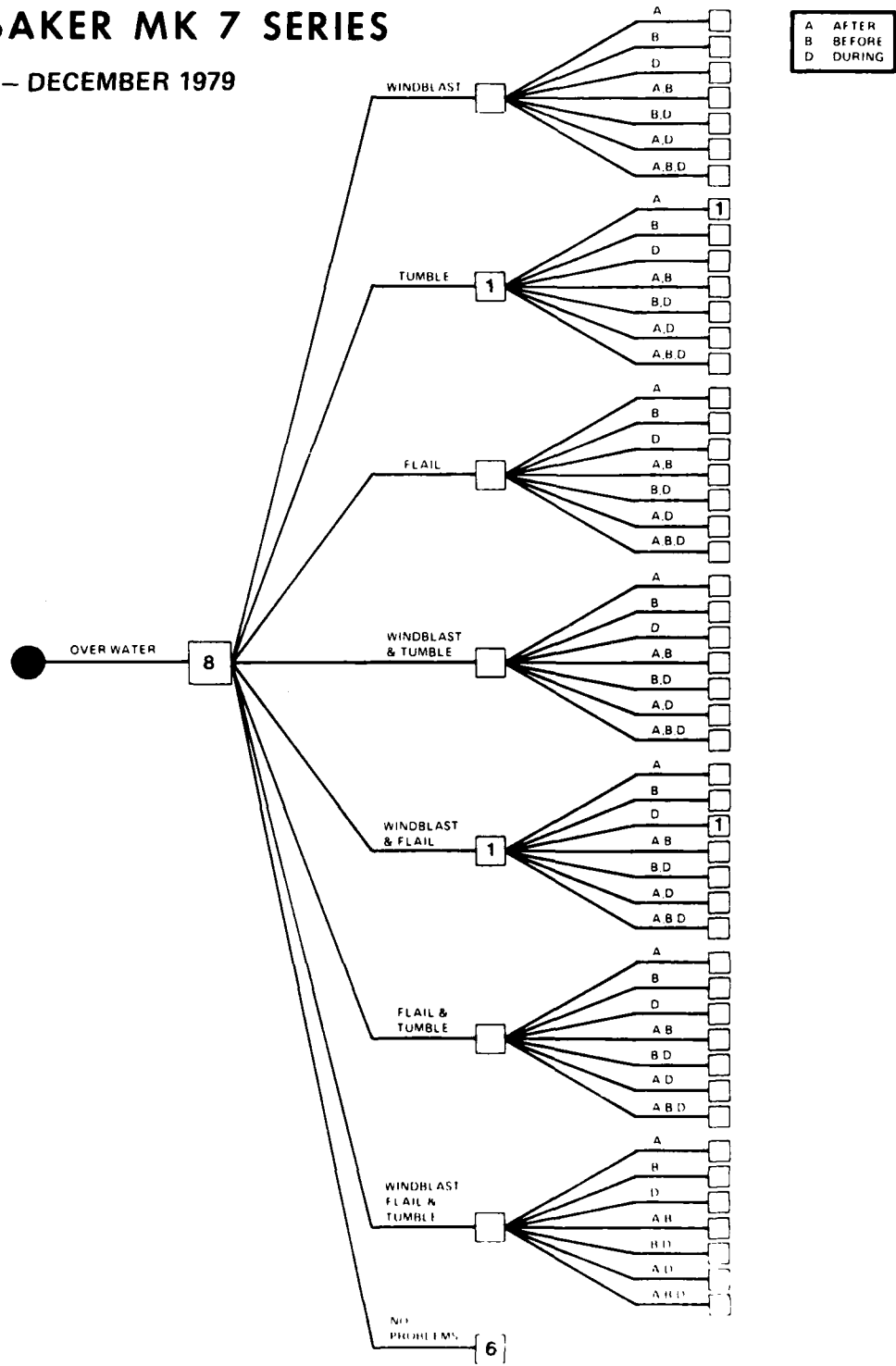
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

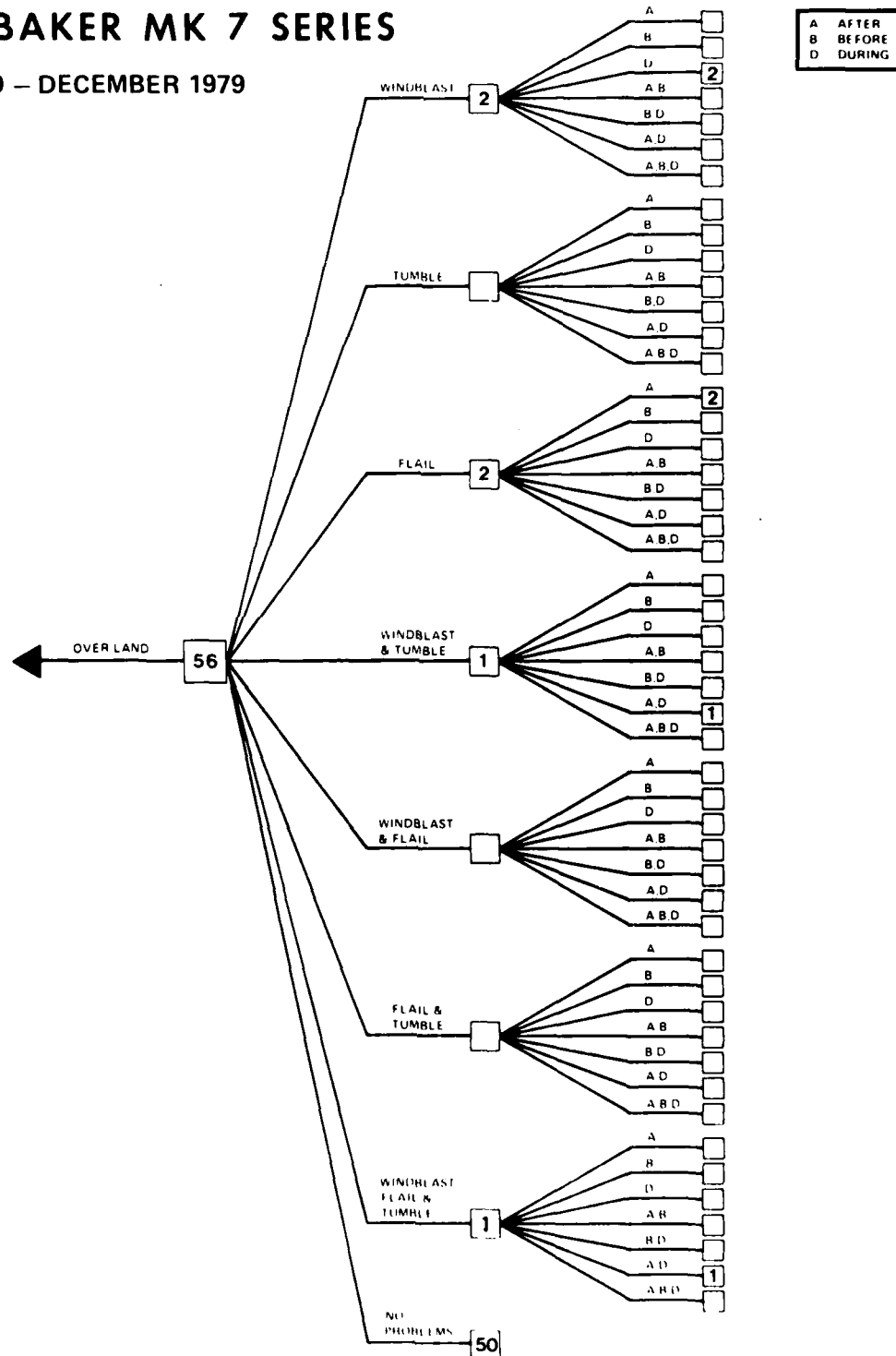
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

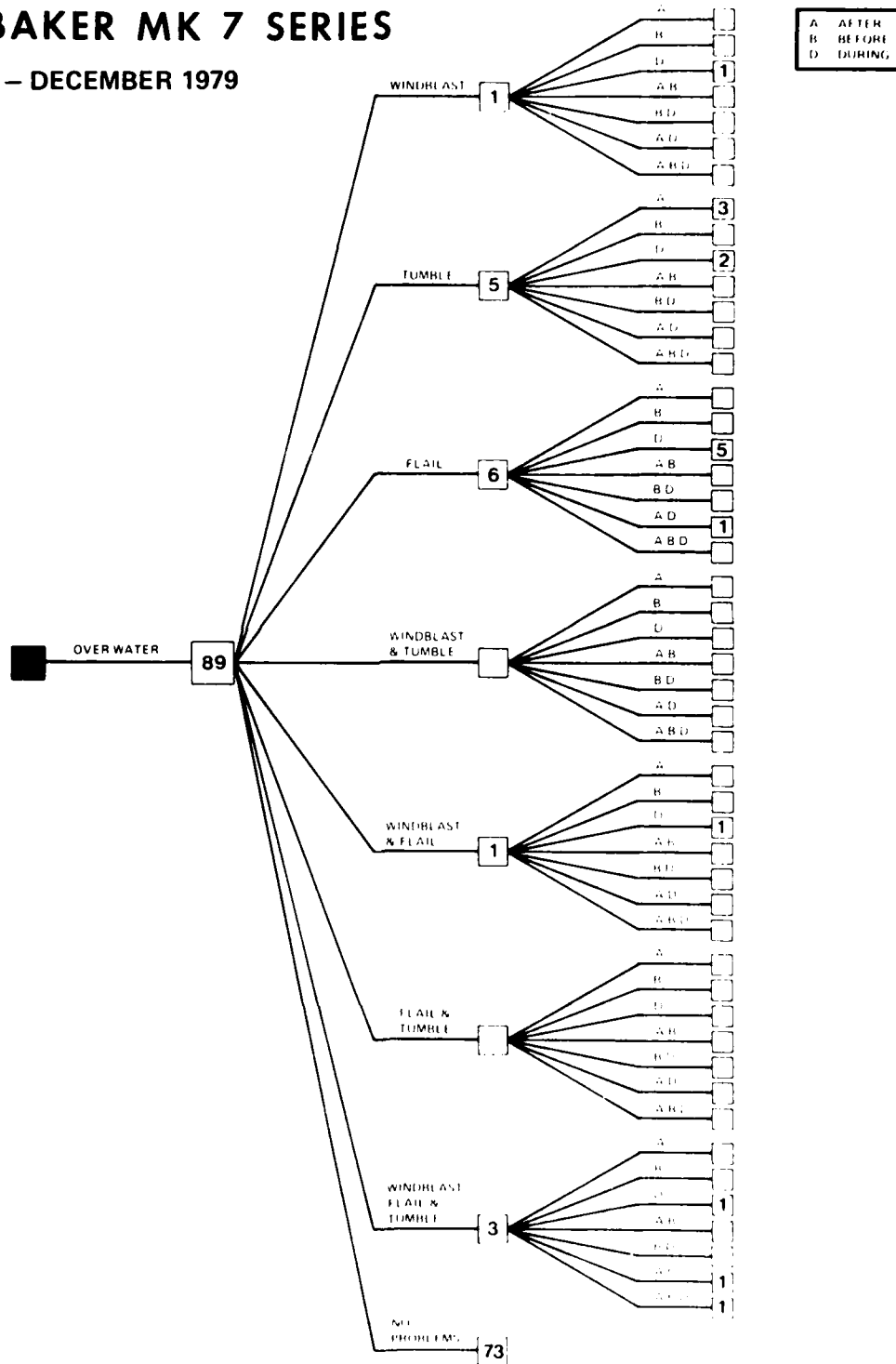
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

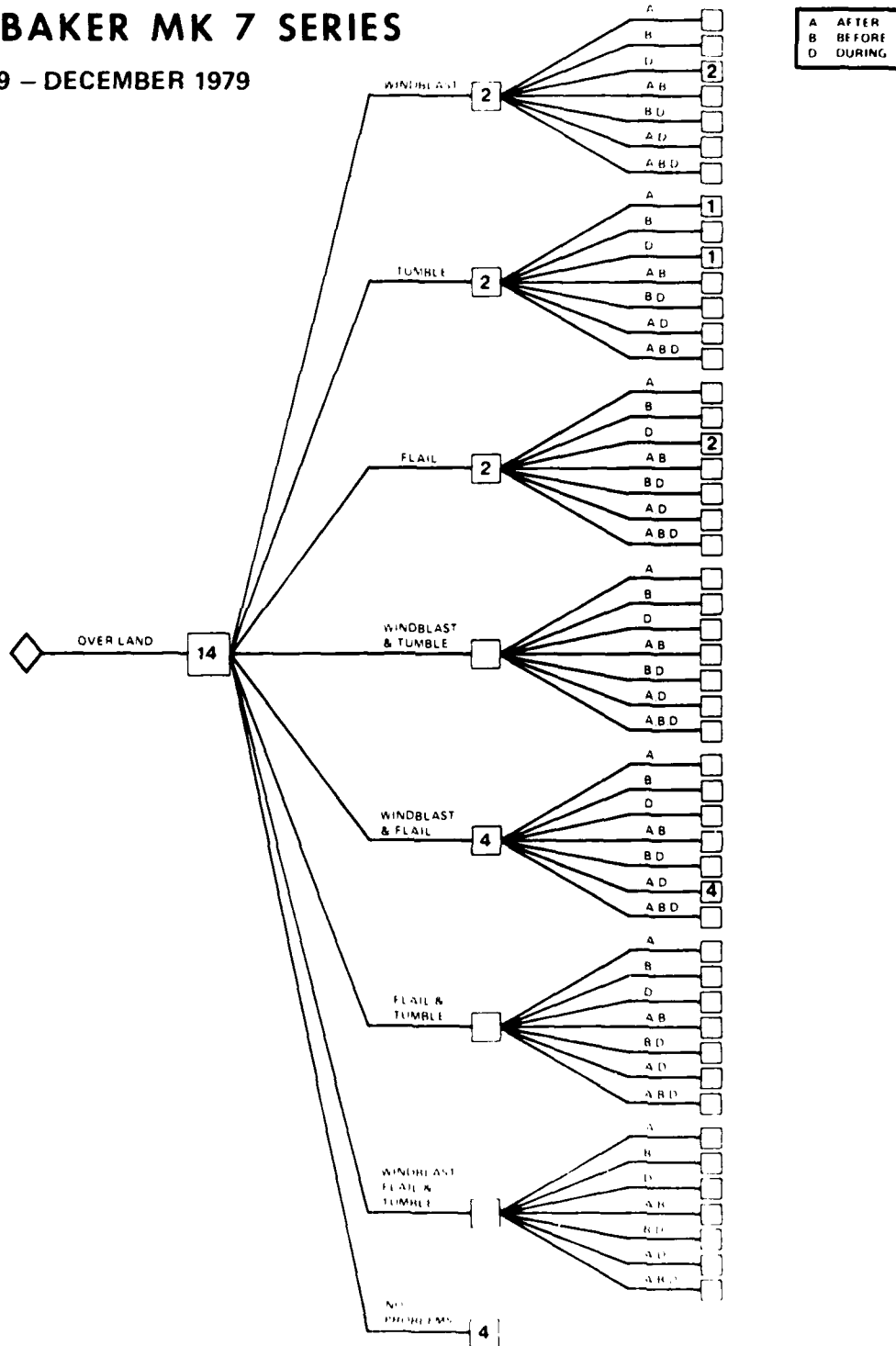
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

JANUARY 1969 – DECEMBER 1979

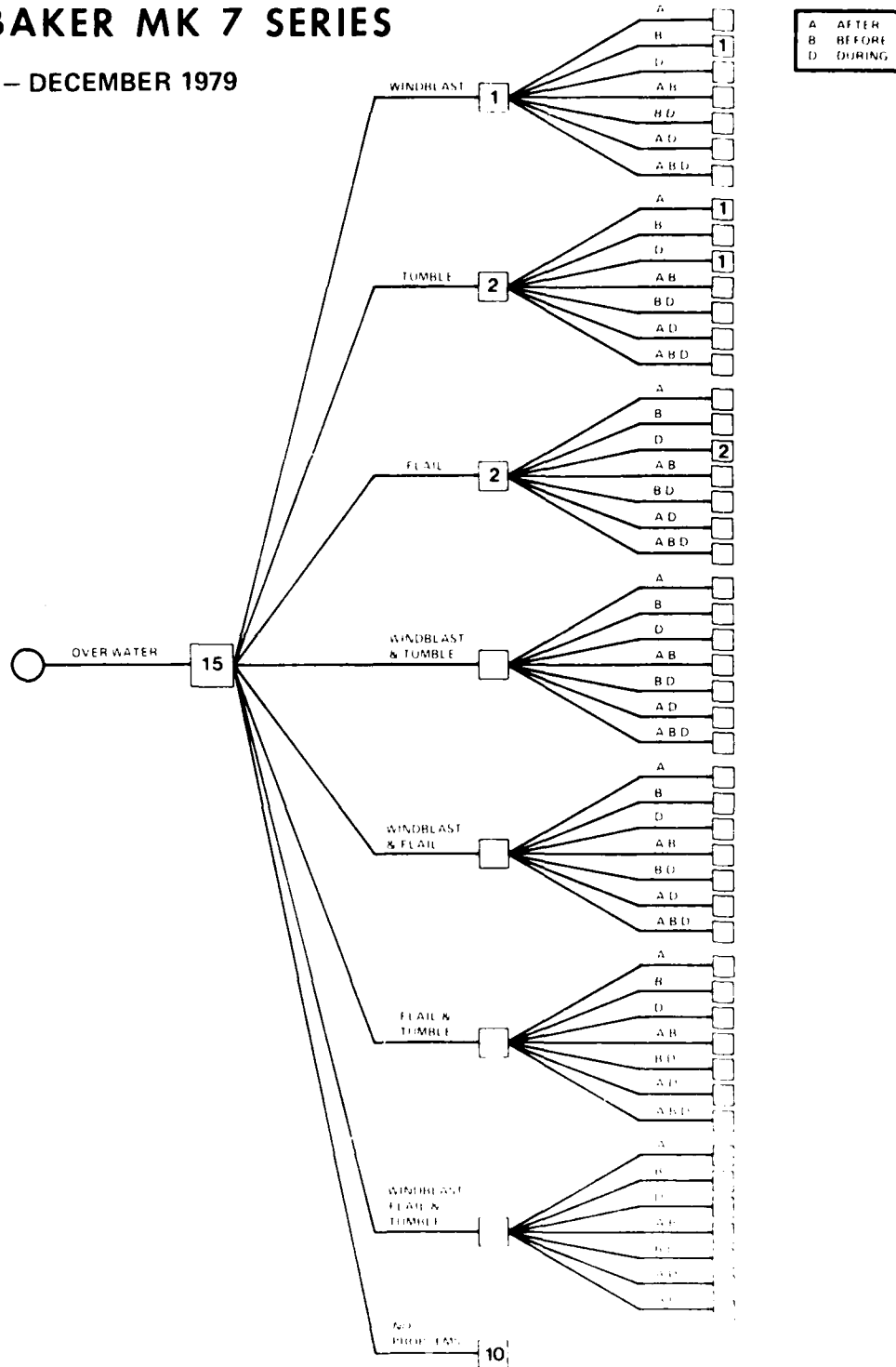


A AFTER
B BEFORE
D DURING

DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

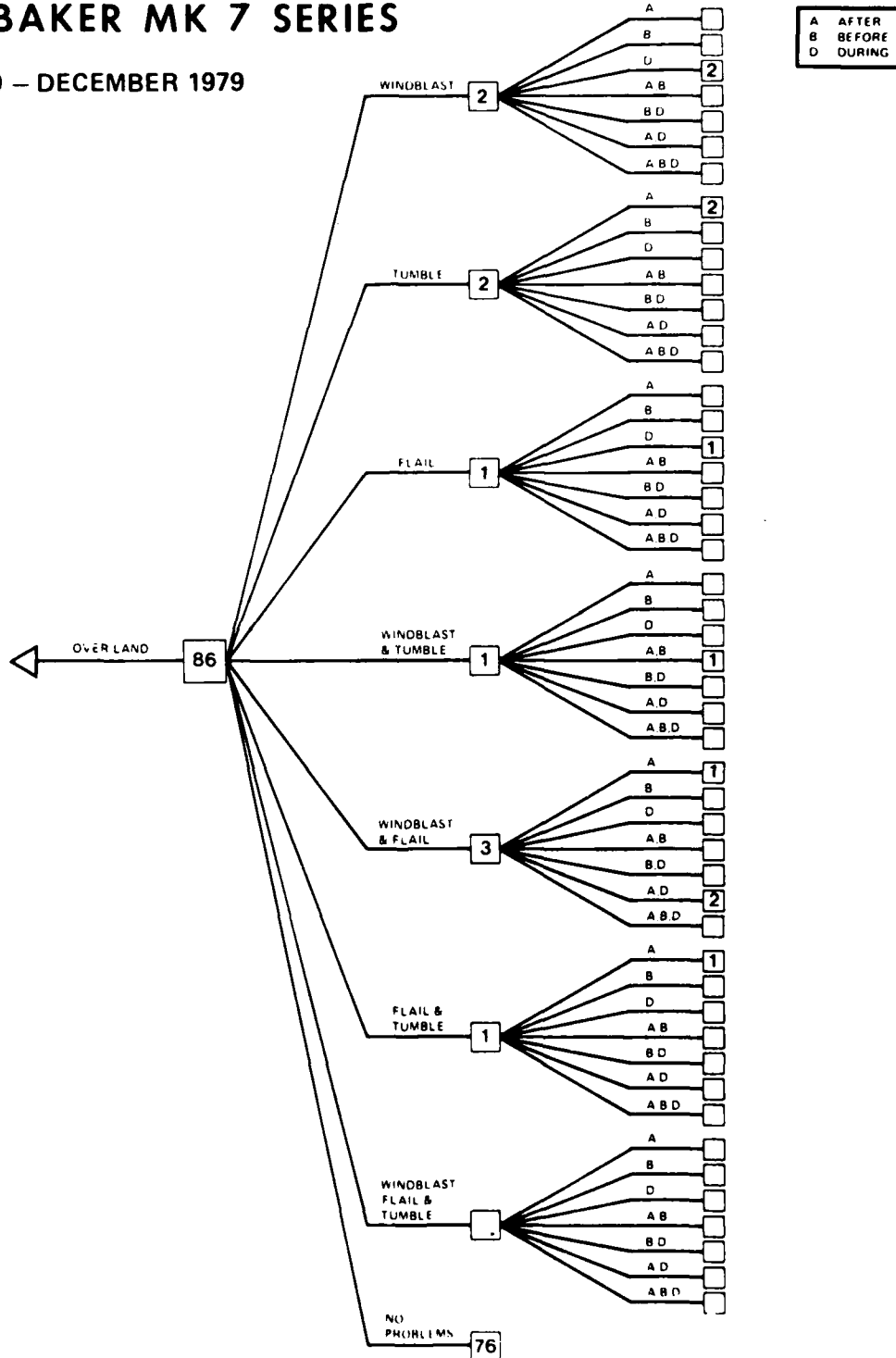
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

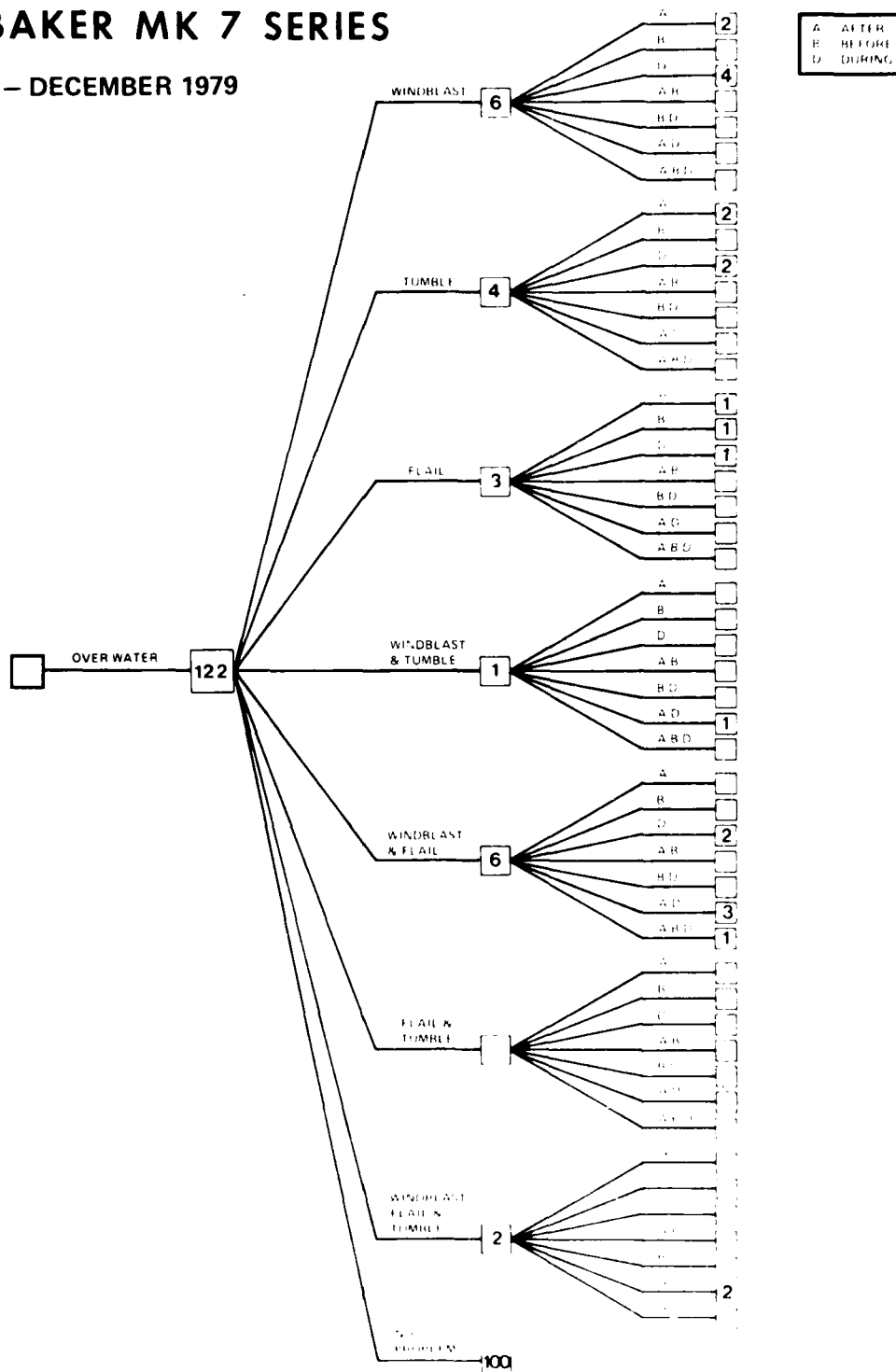
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

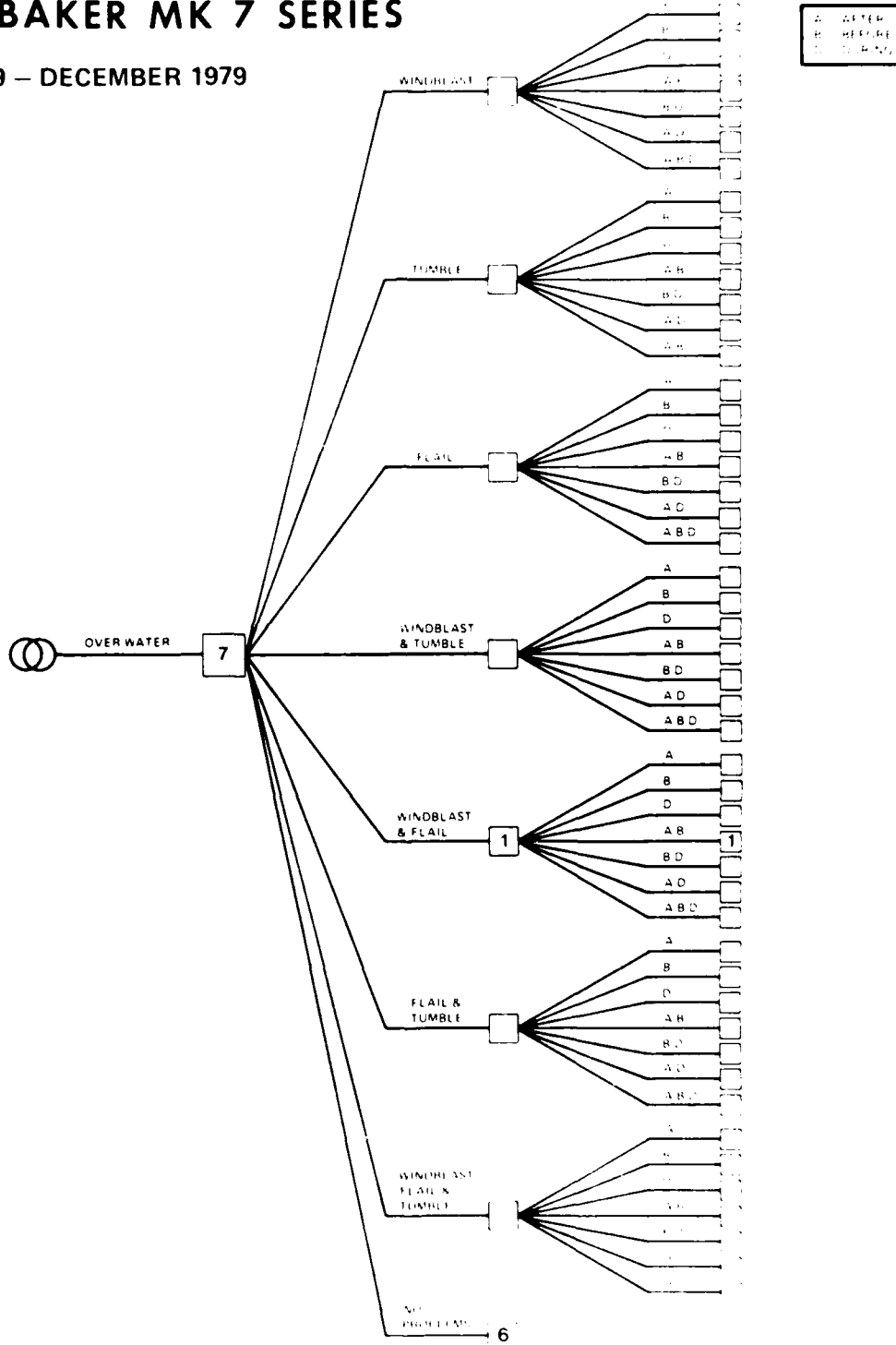
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

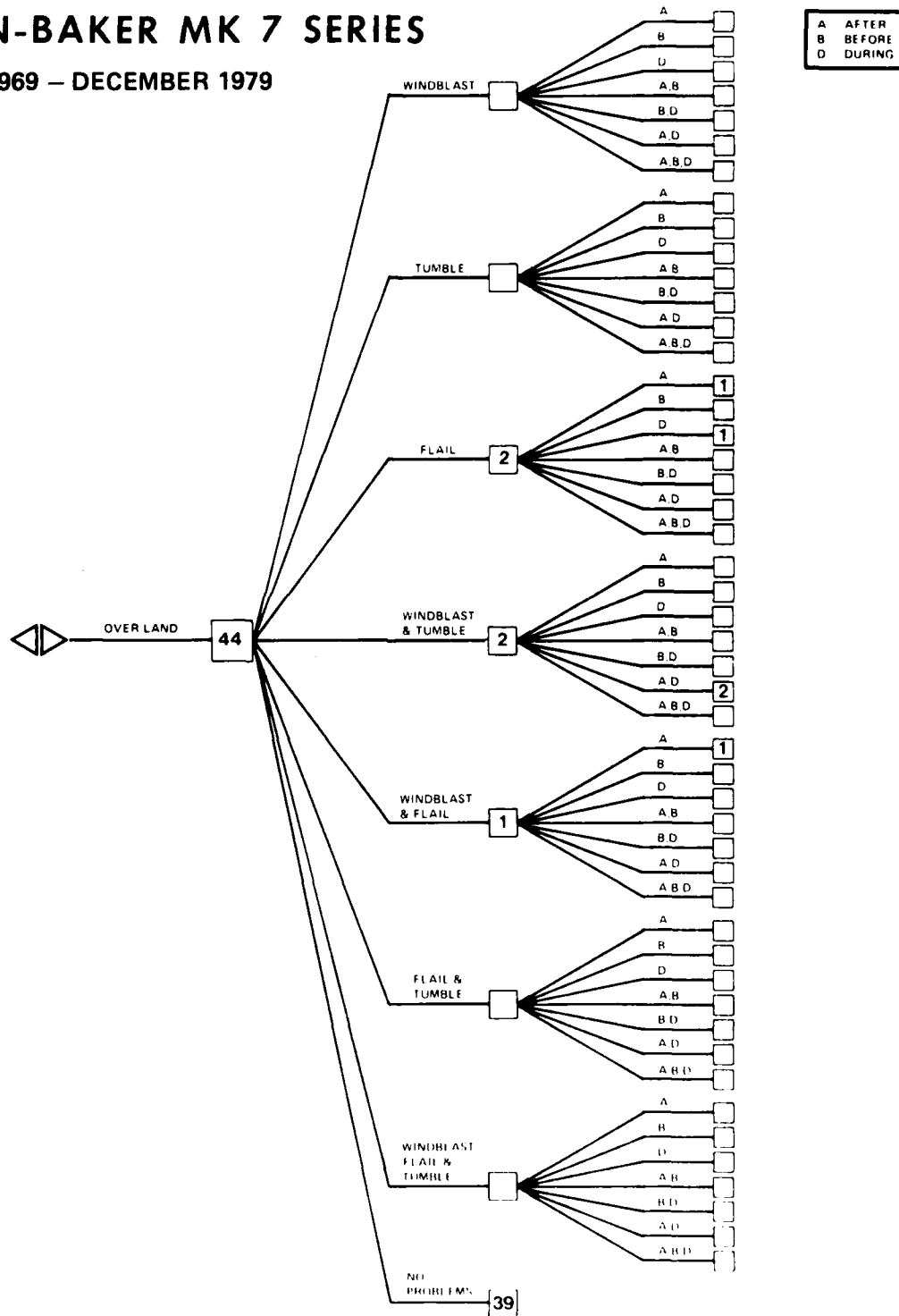
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

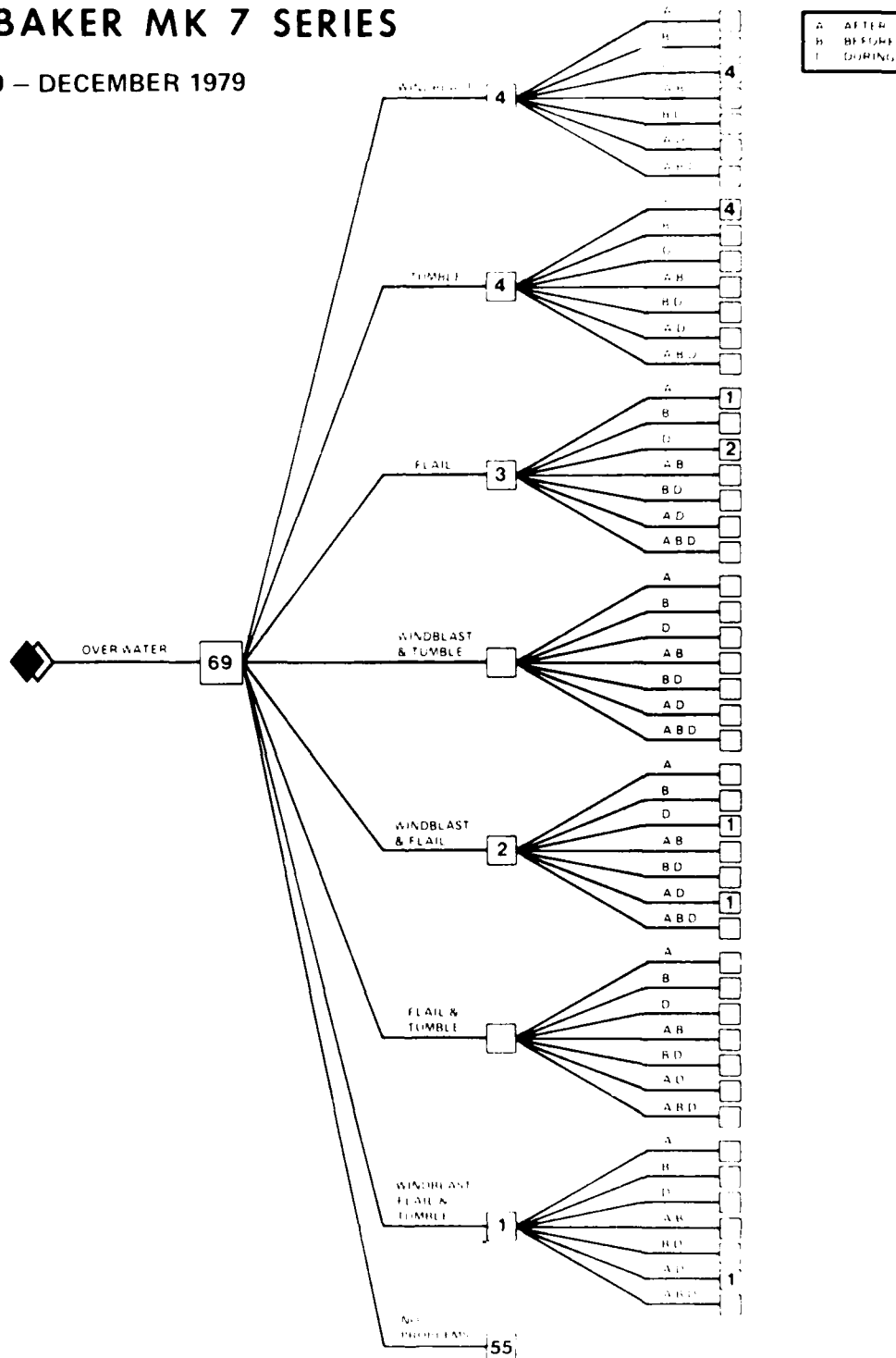
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

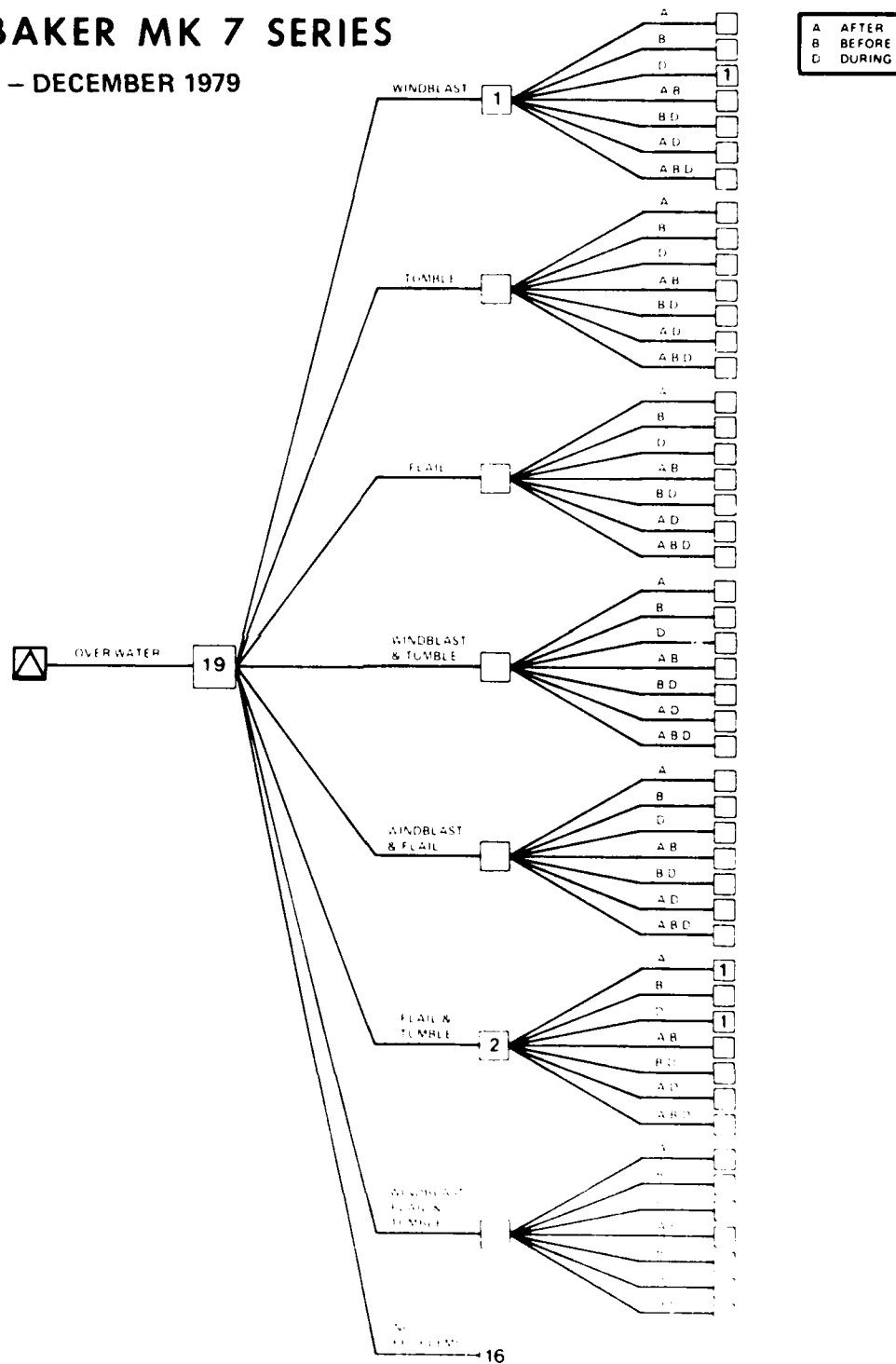
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

MARTIN-BAKER MK 7 SERIES

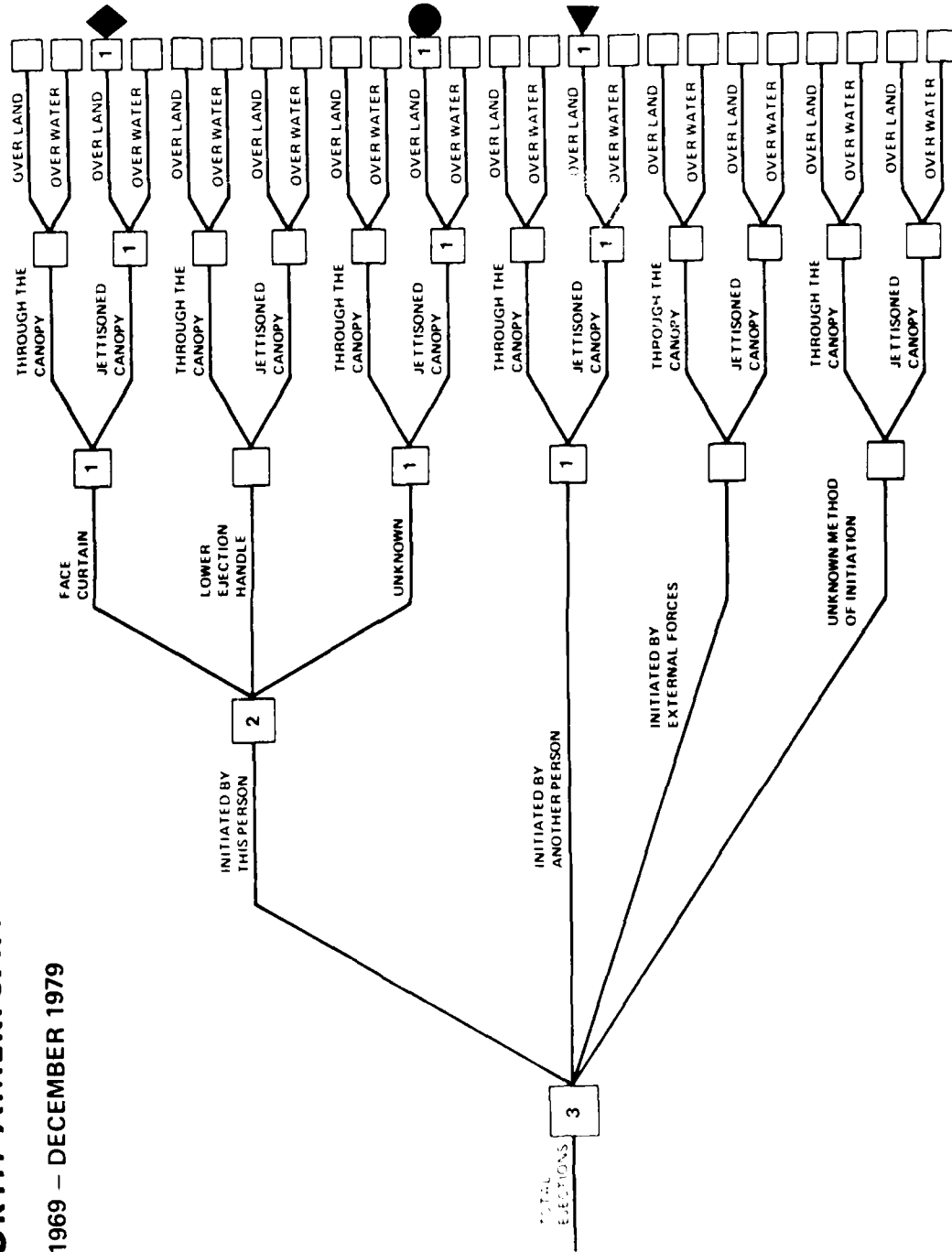
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

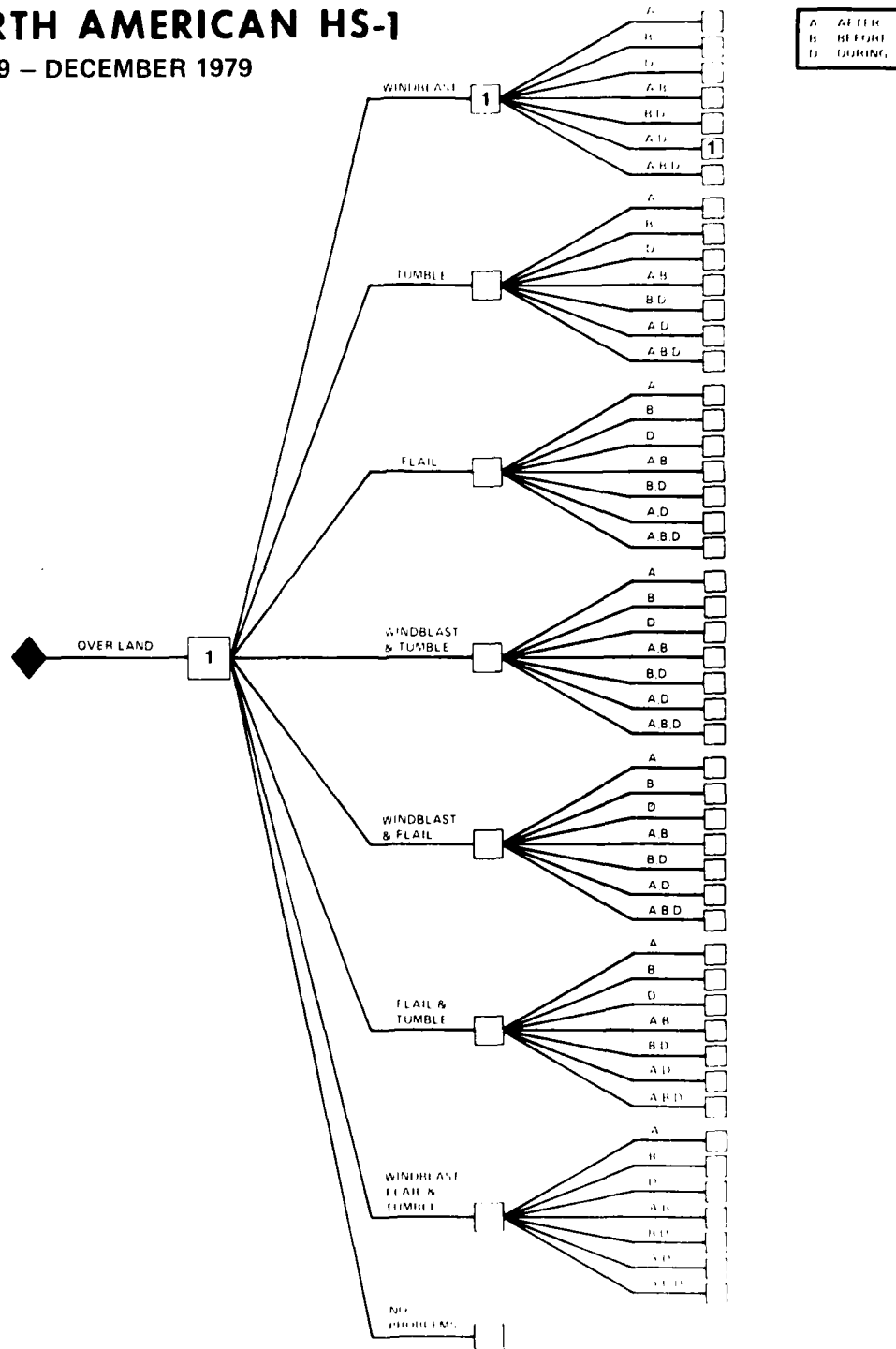
A-5/NORTH AMERICAN HS-1

JANUARY 1969 - DECEMBER 1979



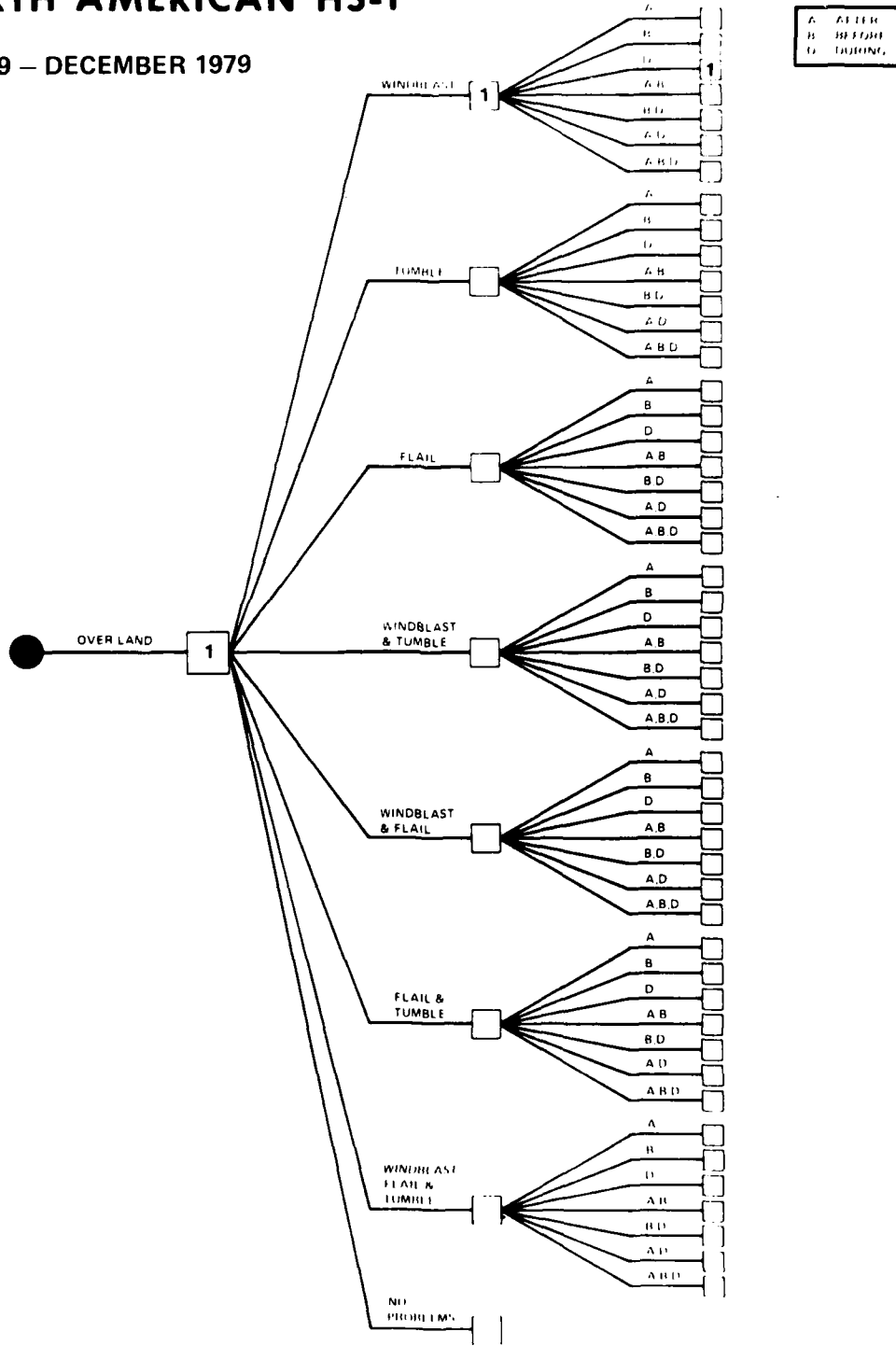
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

A-5/NORTH AMERICAN HS-1
JANUARY 1969 - DECEMBER 1979



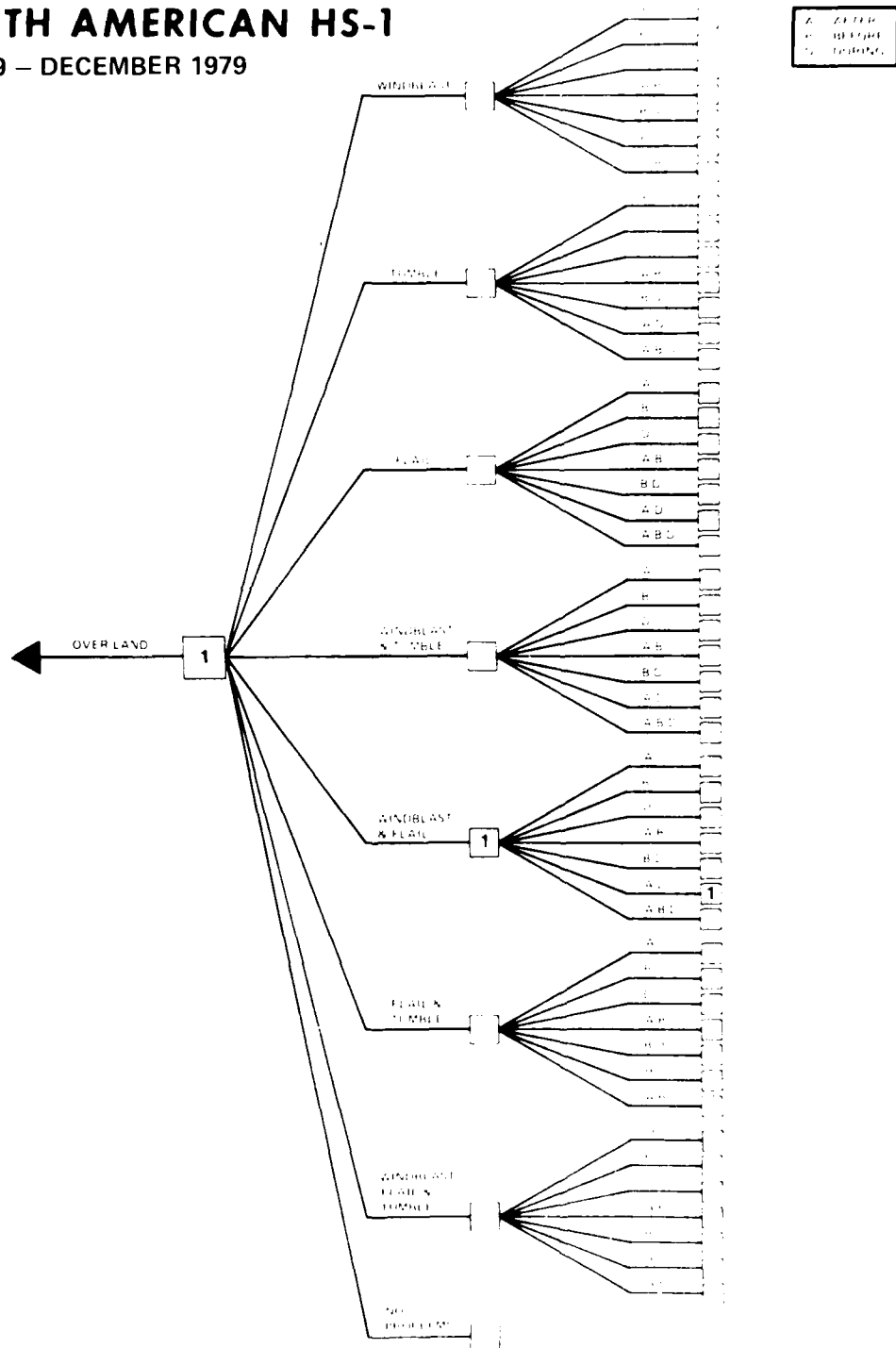
DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS A-5/NORTH AMERICAN HS-1

JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

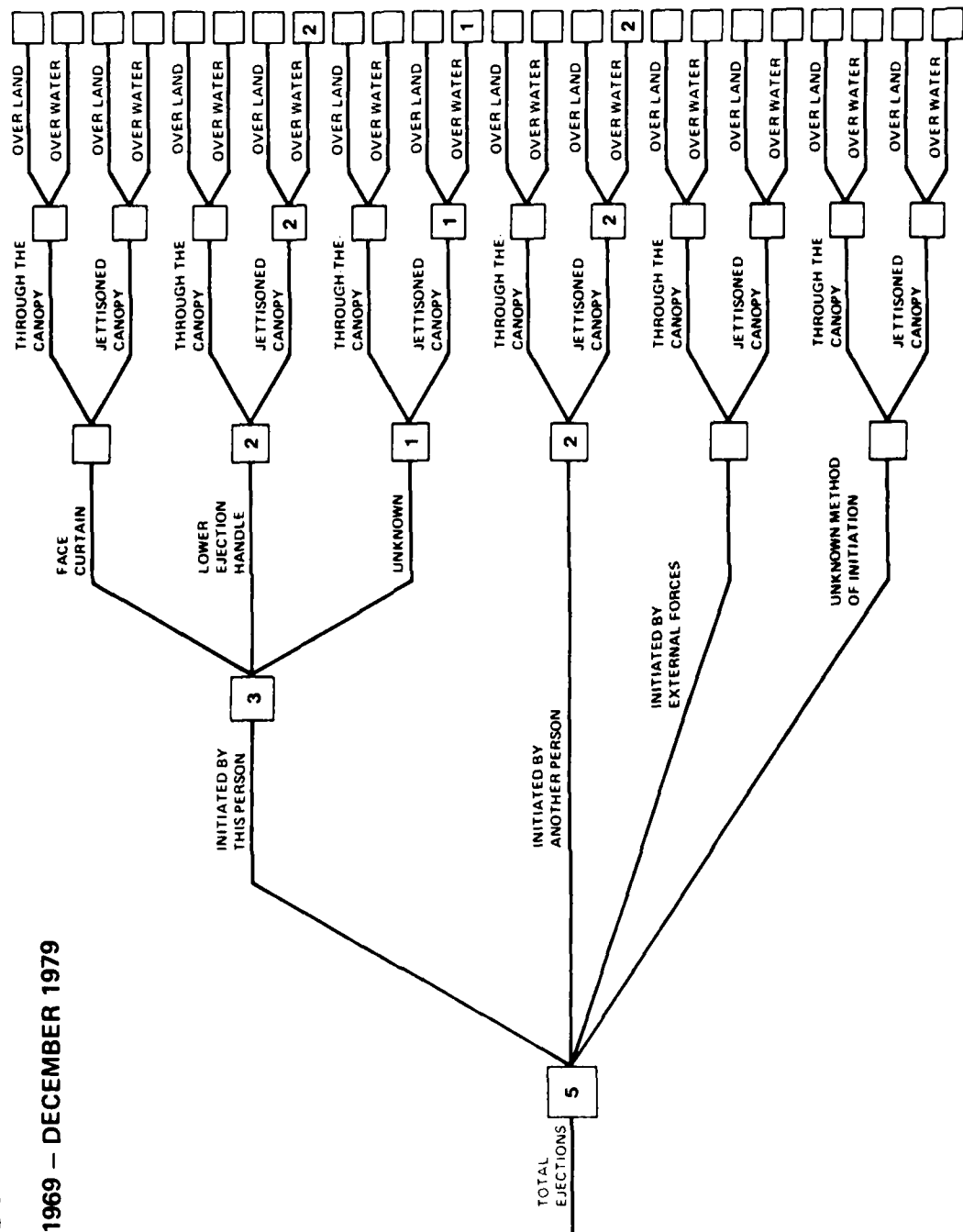
A-5/NORTH AMERICAN HS-1
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

A-5/NORTH AMERICAN HS-1A

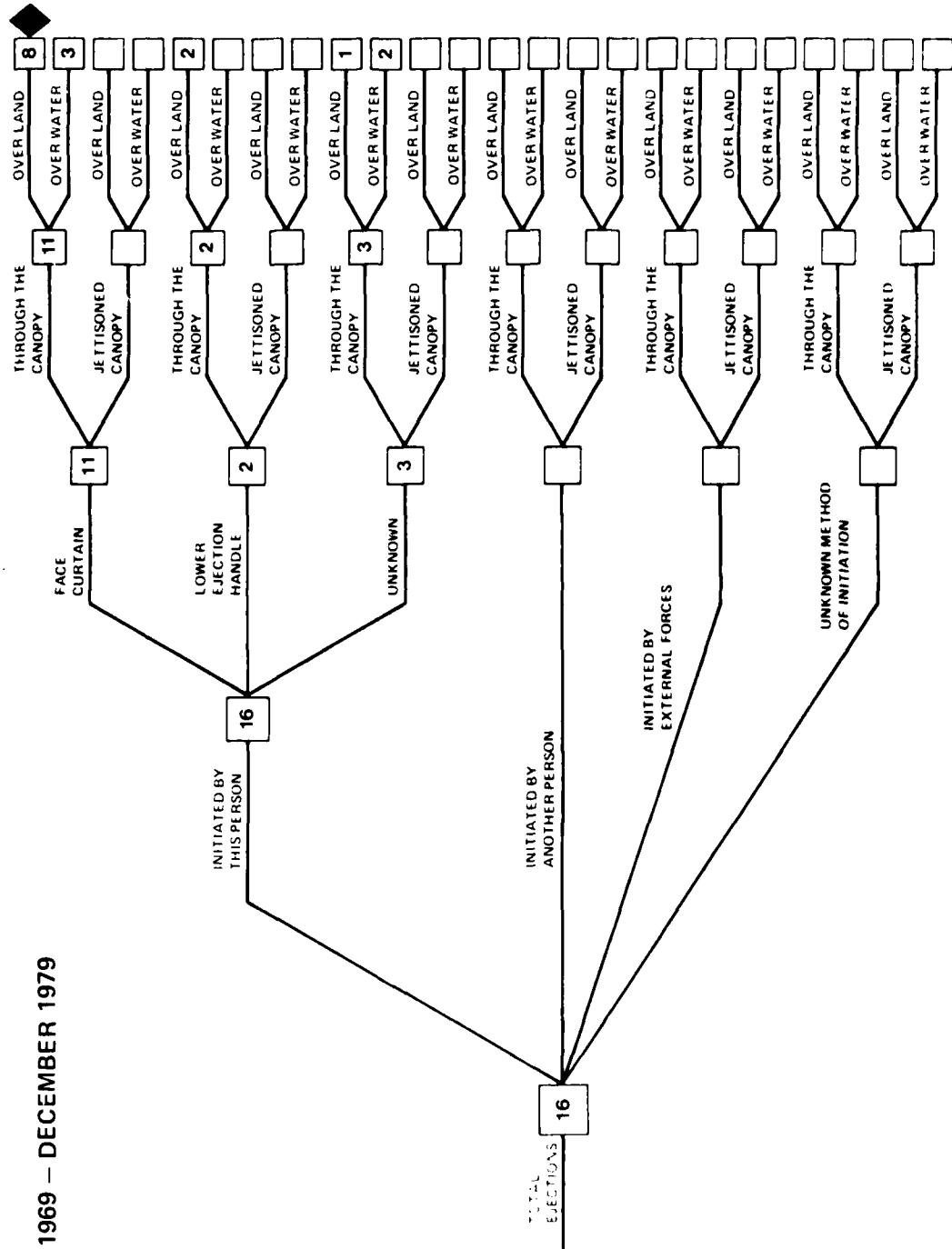
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

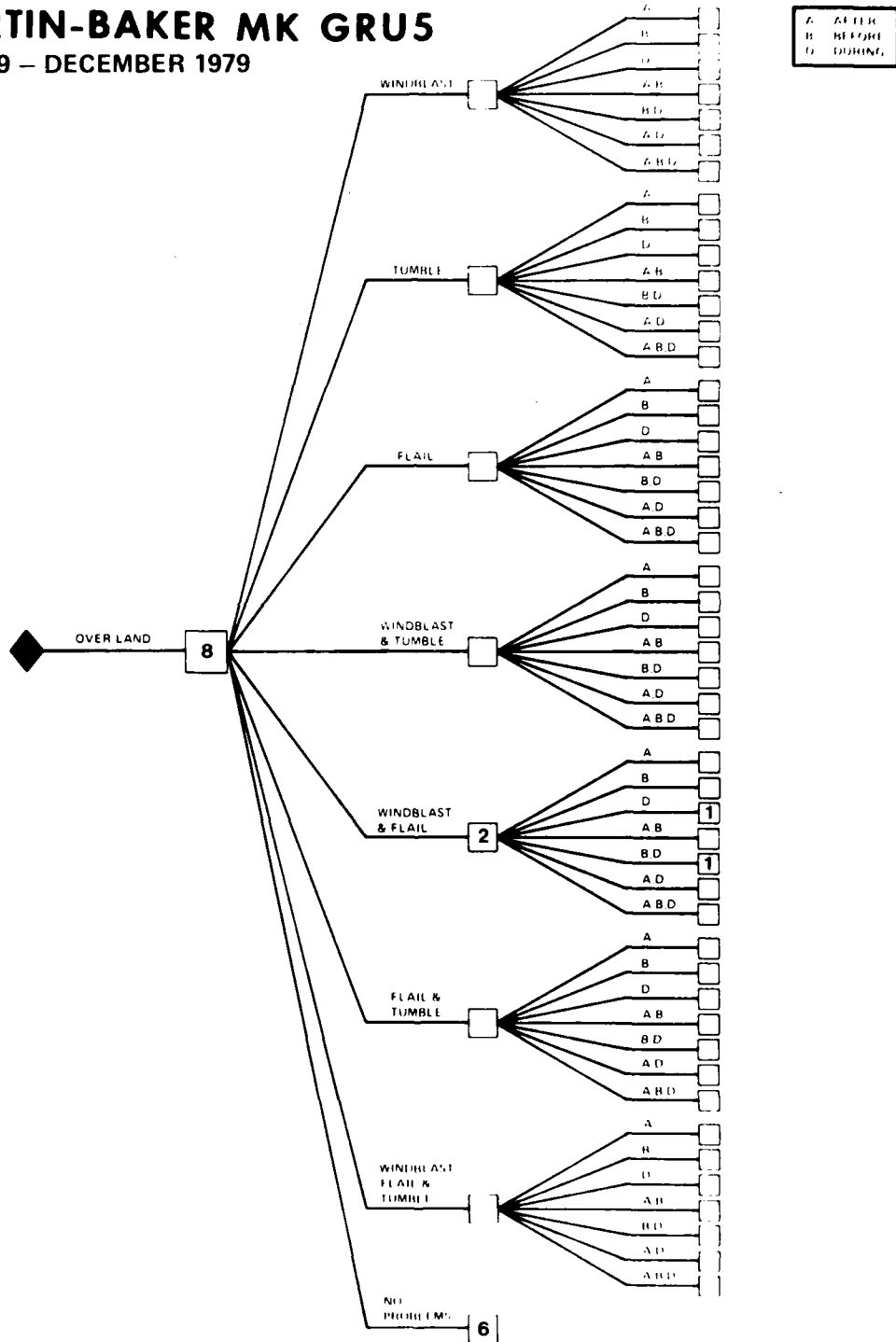
A-6/MARTIN-BAKER MK GRU5

JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

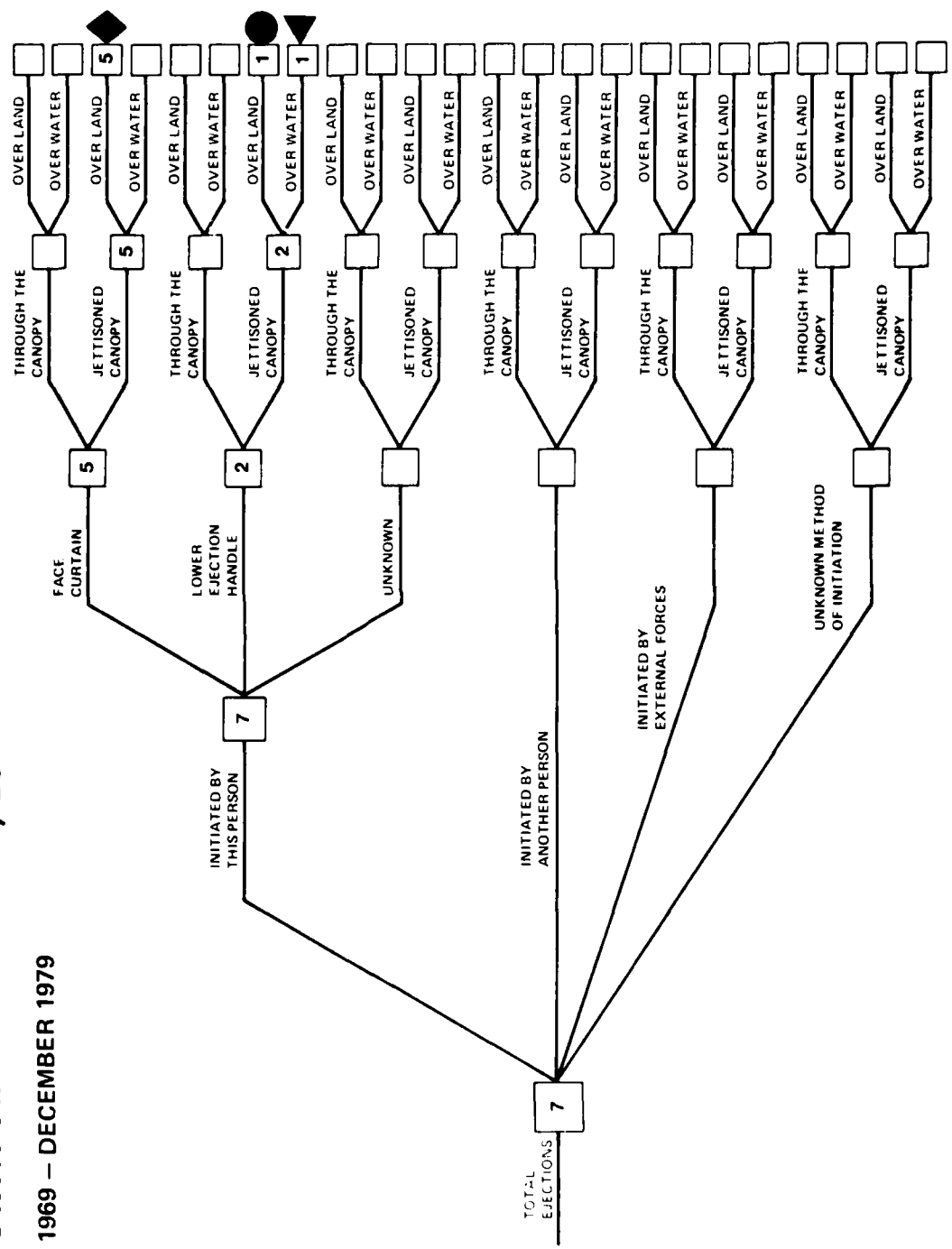
A-6/MARTIN-BAKER MK GRU5
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

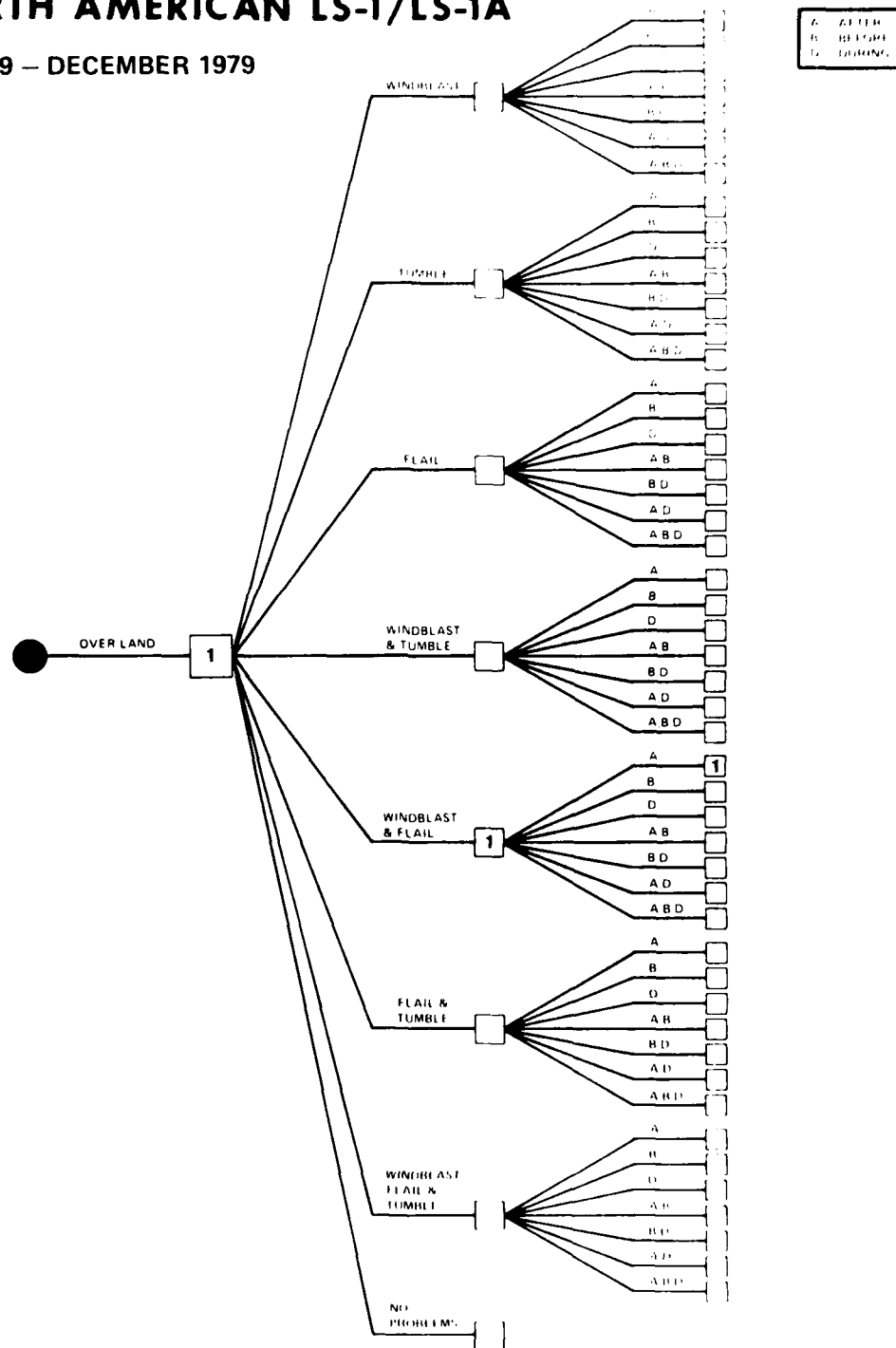
T-2/NORTH AMERICAN LS-1/LS-1A

JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS T-2/NORTH AMERICAN LS-1/LS-1A

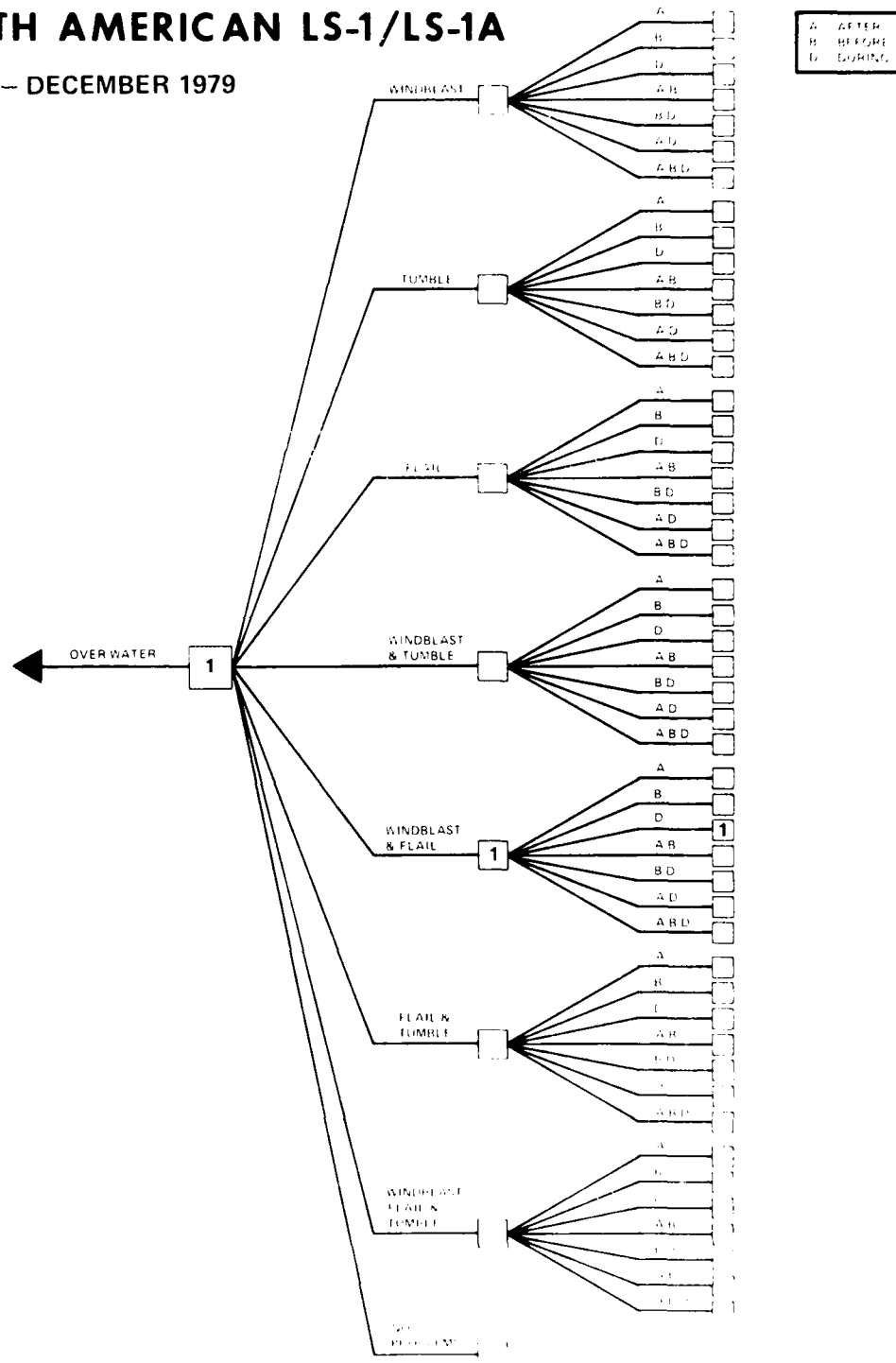
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

T-2/NORTH AMERICAN LS-1/LS-1A

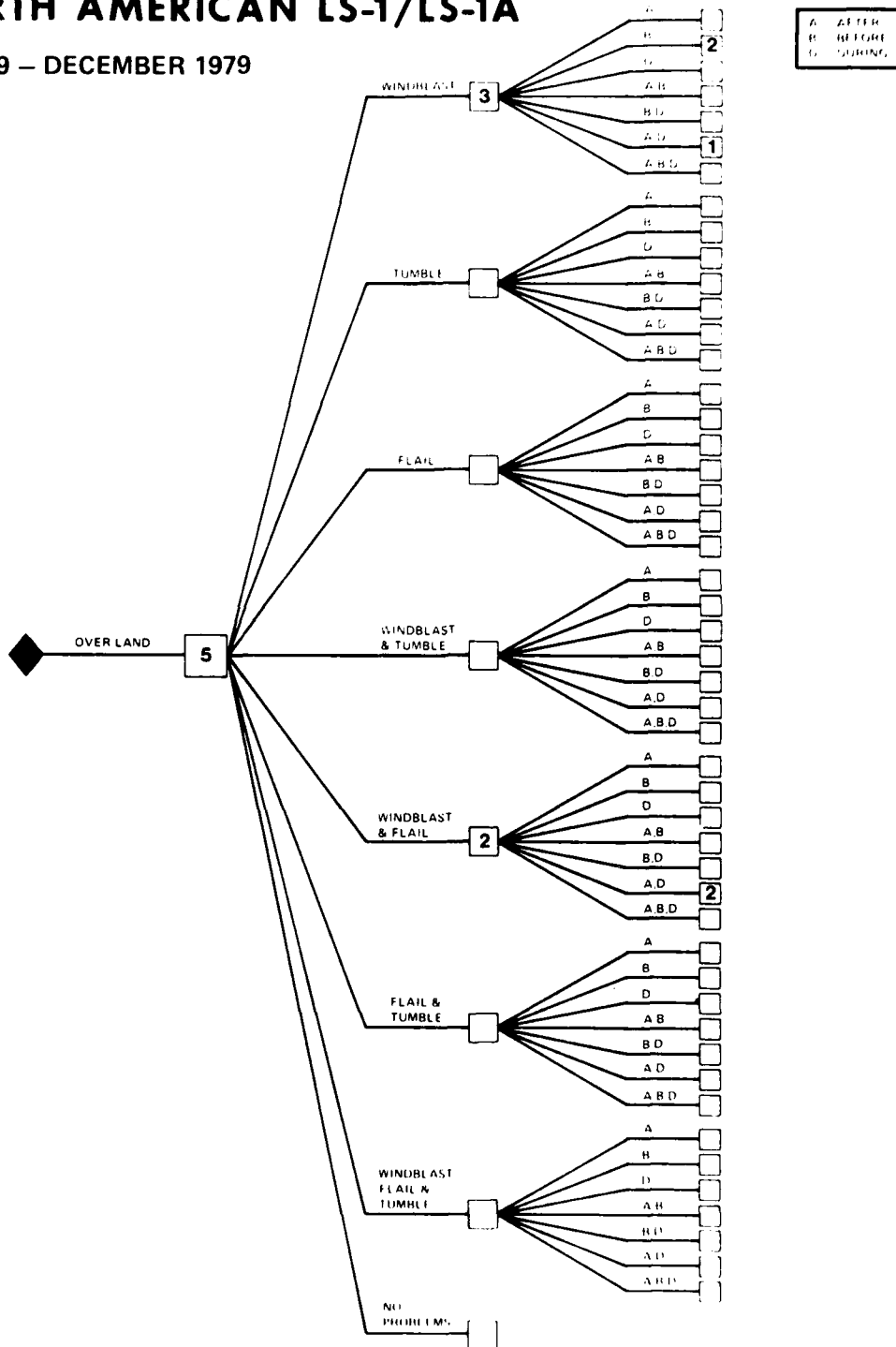
JANUARY 1969 – DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS

T-2/NORTH AMERICAN LS-1/LS-1A

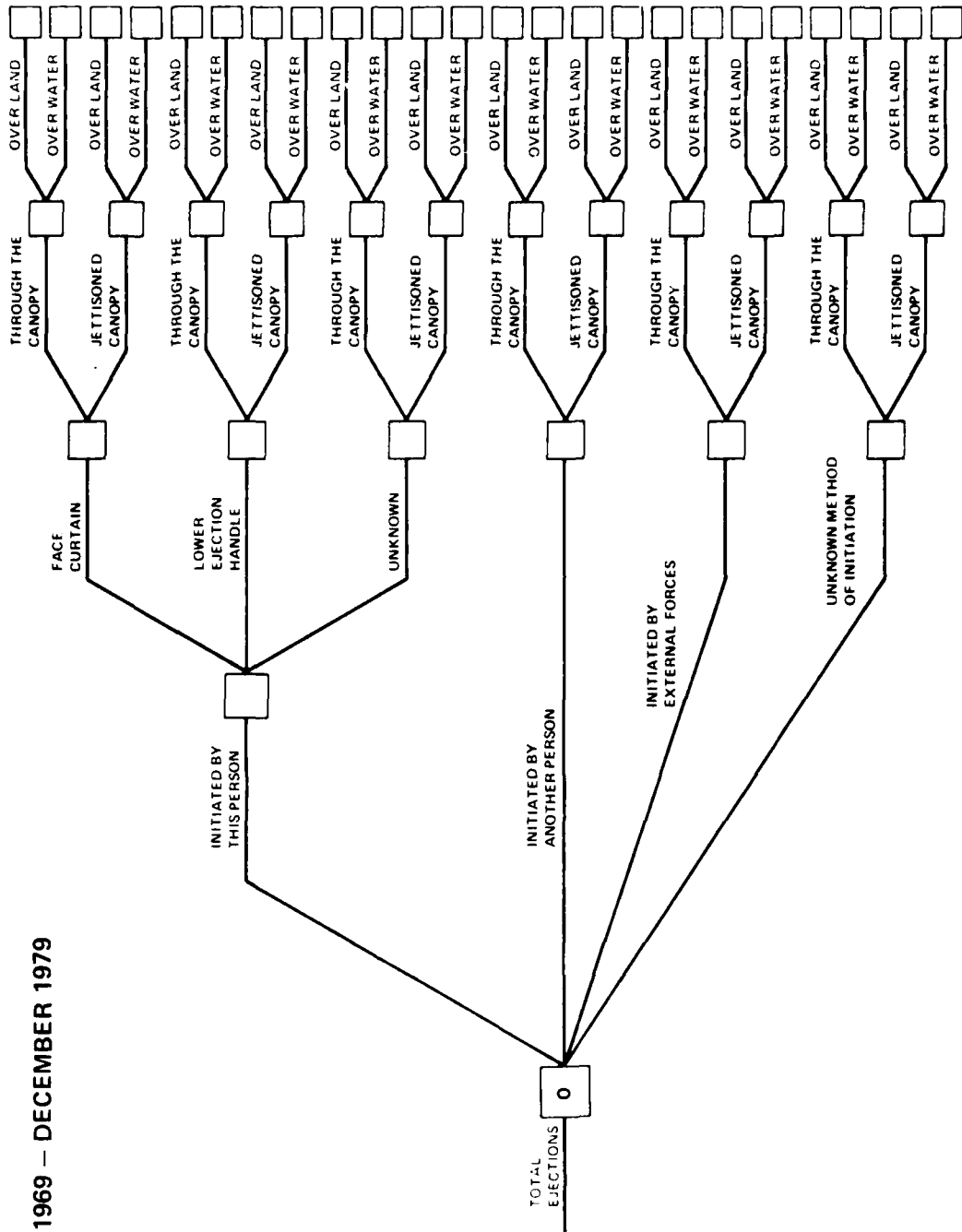
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

T-33/NAMC CATAPULT

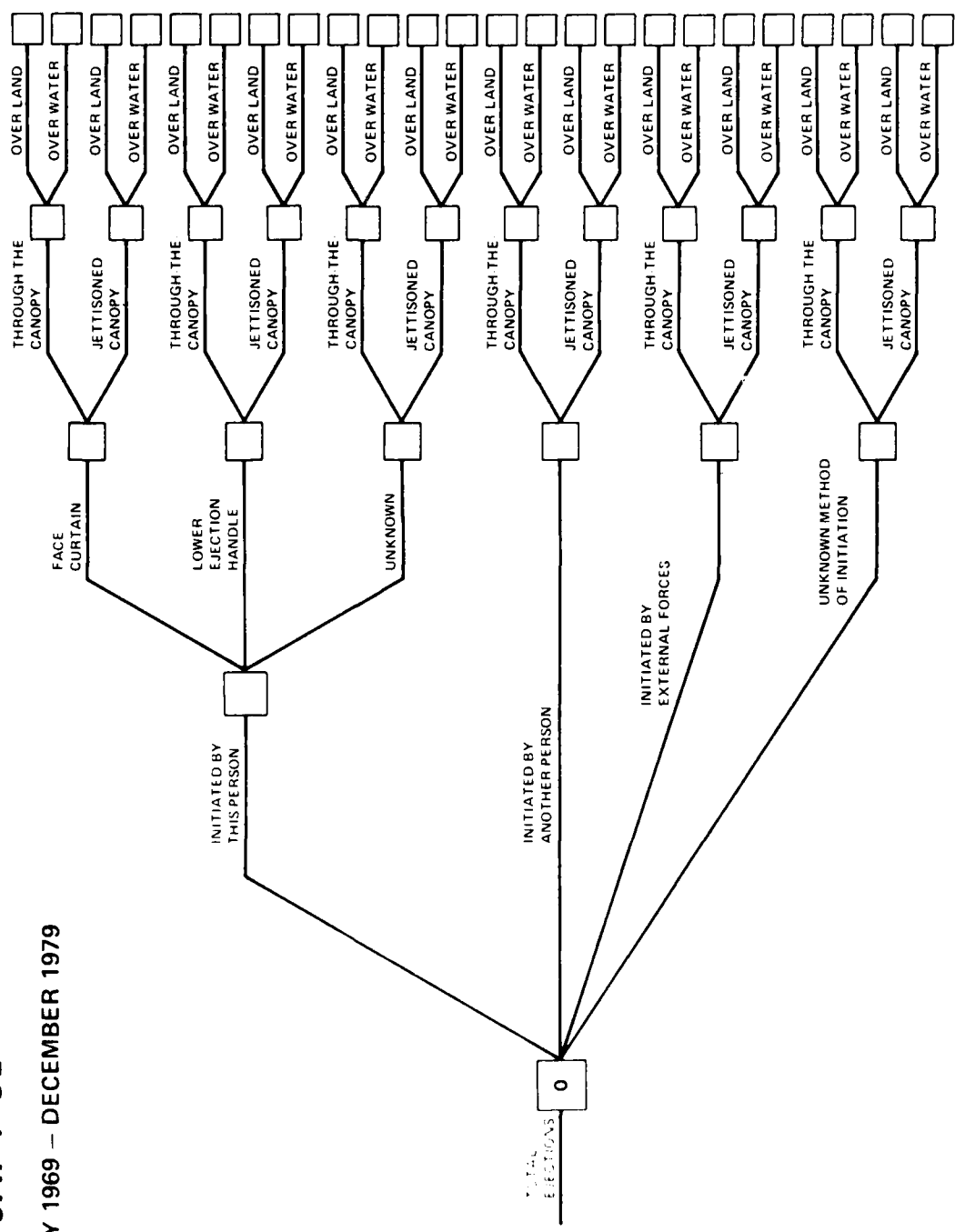
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

F-5/USAF F-5E

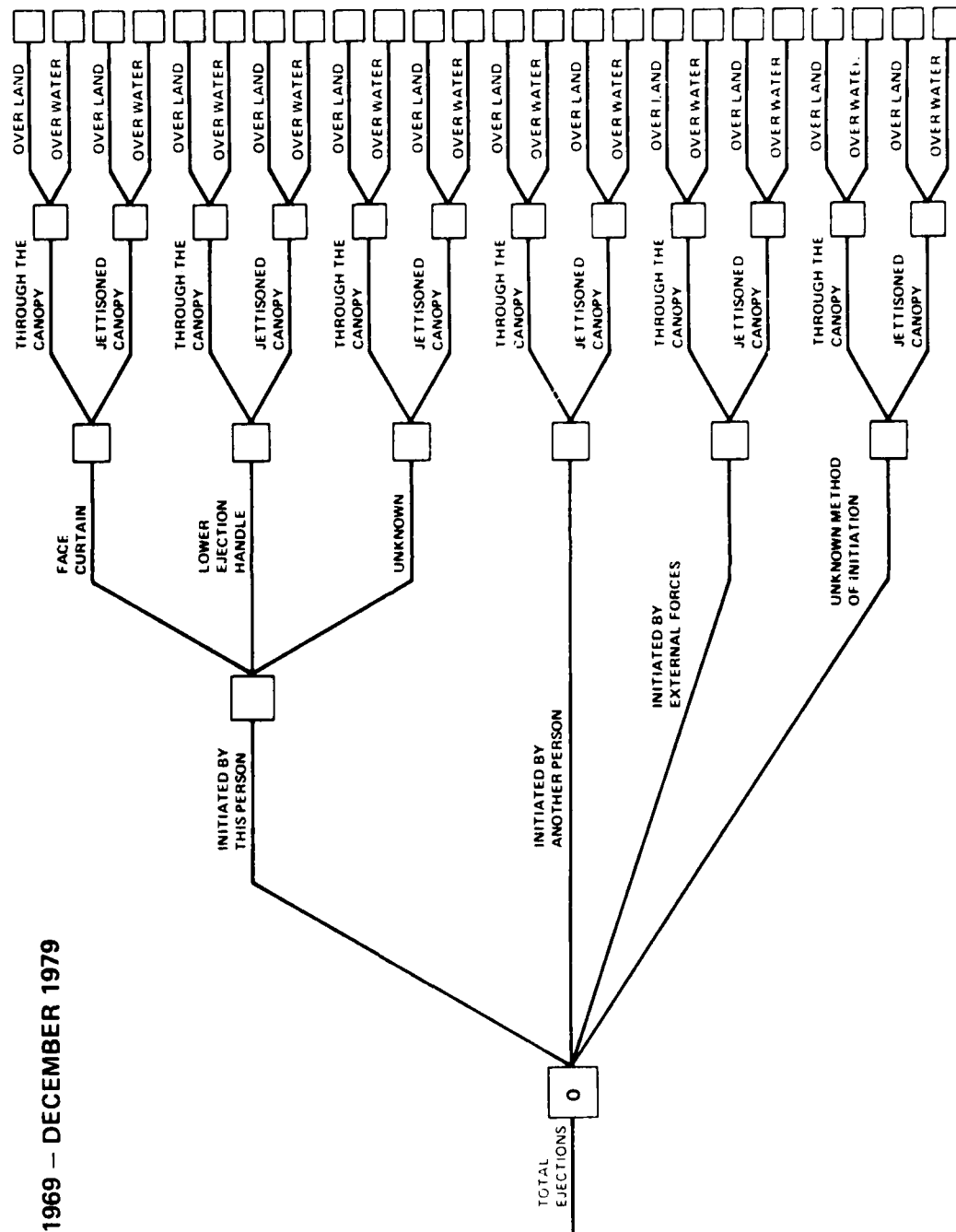
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

V-8 / MARTIN-BAKER H-9

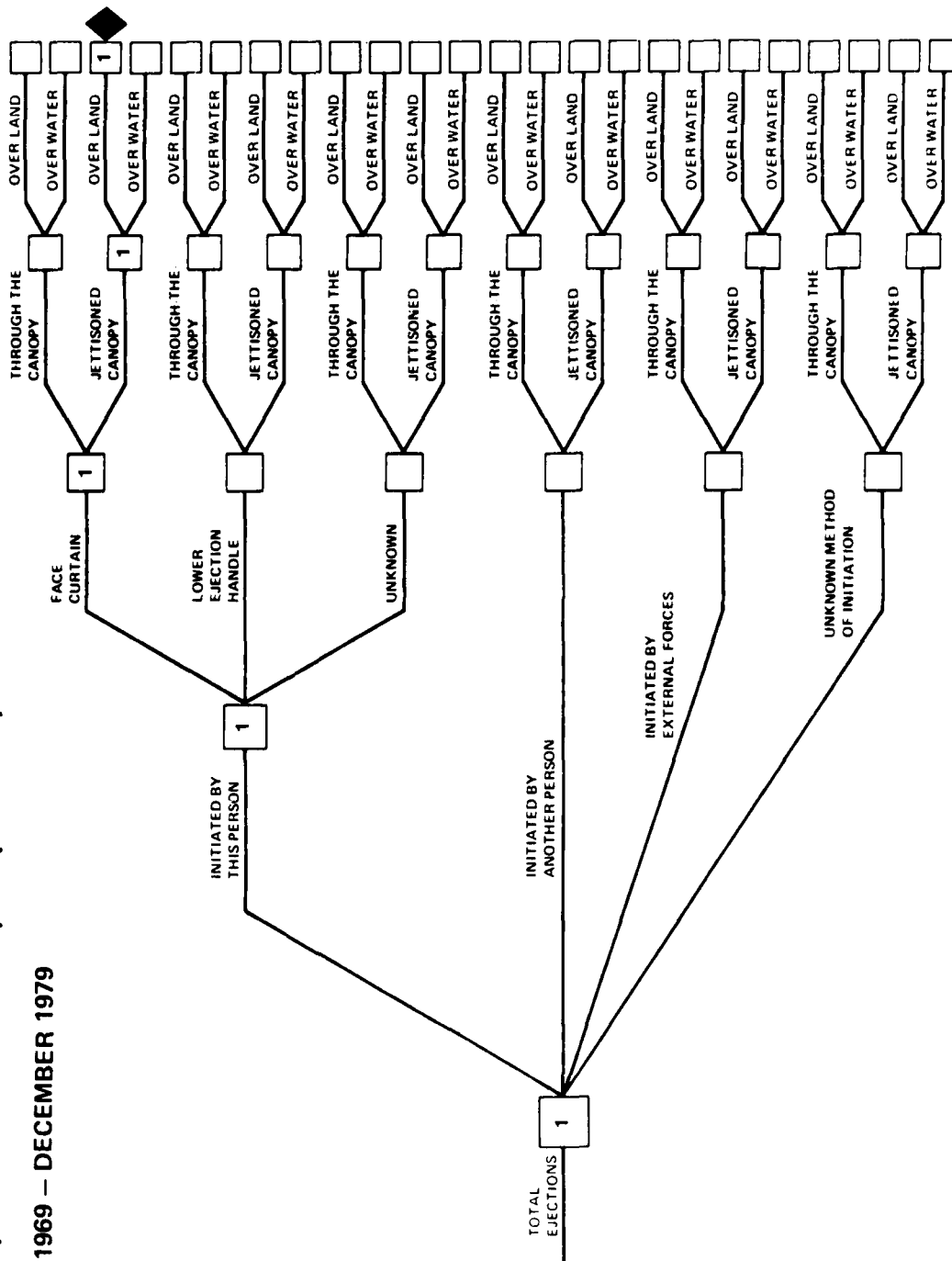
JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED 350 TO 600+ KTS

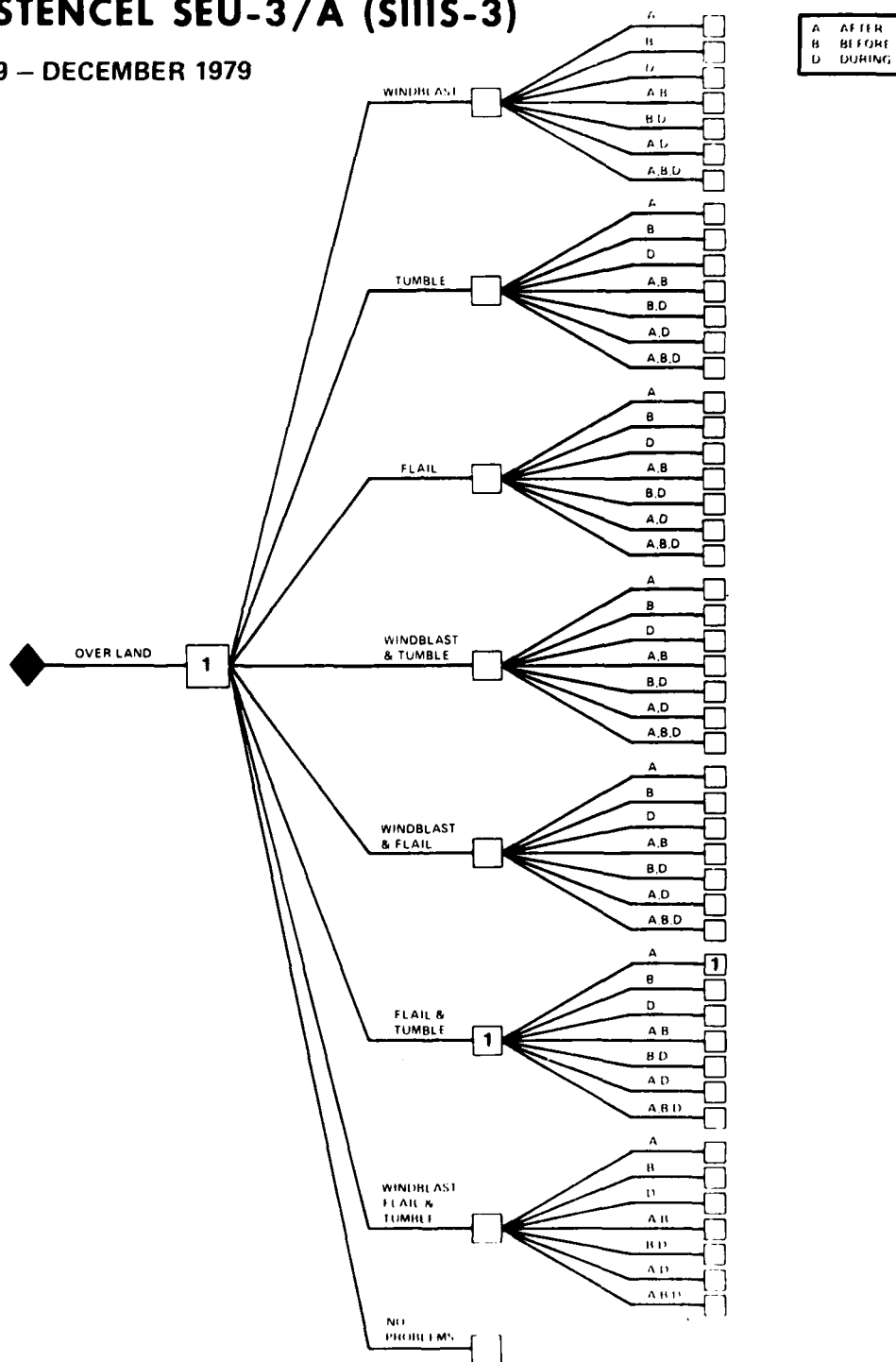
V-8/STENCEL SEU-3/A (SIIS-3)

JANUARY 1969 - DECEMBER 1979



DISTRIBUTION OF WINDBLAST, FLAIL AND TUMBLE ASSOCIATED PROBLEMS BY TYPE INITIATION AND HANDLE USED (CONT'D) 350 TO 600+ KTS V-8/STENCEL SEU-3/A (SIIS-3)

JANUARY 1969 – DECEMBER 1979



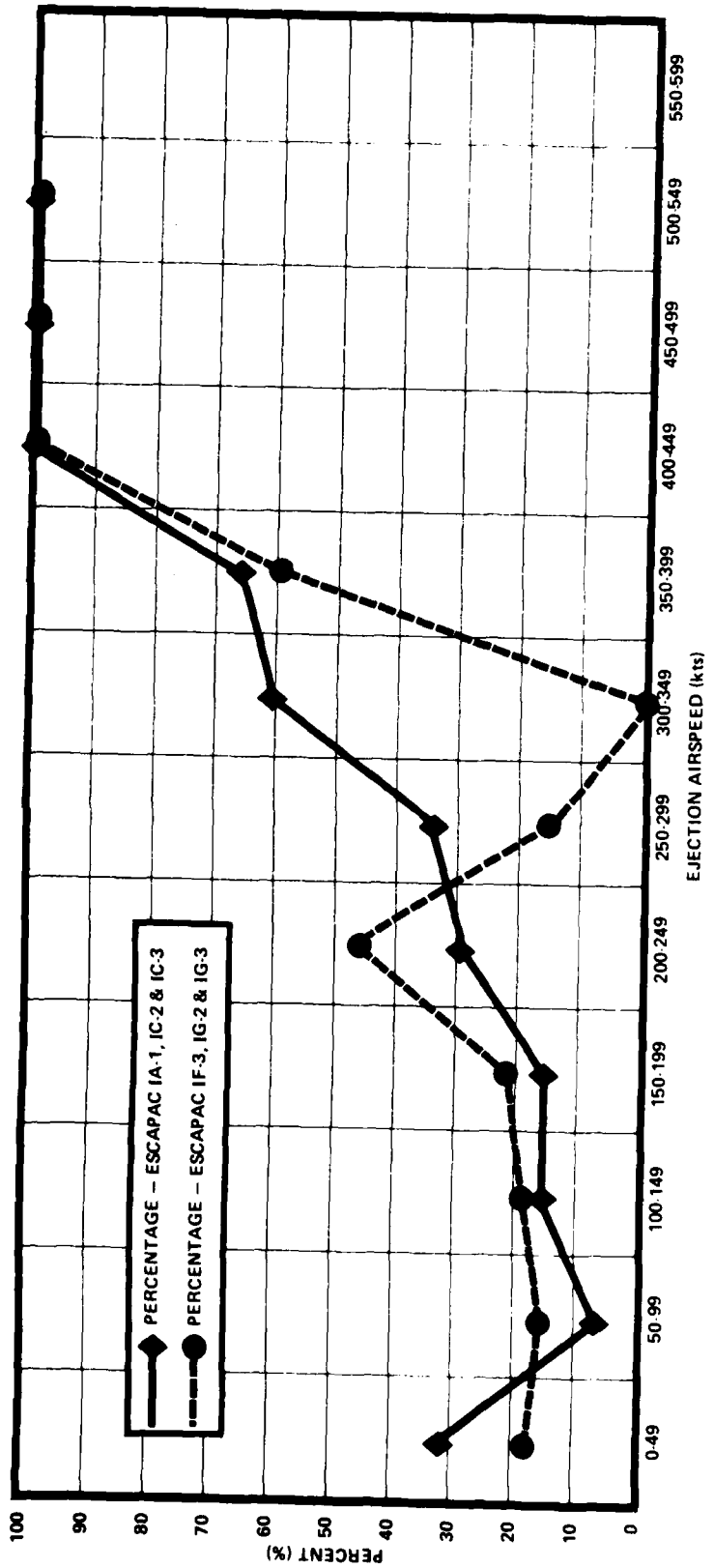
FLAILING INJURIES

- CLASSIC CAUSAL FACTOR FOR FLAILING INJURIES (ARMS & LEGS PRIMARILY) HAS BEEN WINDBLAST OR "q".
- SINCE $q \approx 1/2 \rho V^2$ WINDBLAST INDUCED TO FLAIL INJURIES SHOULD BE EXPECTED TO DEMONSTRATE A SQUARE FUNCTION RELATIONSHIP WITH EJECTION AIRSPEED.

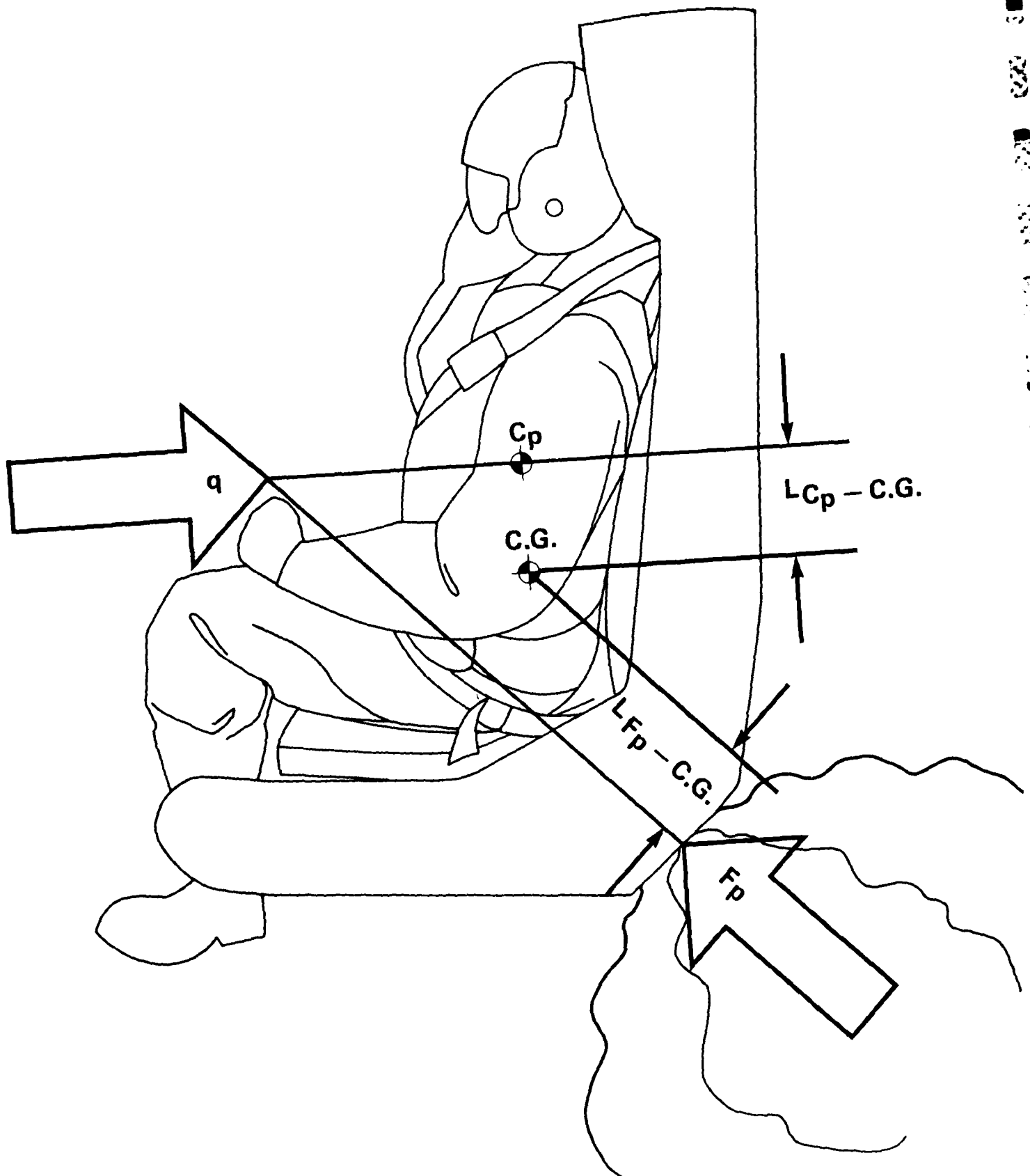
FLAILING INJURIES

- PROBABLE CAUSE FOR EXPECTED FLAIL INJURY INCIDENCE PATTERN SHOWING ONLY AMONGST SURVIVING EJECTEES IS MASKING EFFECTS OF
 - LOST CATEGORY
 - MULTIPLE EXTREME INJURIES CATEGORY
- ALTHOUGH THESE EJECTEES MAY HAVE SUFFERED FLAILING INJURIES DETECTION IMPOSSIBLE FOR THOSE IN LOST CATEGORY AND UNLIKELY DUE TO MASSIVENESS OF INJURIES SUSTAINED BY THOSE IN MULTIPLE EXTREME INJURY CATEGORY.

COMPARISON OF INCIDENCE RATE OF FLAIL, WINDBLAST AND/OR TUMBLE PROBLEMS AMONG SURVIVING EJECTEES USING ESCAPAC IA-1, IC-2 & IC-3 AND USING ESCAPAC IF-3, IG-2 & IG-3 EJECTION SEATS (1 JANUARY 1969 THROUGH 31 DECEMBER 1979)



UNBALANCING FORCES ACTING UPON SEAT-EJECTEE COMBINATION IMMEDIATELY AFTER RAIL SEPARATION



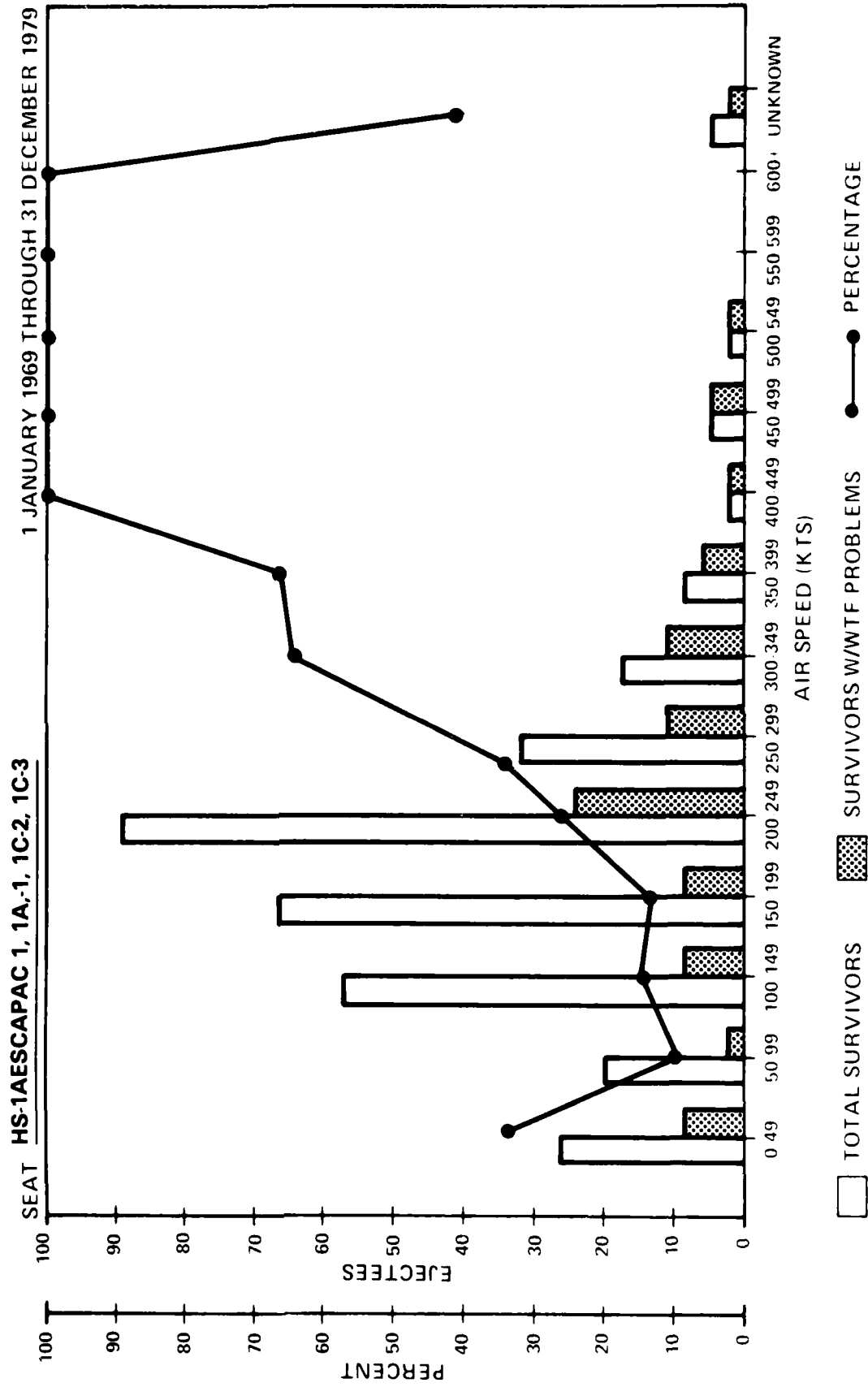
**GENERALIZED VIEW OF SIIIS-3 EJECTION SEAT SHOWING
HEADBOX MOUNTED PARACHUTE
FREE TO DEPLOY WITH EJECTEE IN SEAT**



**GENERALIZED VIEW OF ESCAPAC EJECTION SEAT SHOWING
MANUAL BAILOUT TYPE PARACHUTE
TRAPPED BETWEEN EJECTEE AND SEAT BACK**

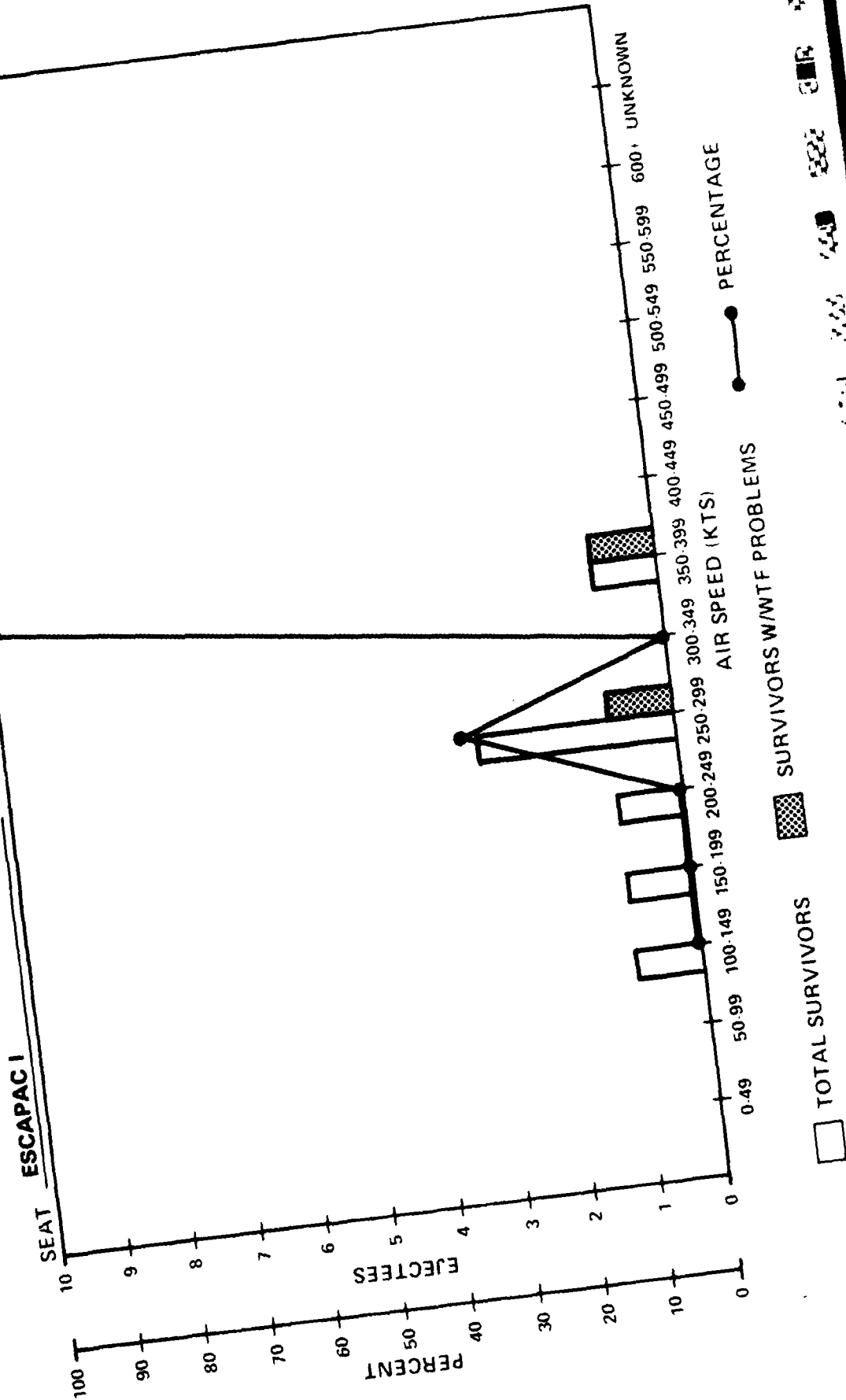


OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES



OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

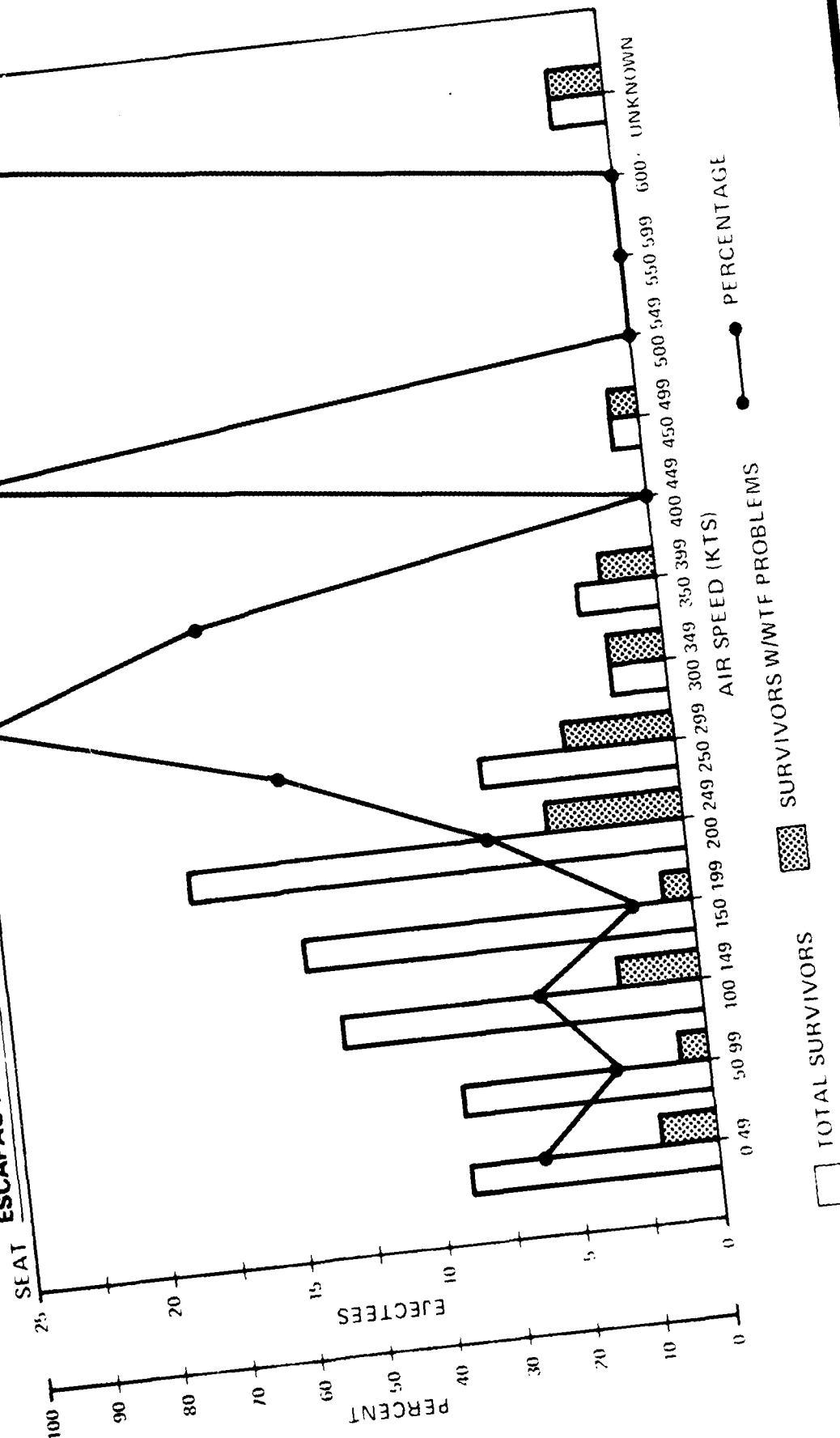
1 JANUARY 1969 THROUGH 31 DECEMBER 1979



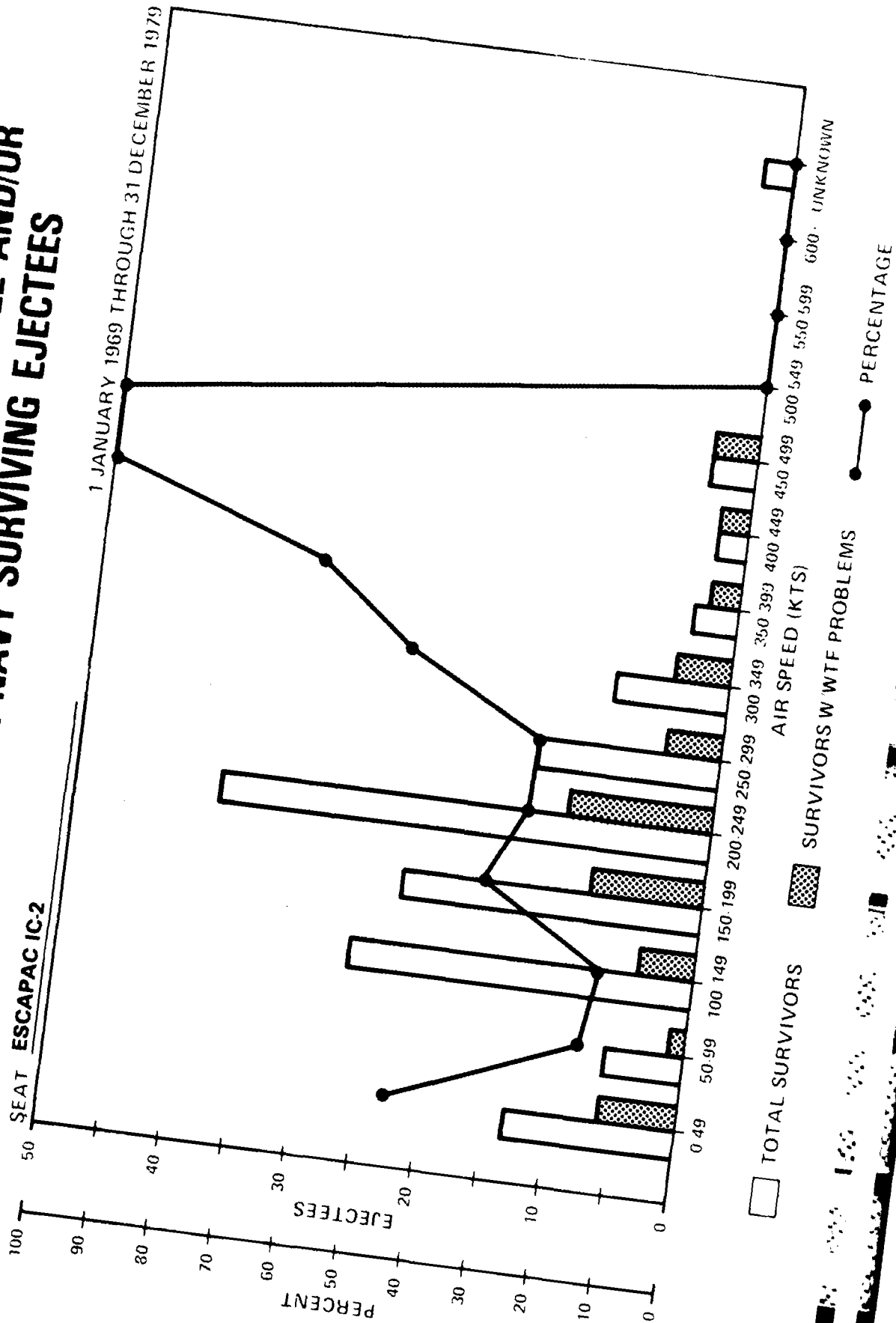
OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

1 JANUARY 1969 THROUGH 31 DECEMBER 1979

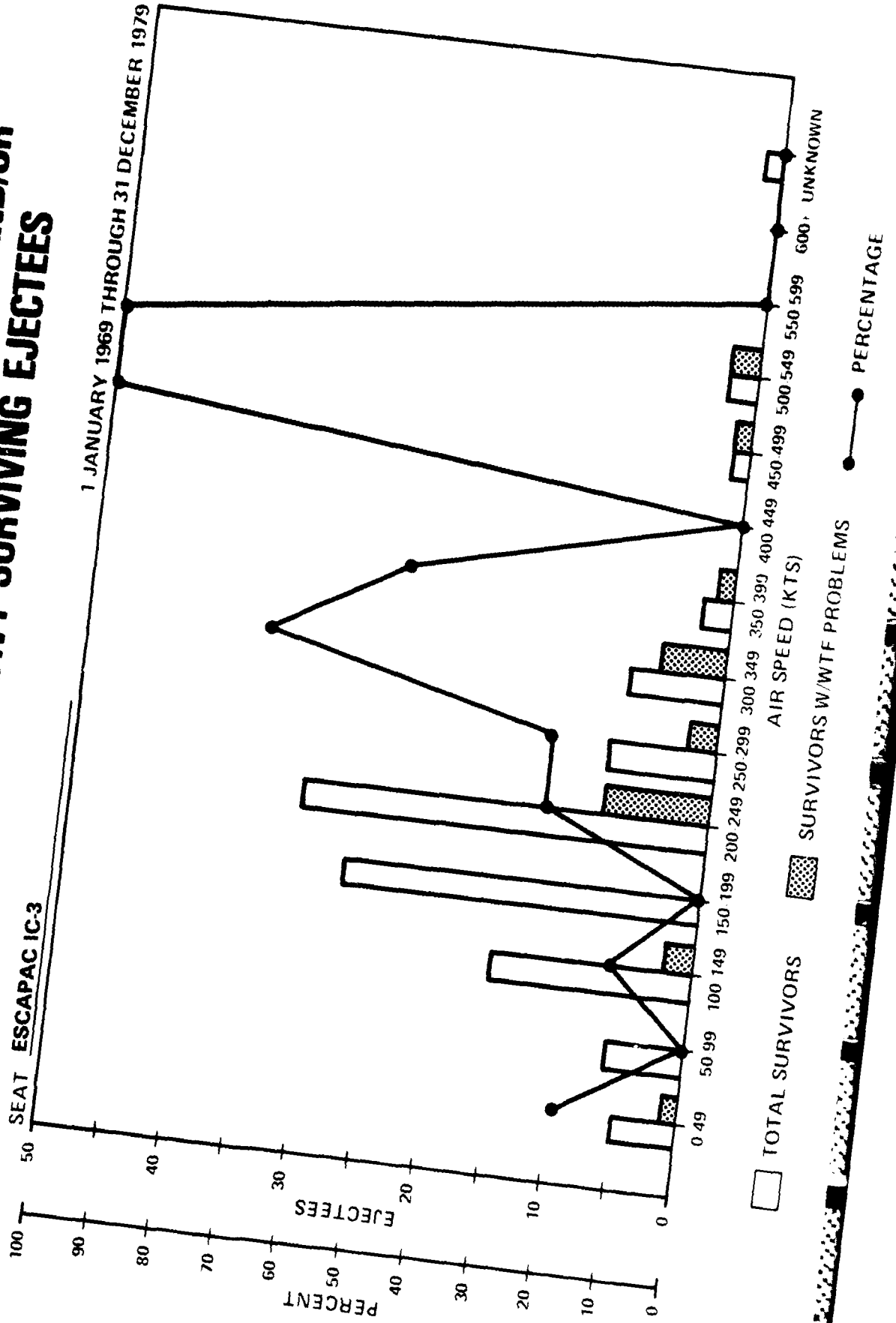
ESCAPAC IA-1



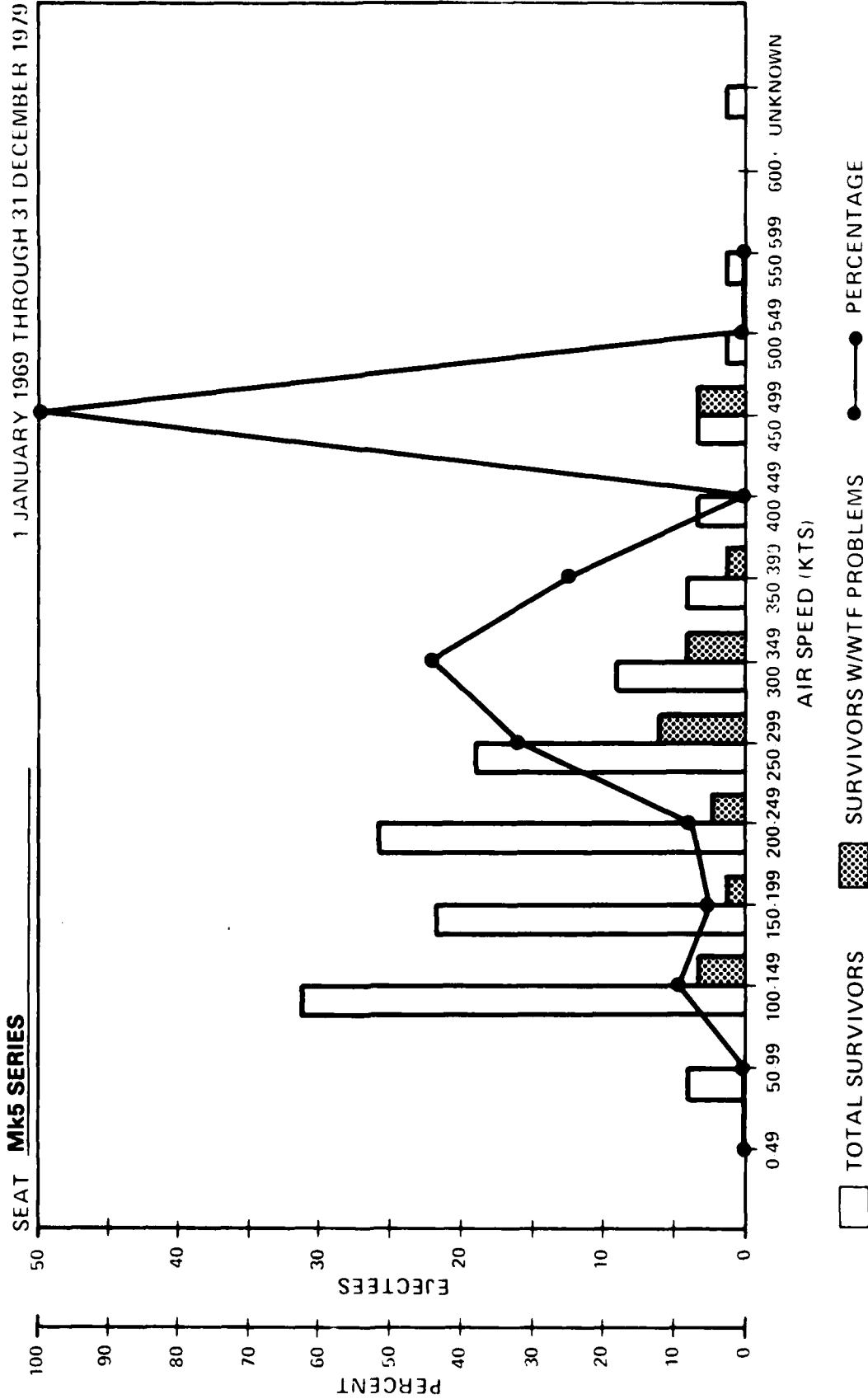
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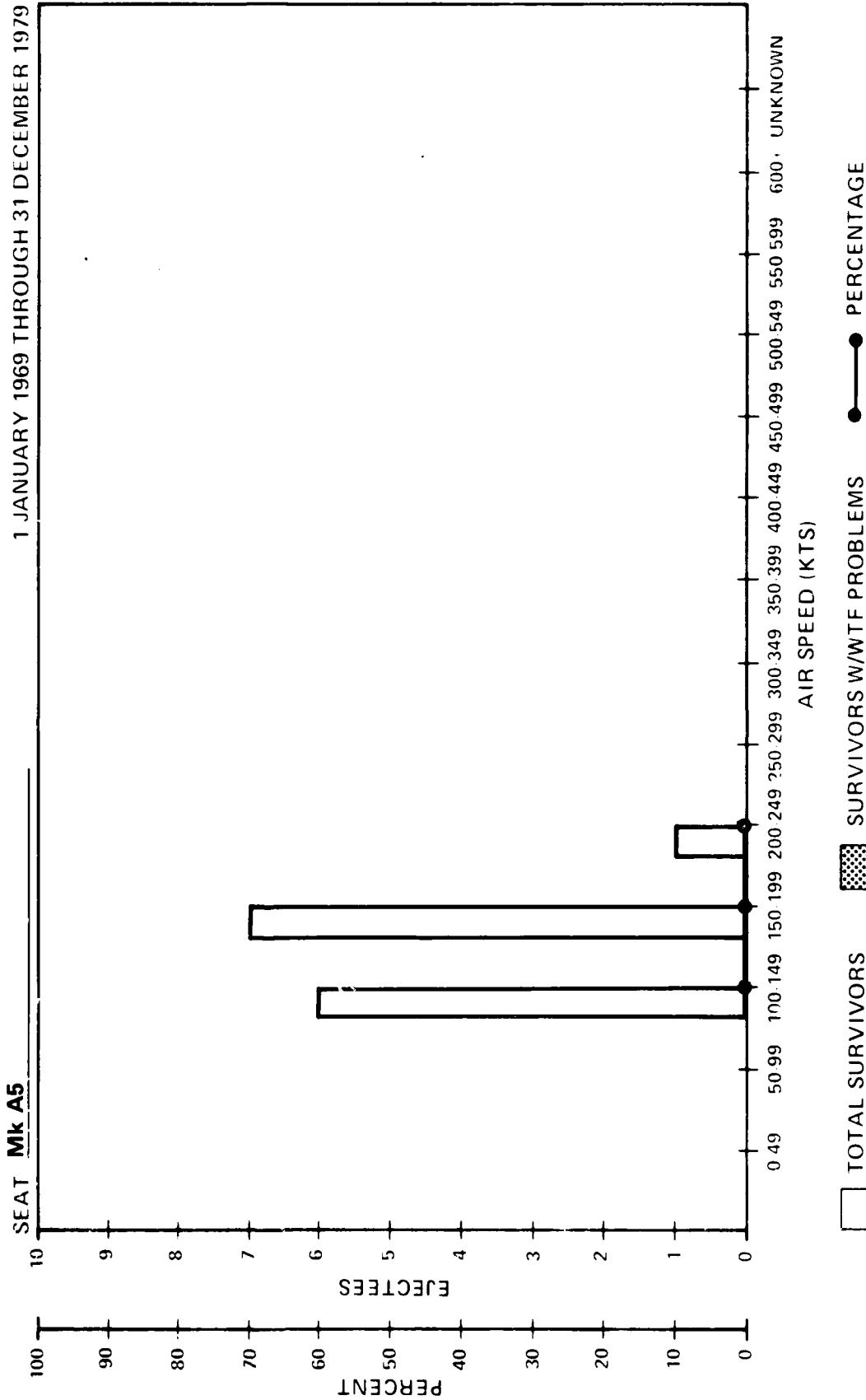
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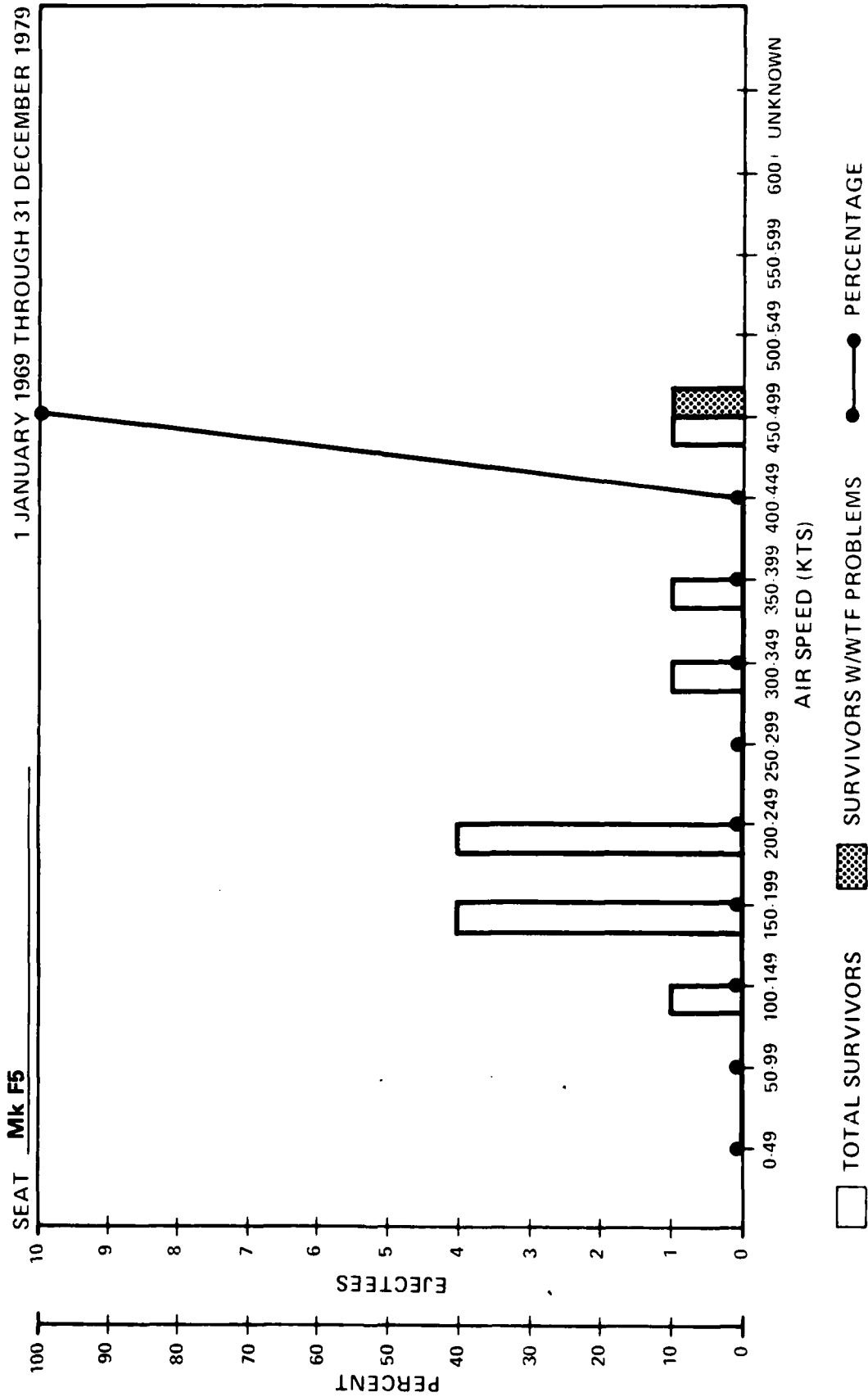
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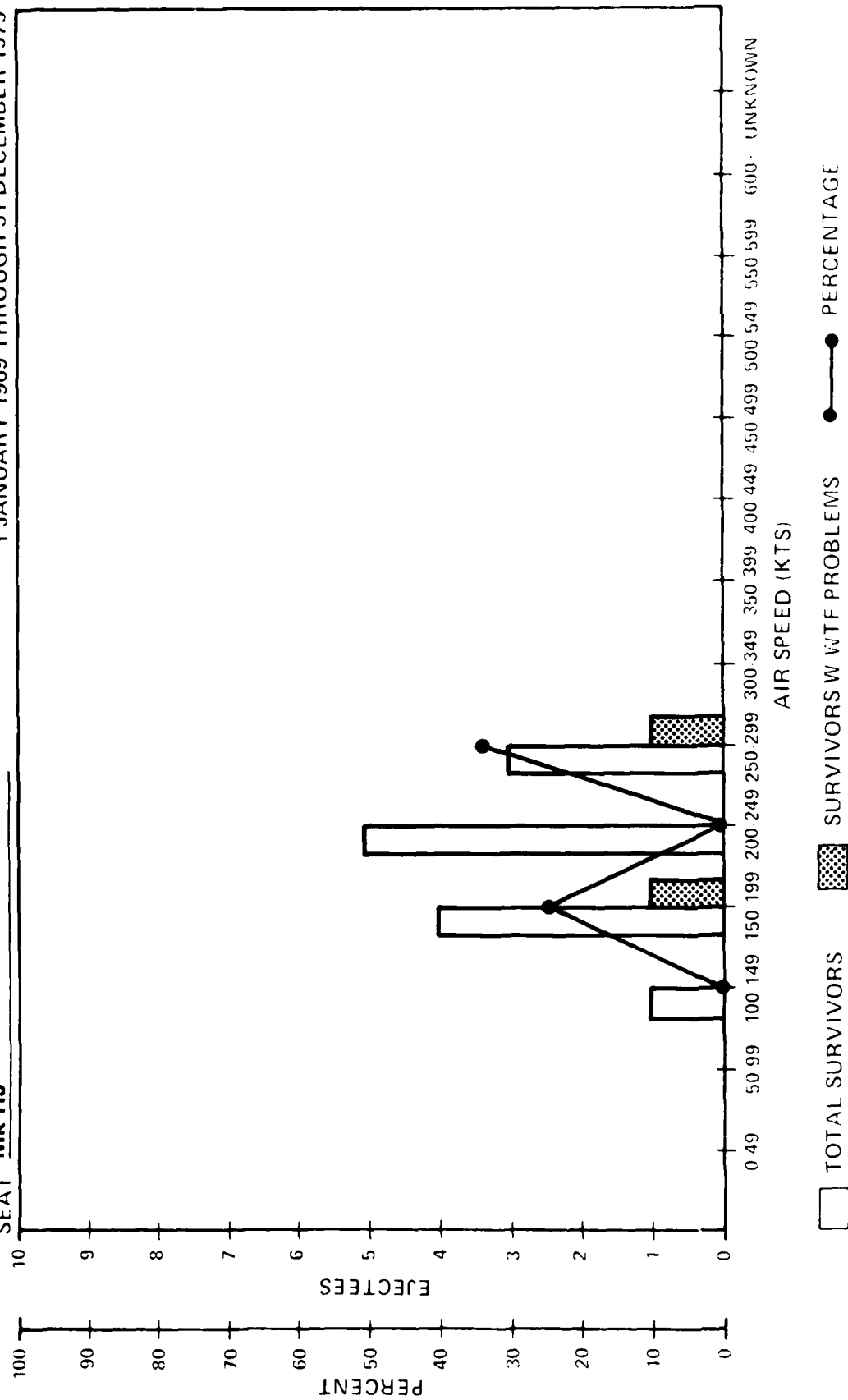


OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

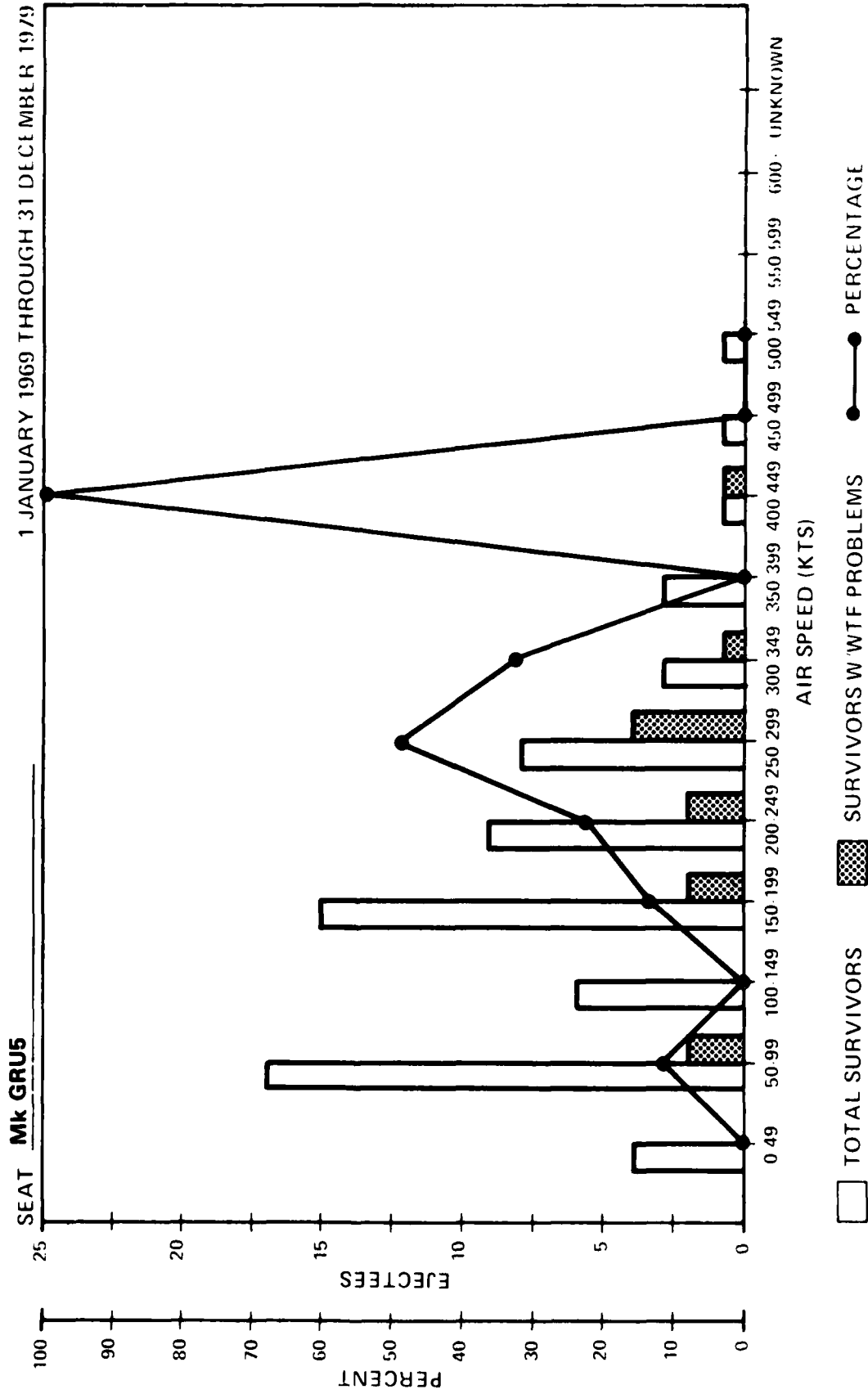


OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

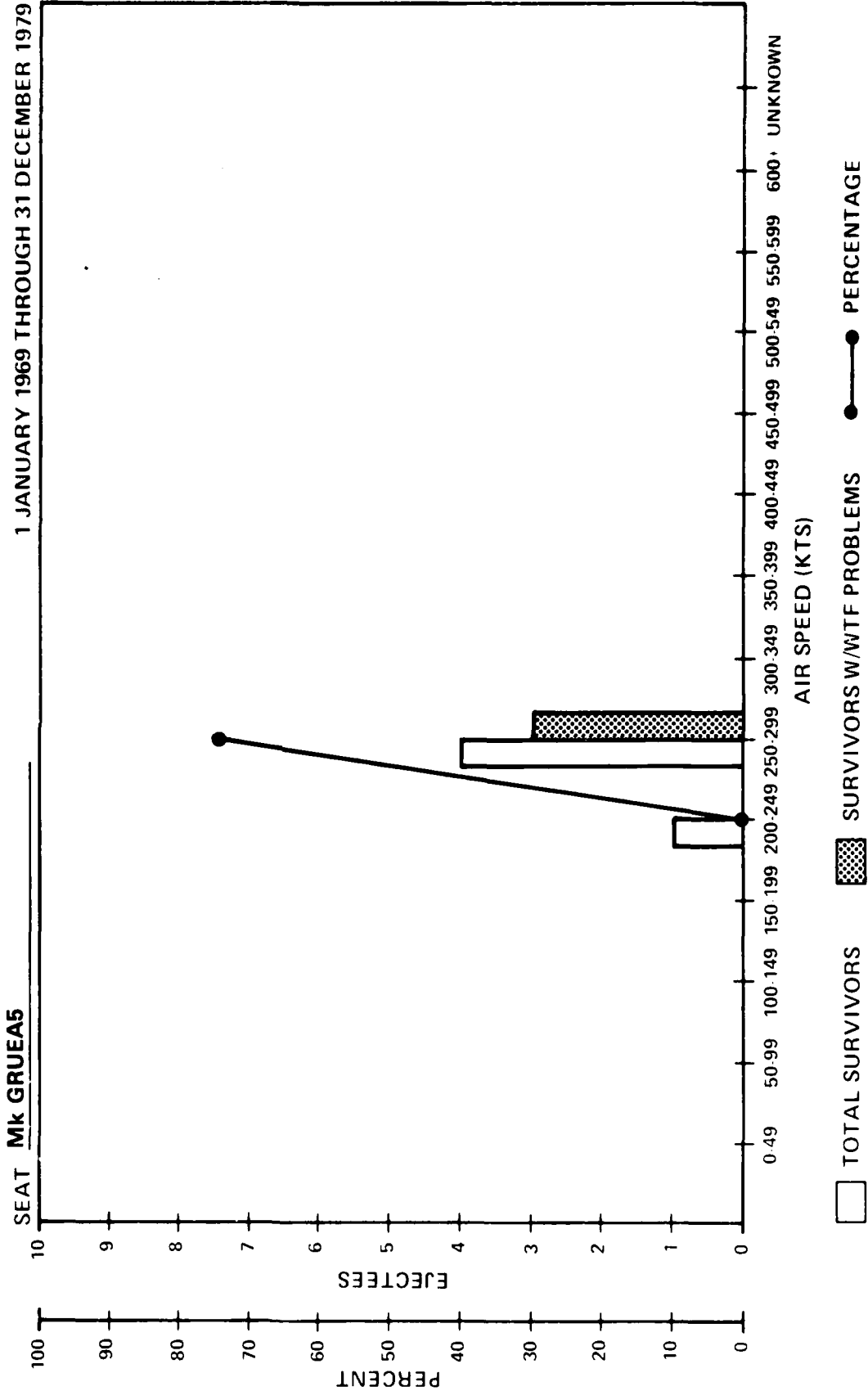
SEAT Mk H5 1 JANUARY 1969 THROUGH 31 DECEMBER 1979



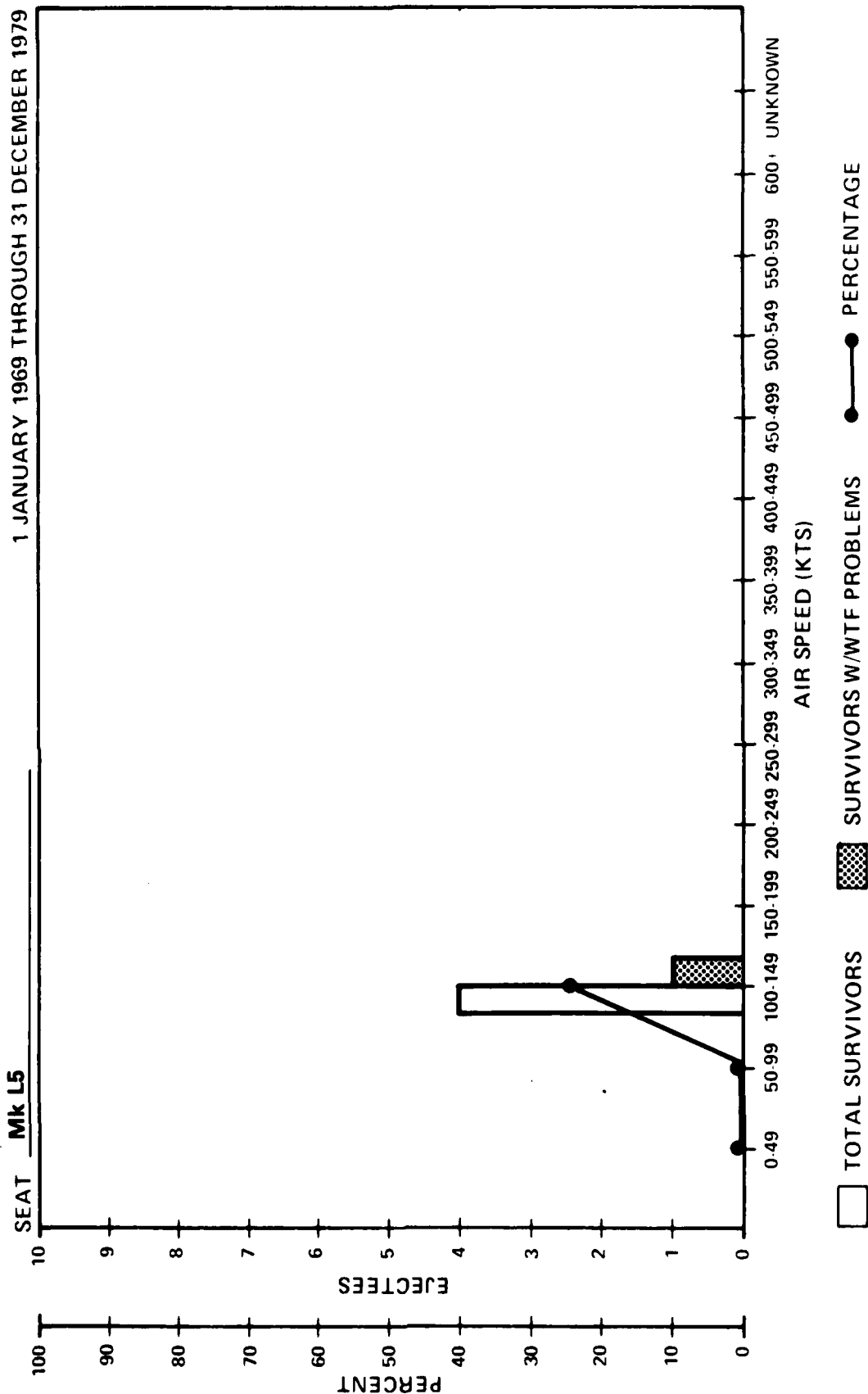
OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES



OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

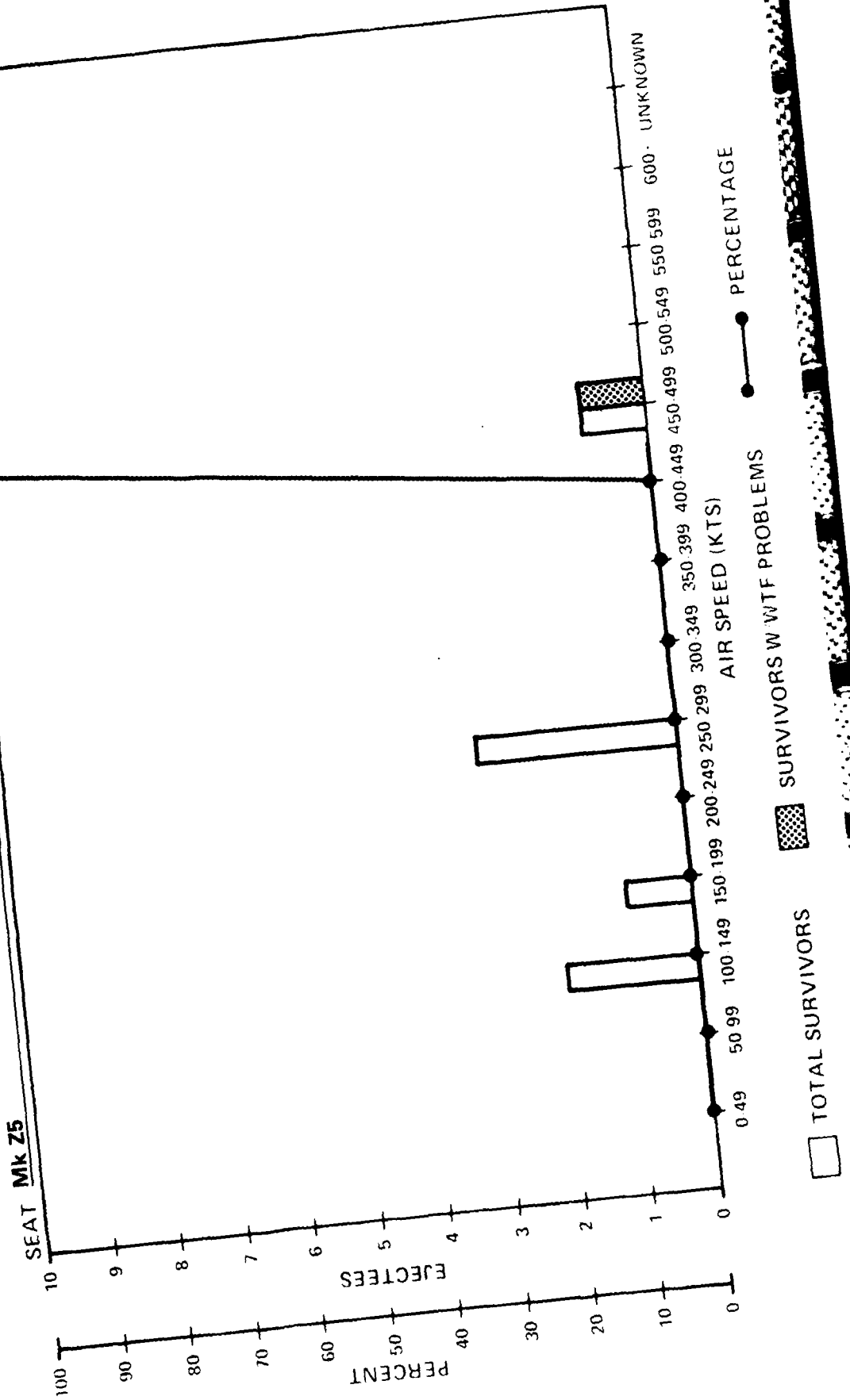


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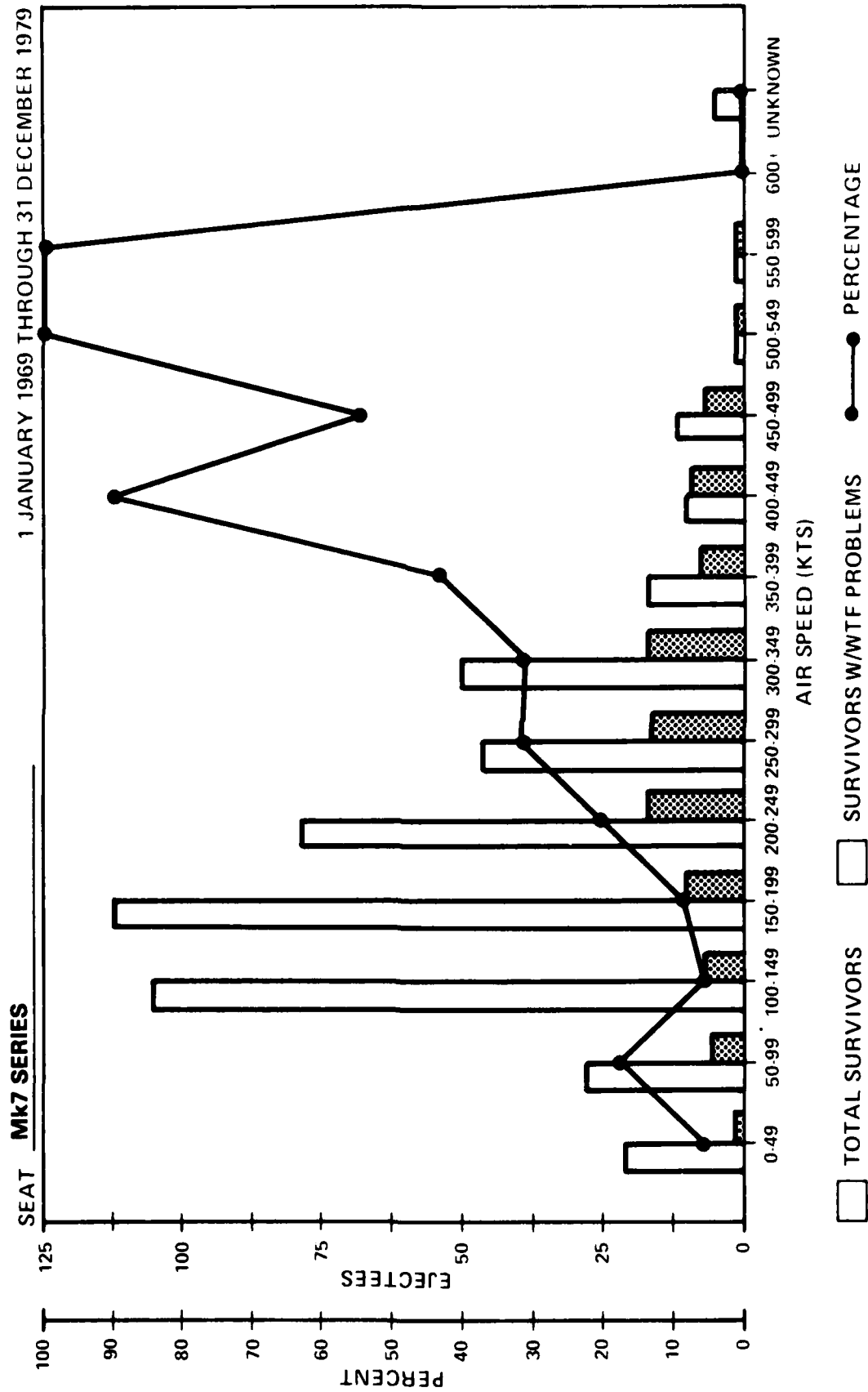


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1 JANUARY 1969 THROUGH 31 DECEMBER 1979

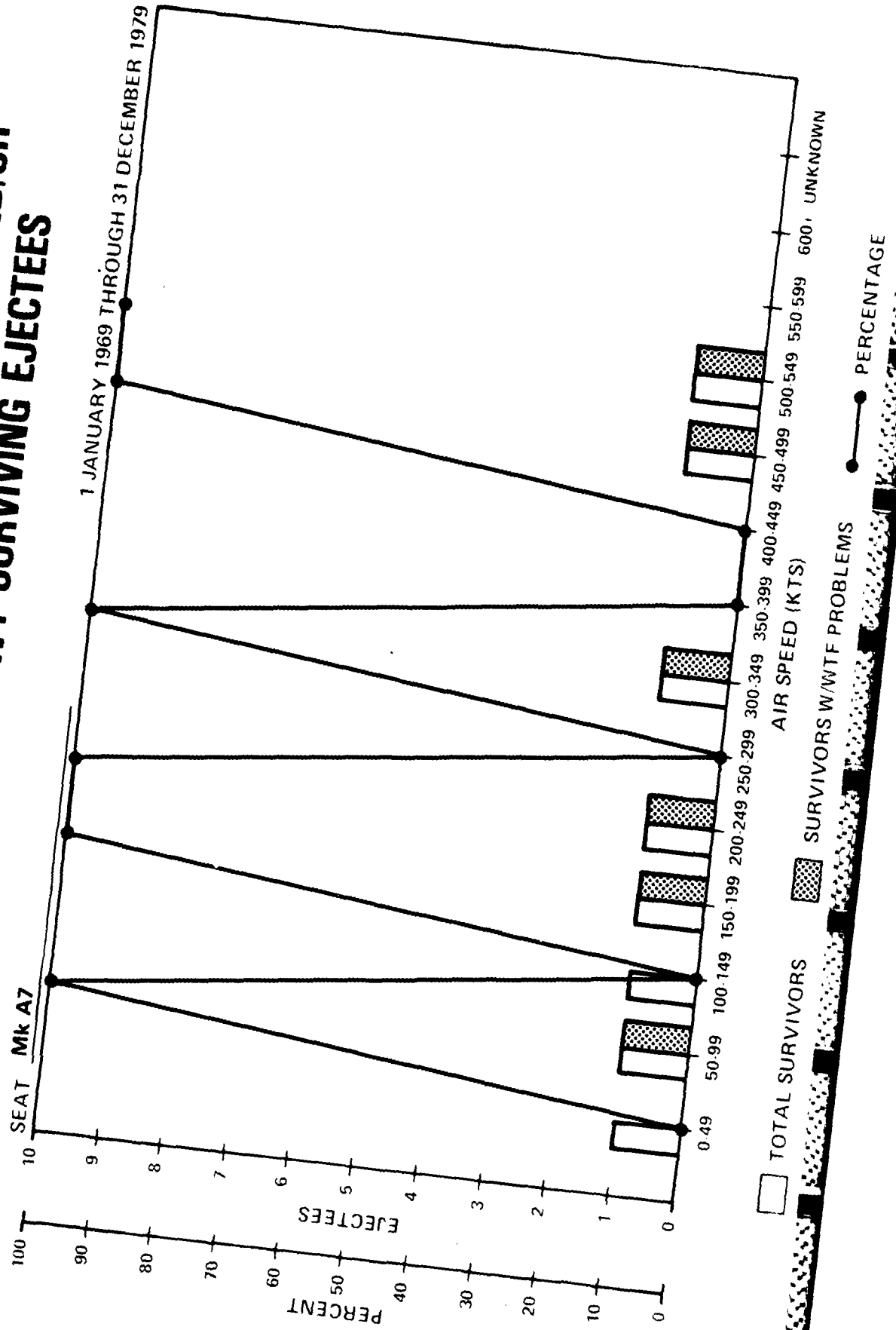


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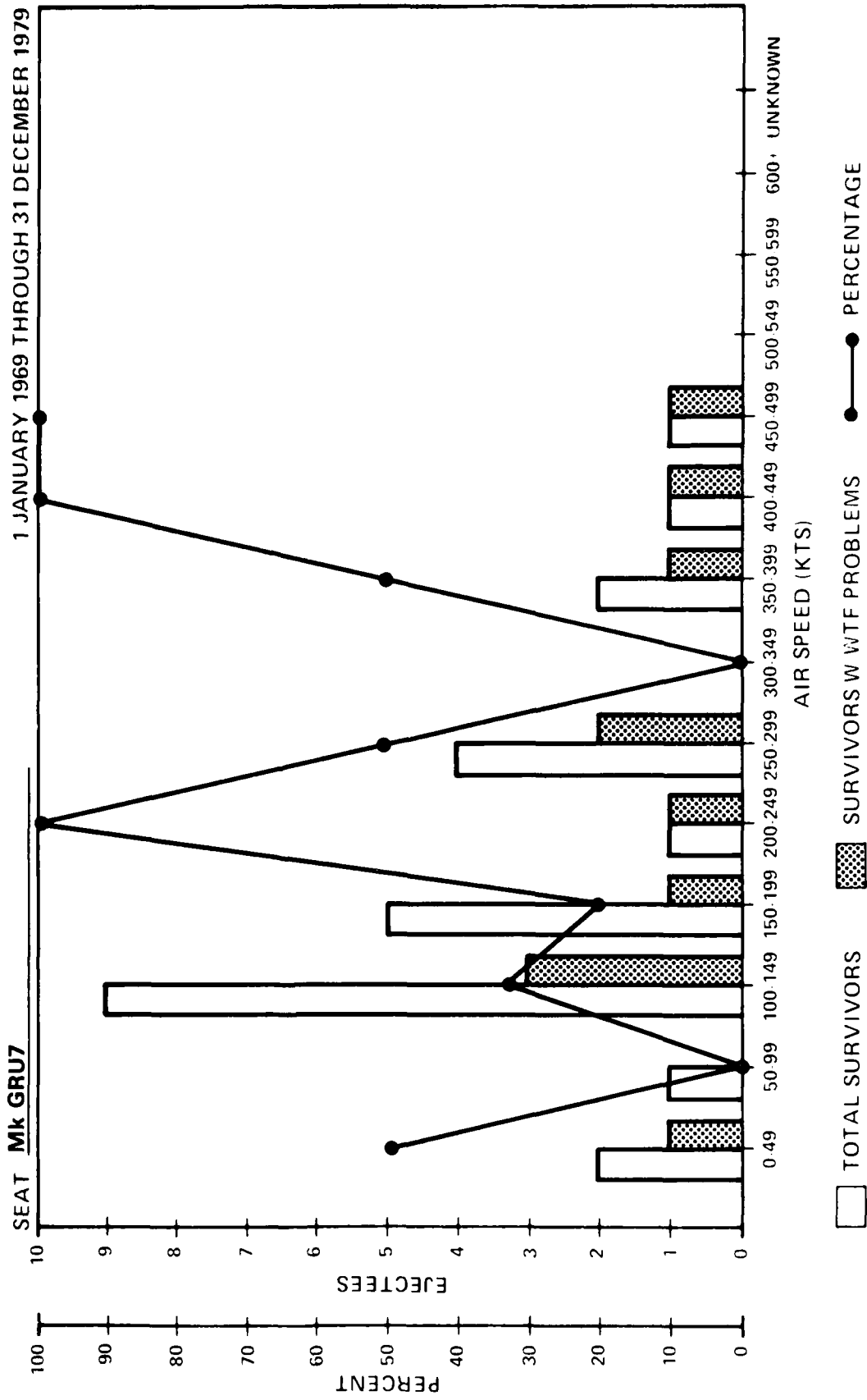


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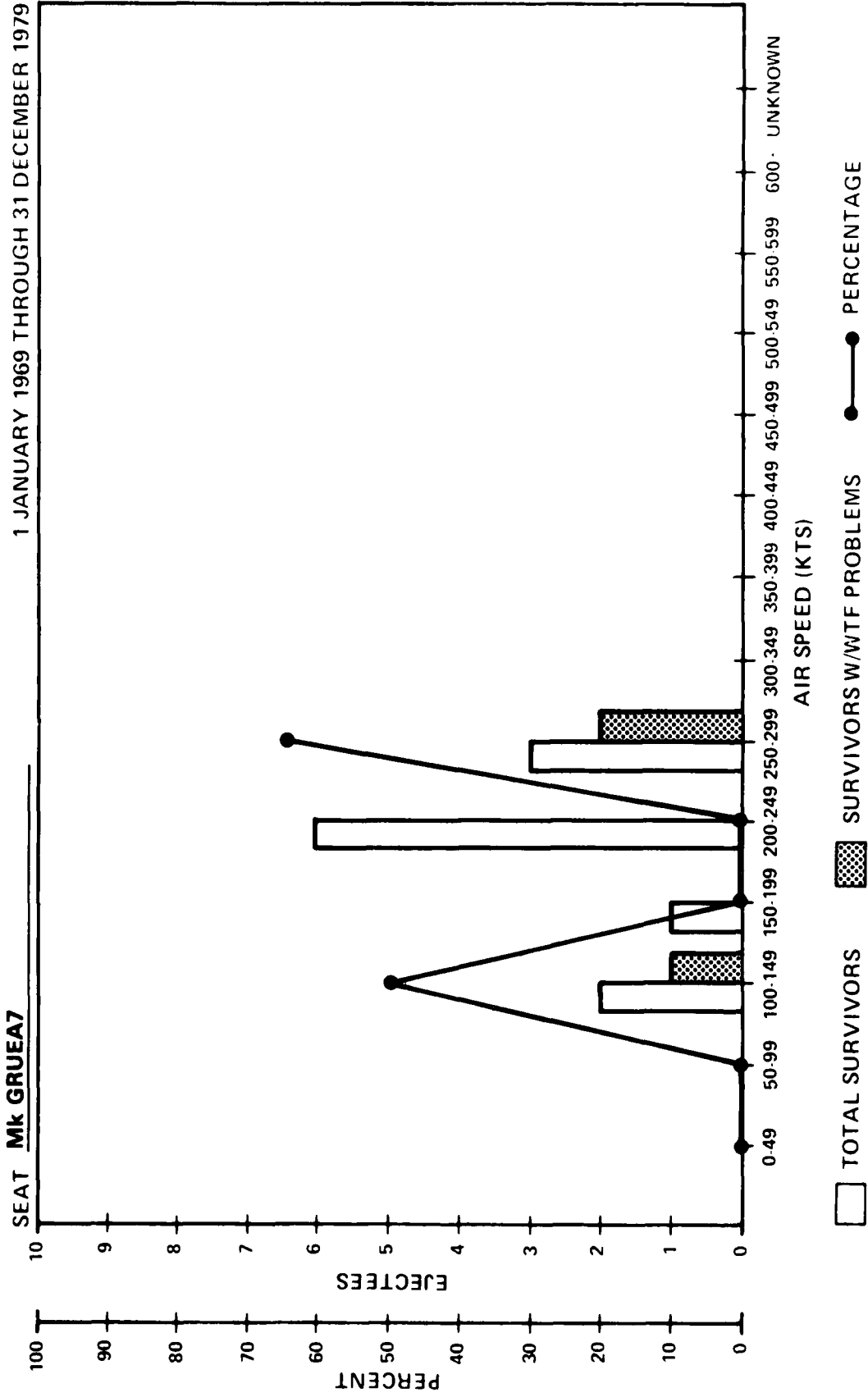
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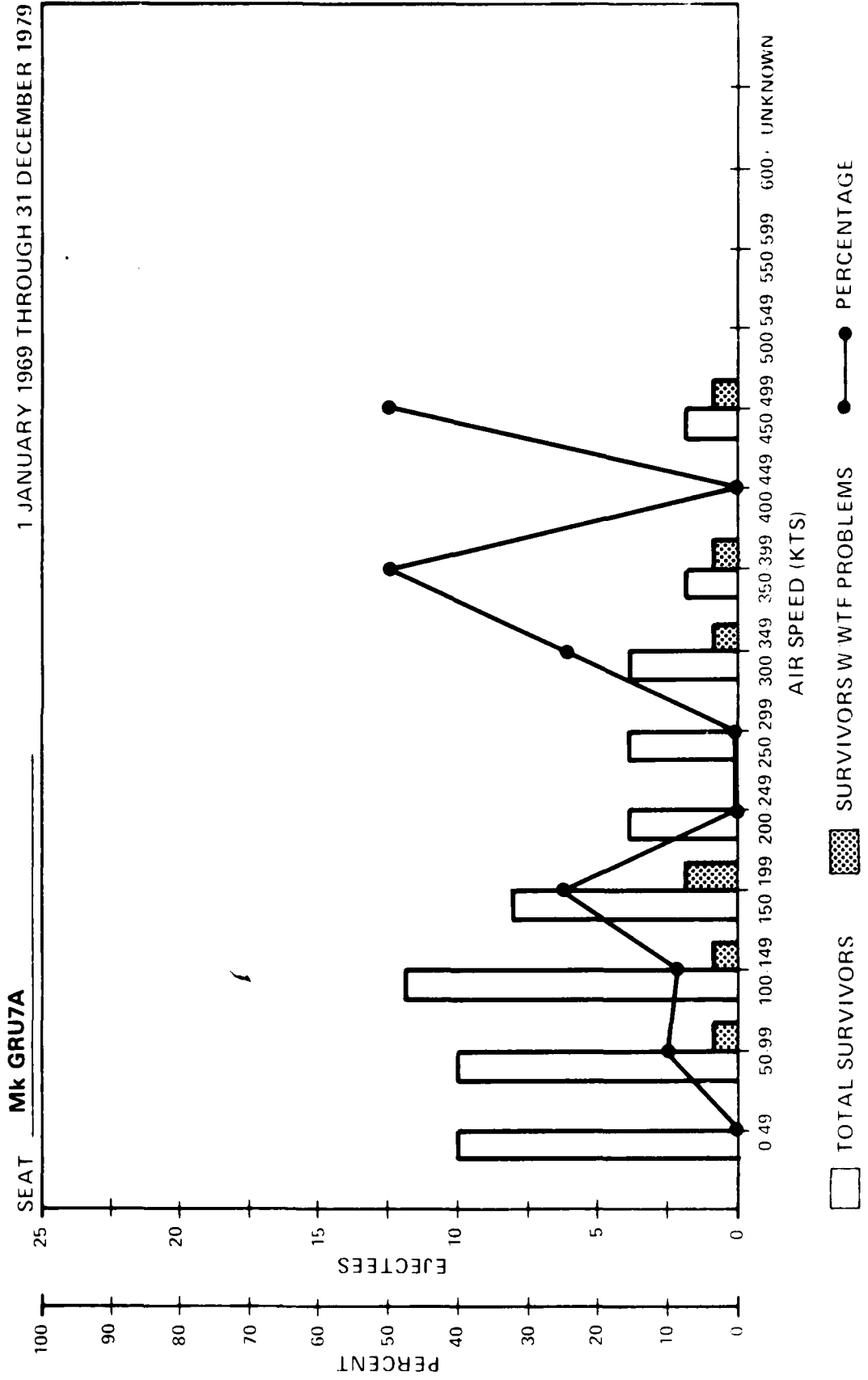
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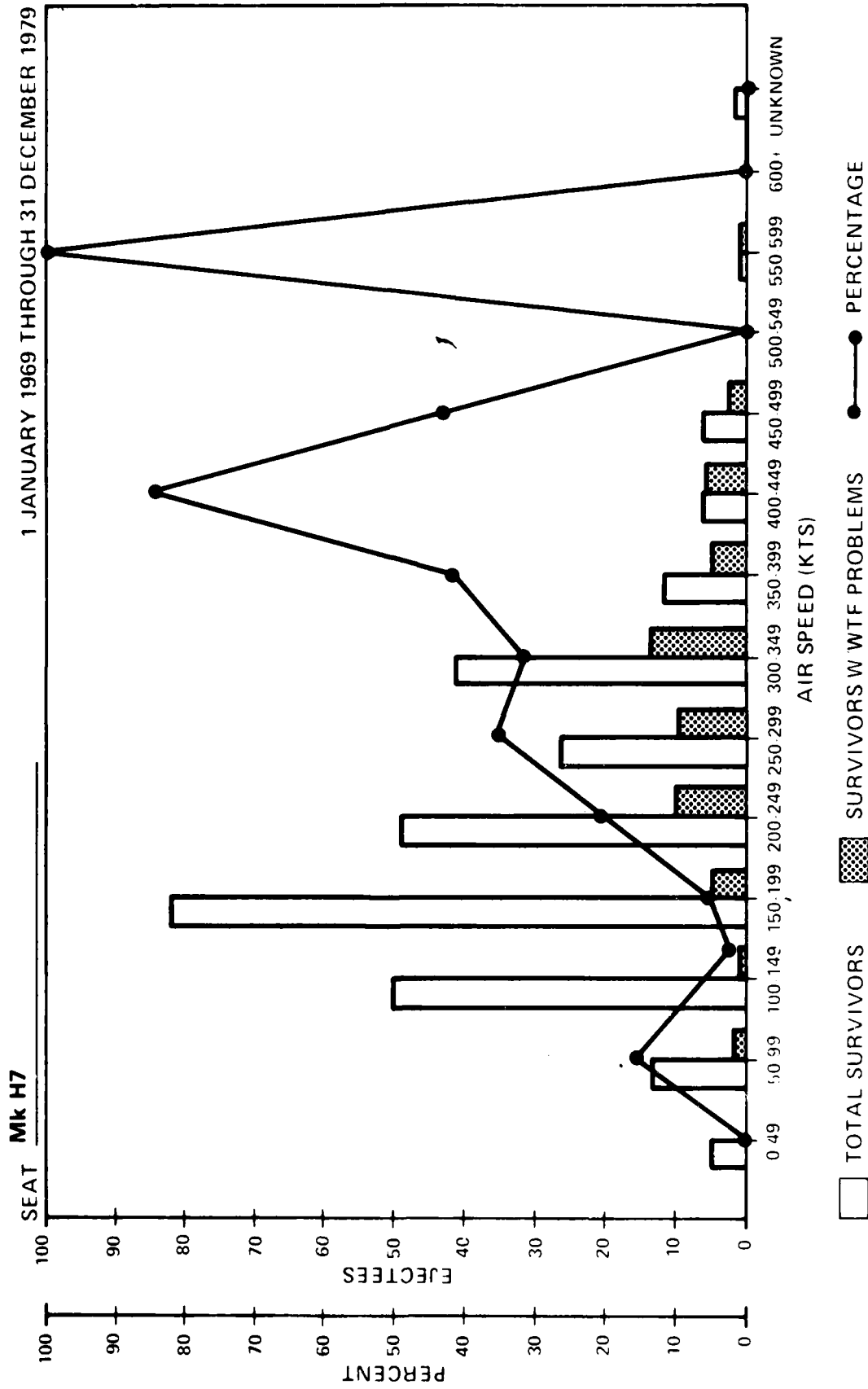
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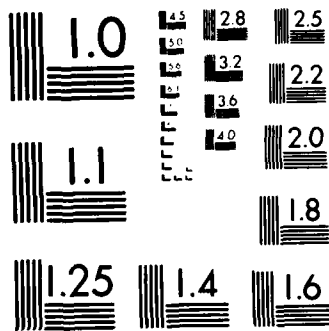


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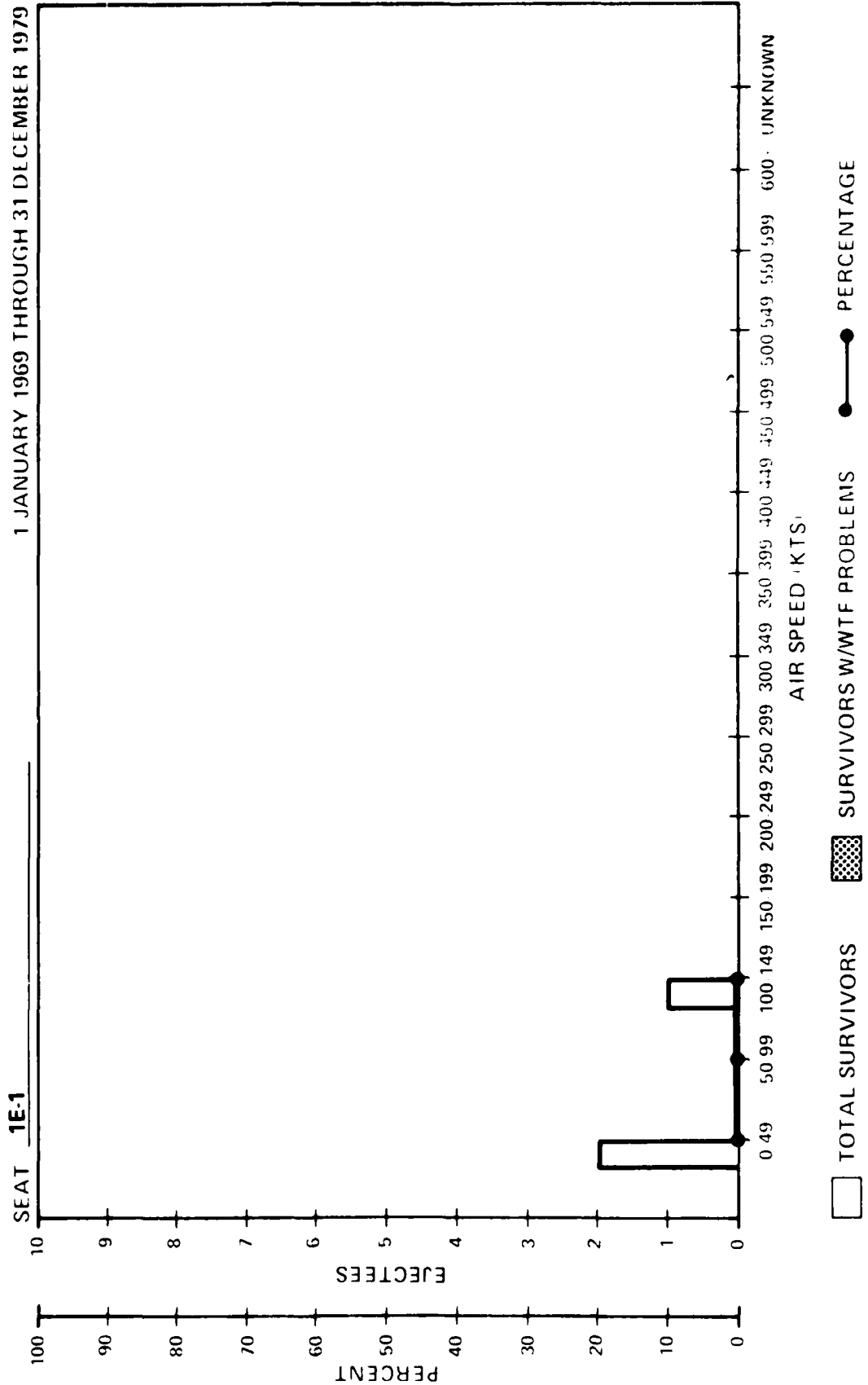
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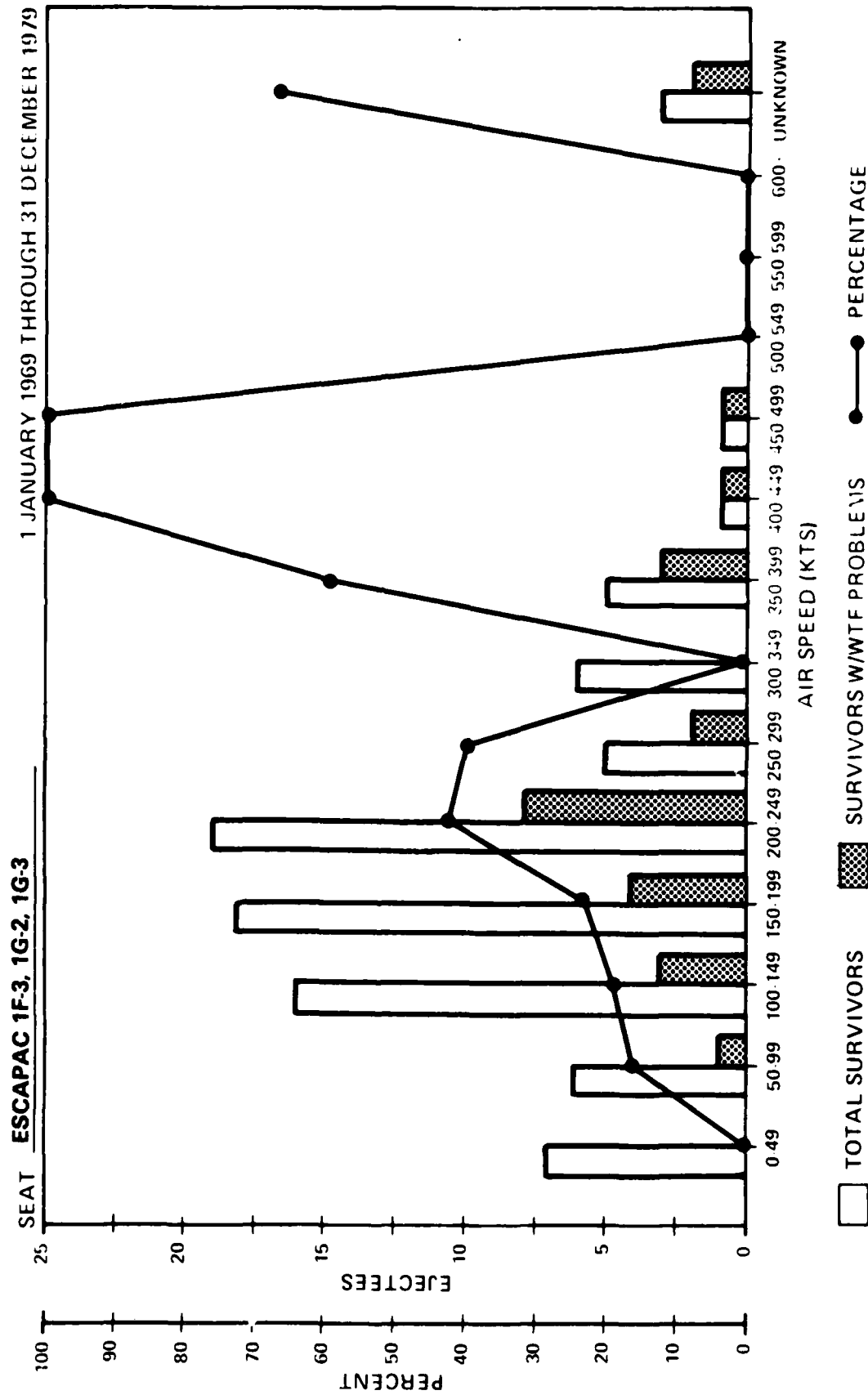


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963 A

OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

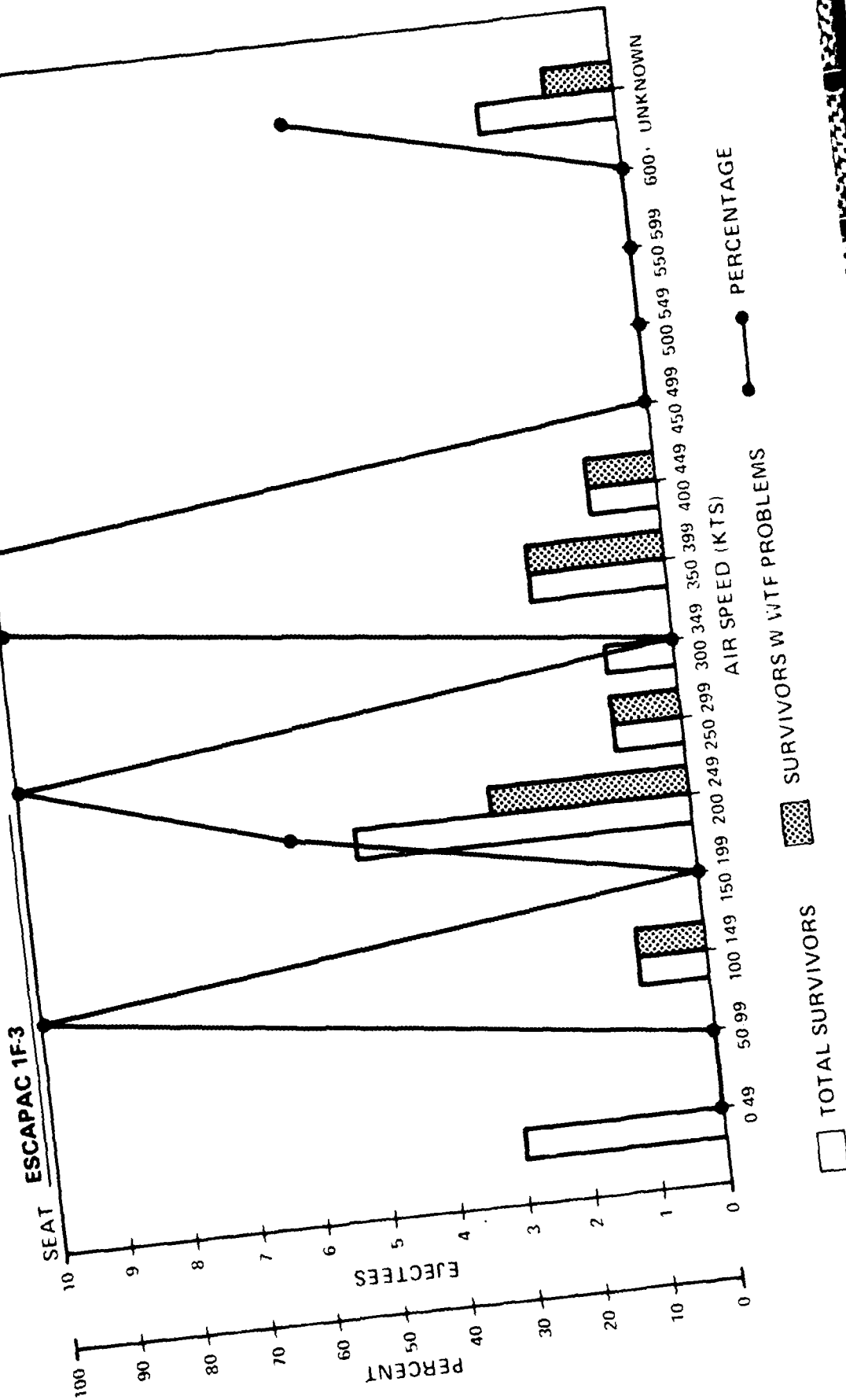


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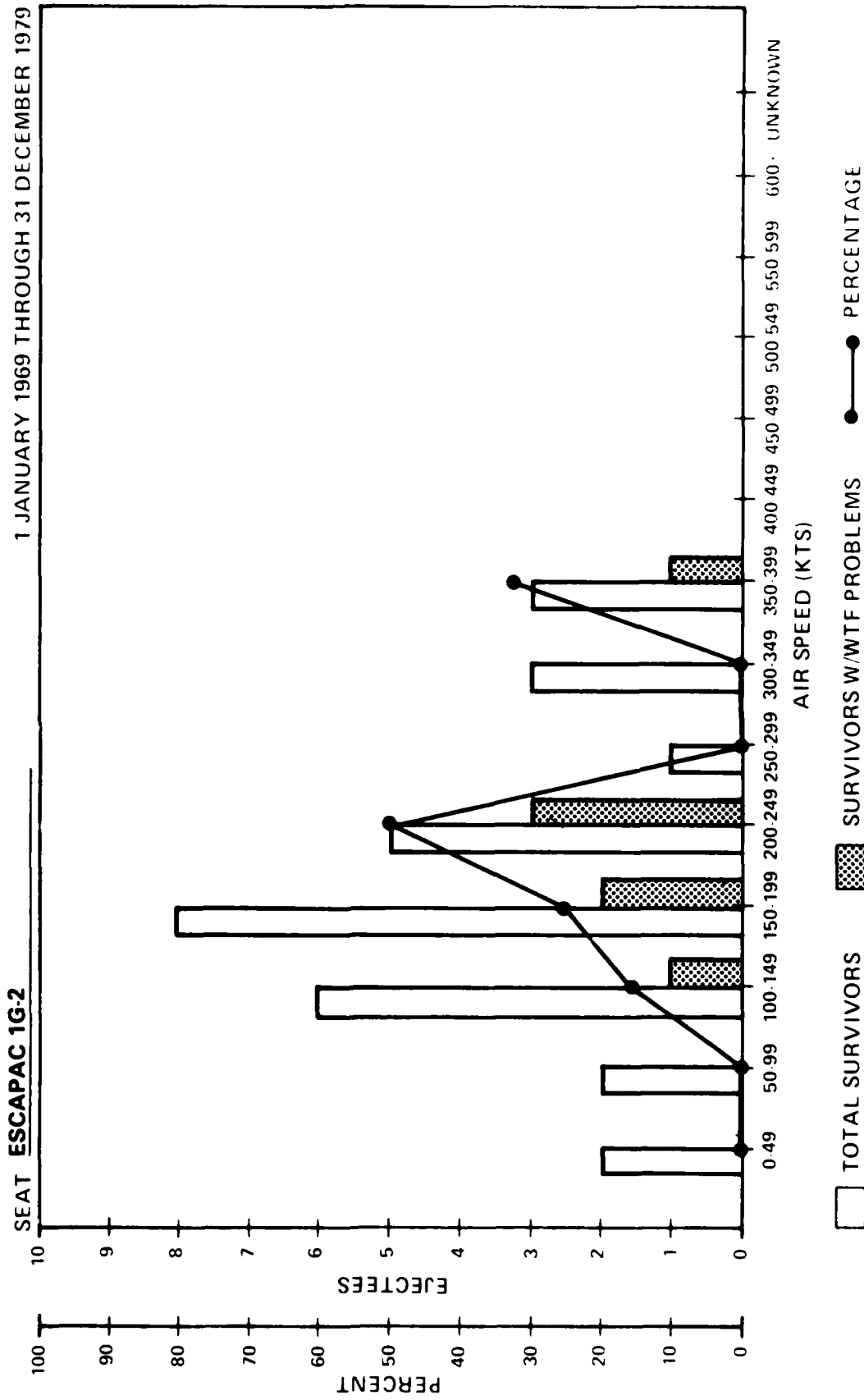


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1 JANUARY 1969 THROUGH 31 DECEMBER 1979



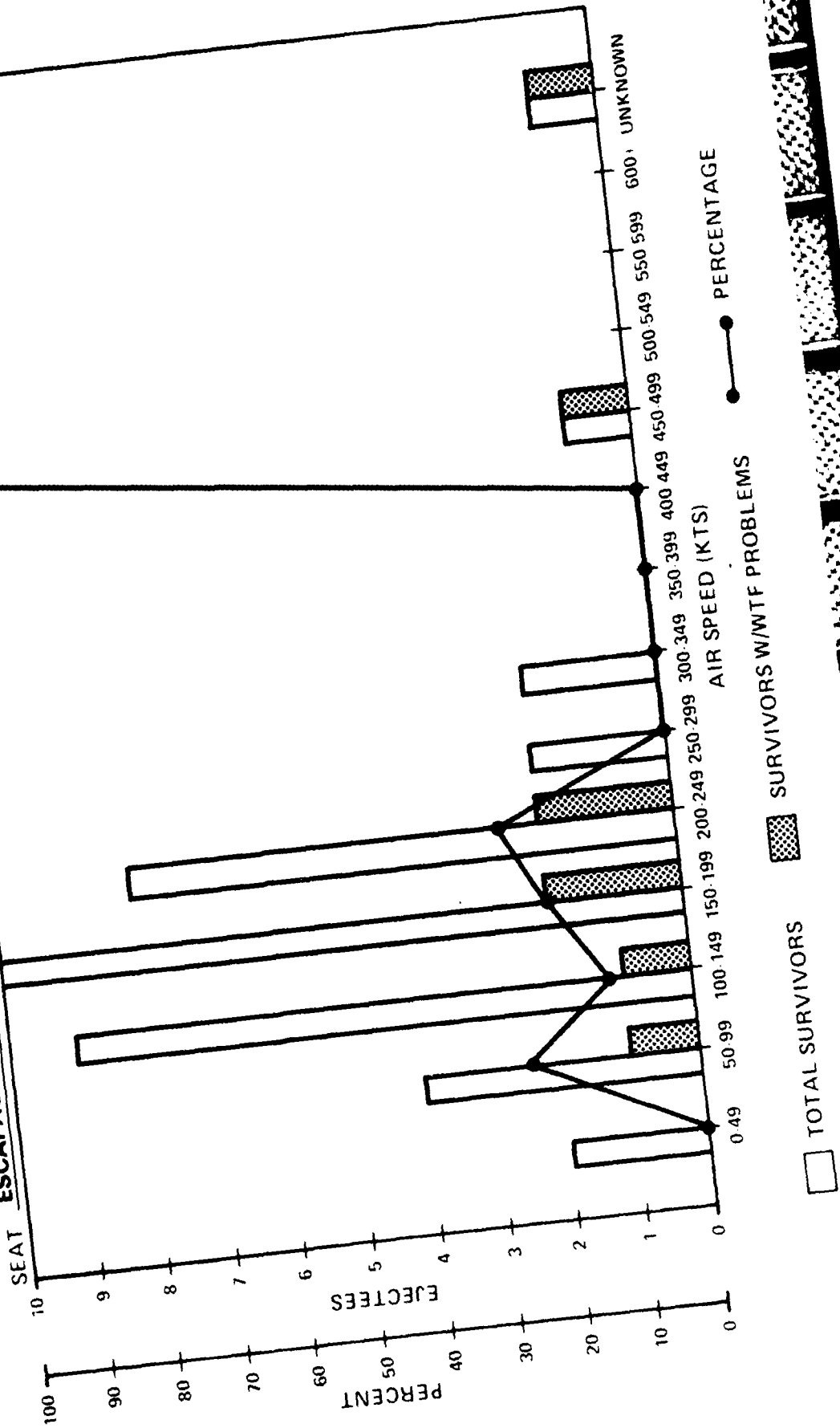
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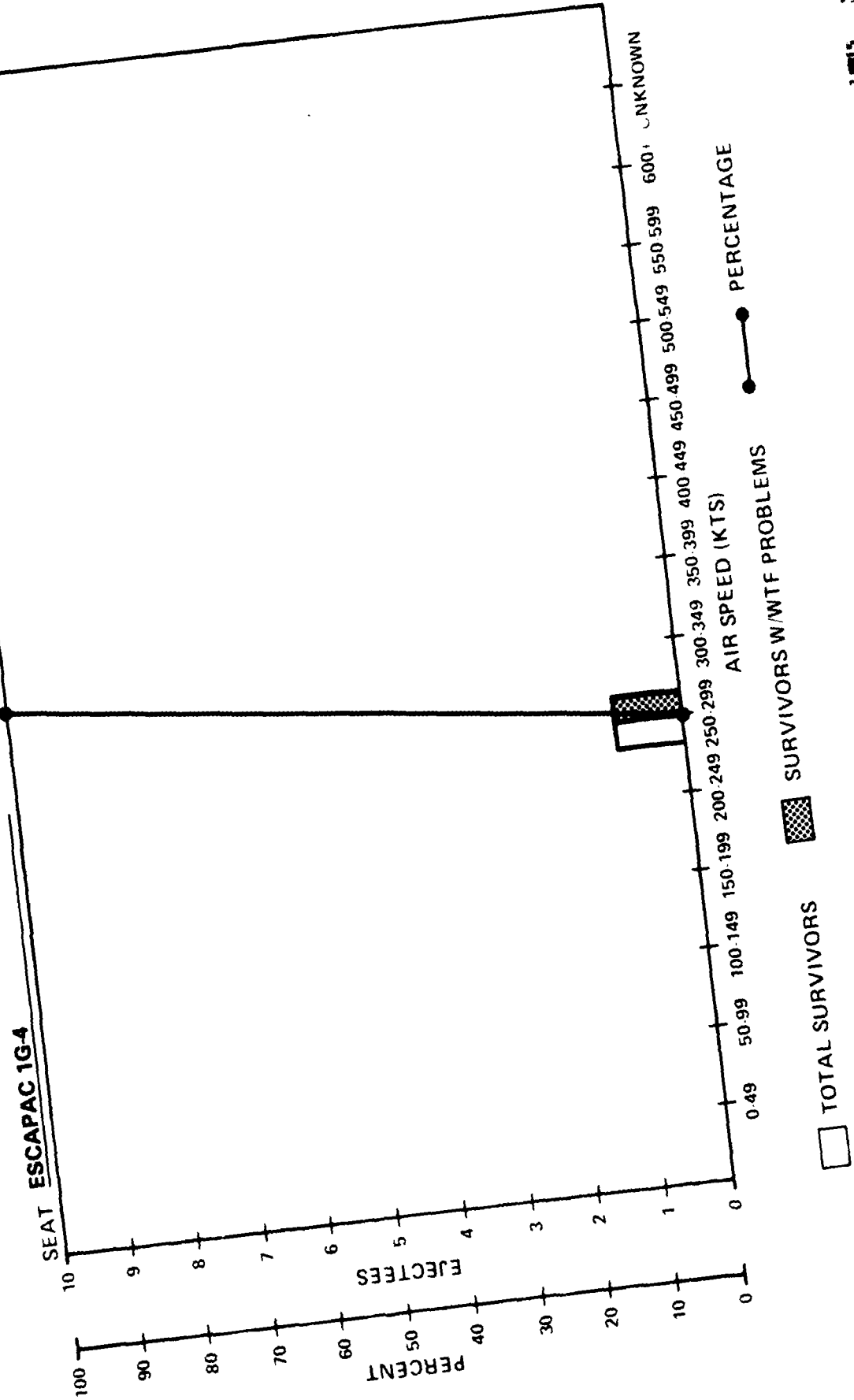
1 JANUARY 1969 THROUGH 31 DECEMBER 1979

SEAT ESCAPAC 1G-3

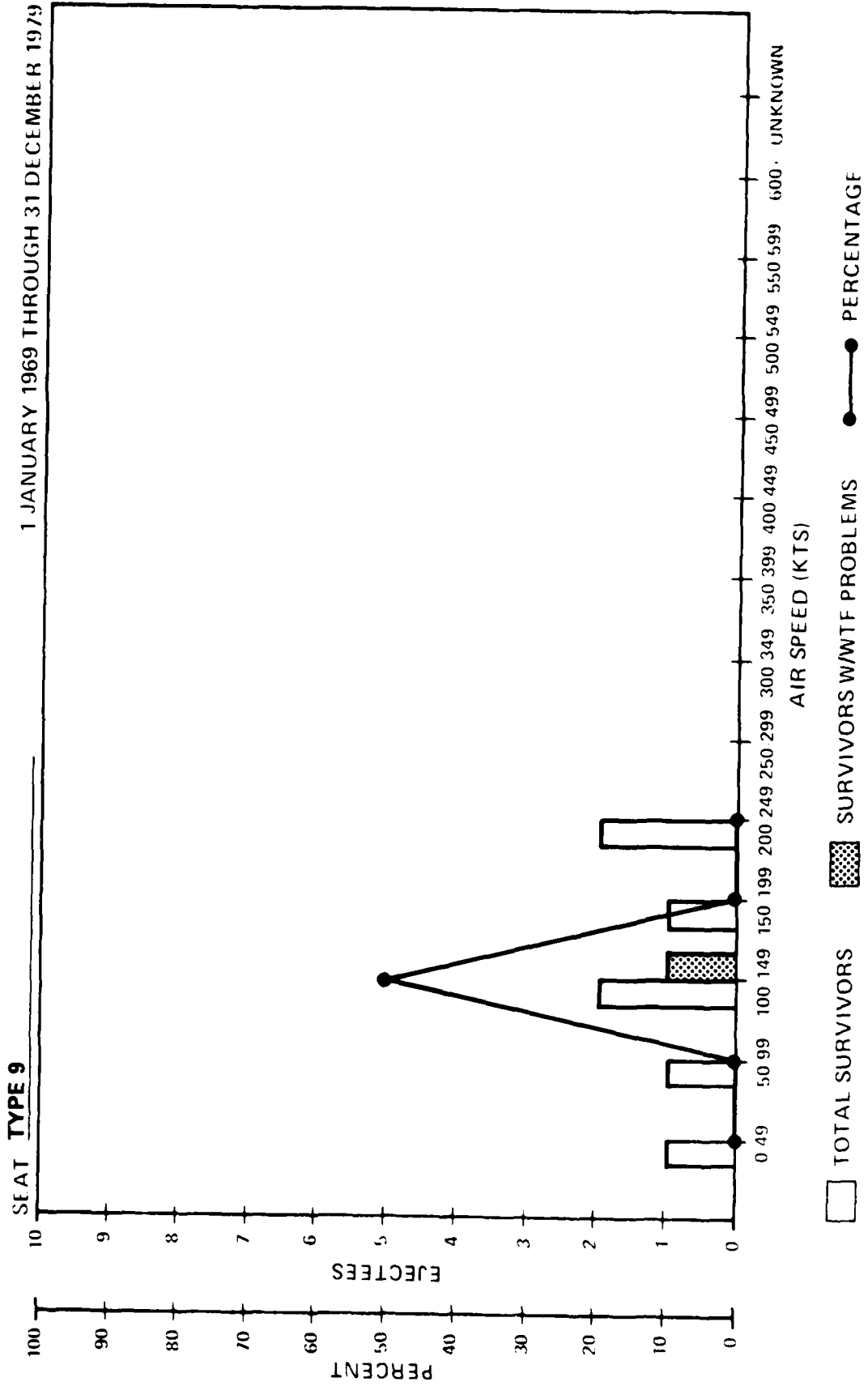


OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

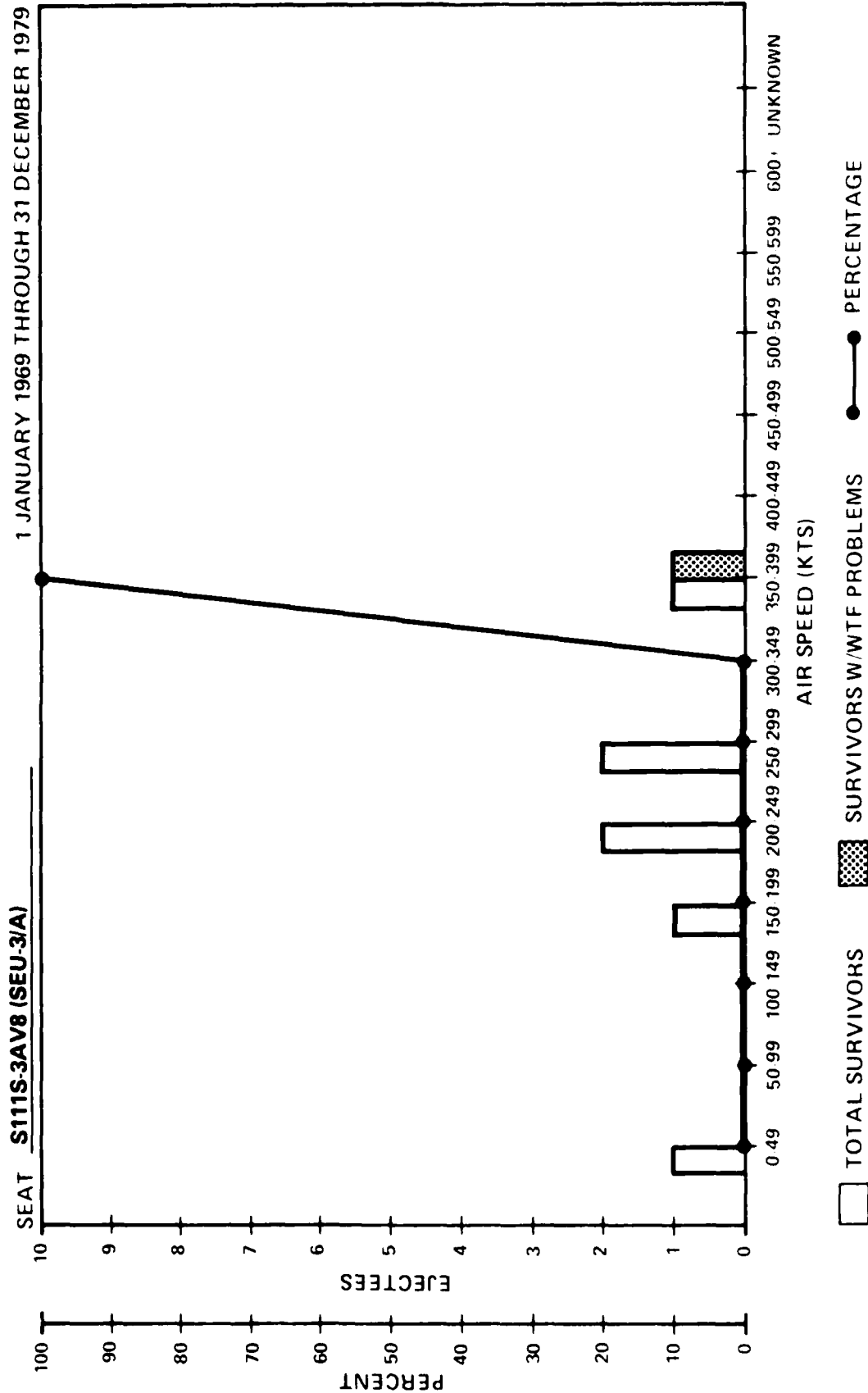
1 JANUARY 1969 THROUGH 31 DECEMBER 1979



OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

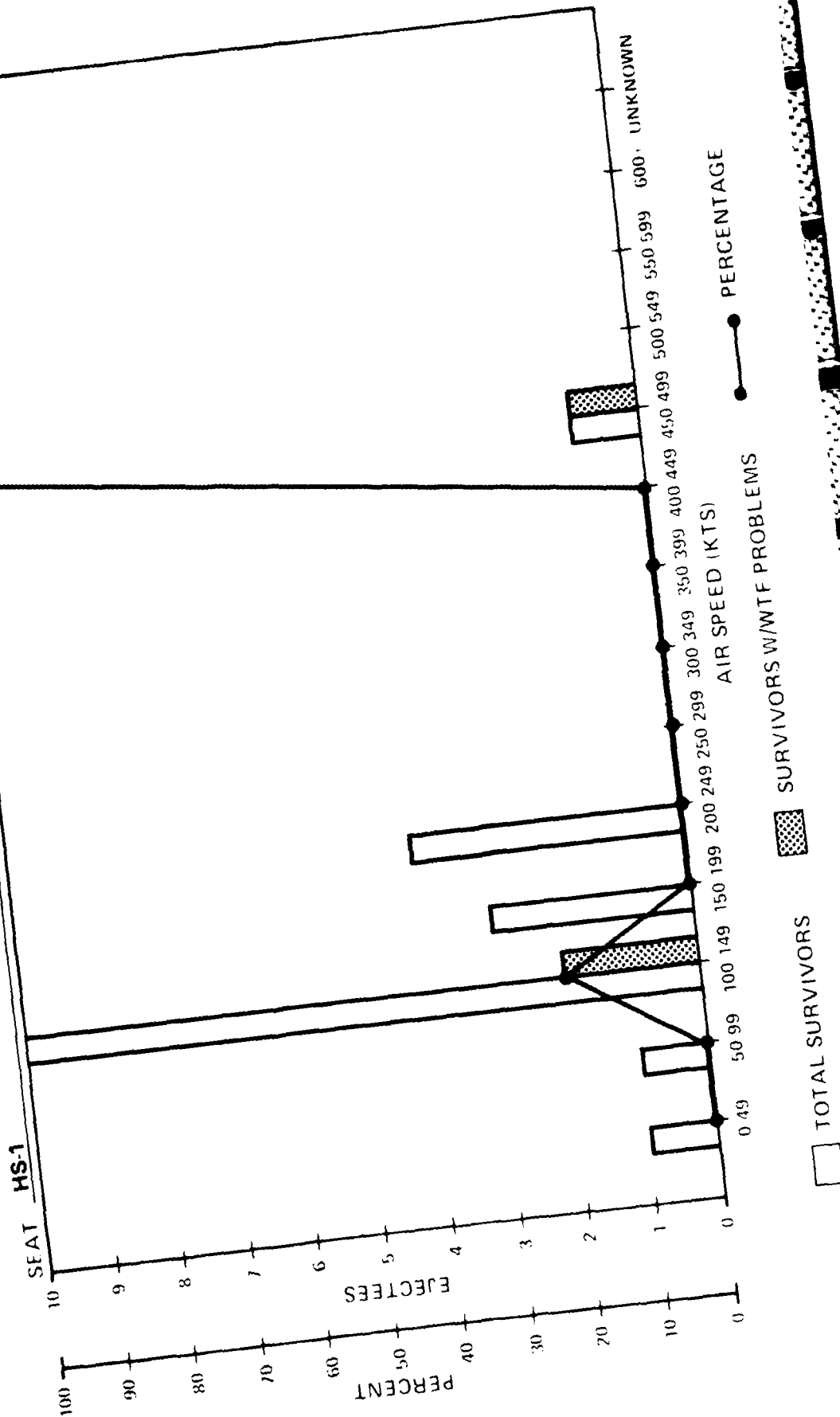


OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES



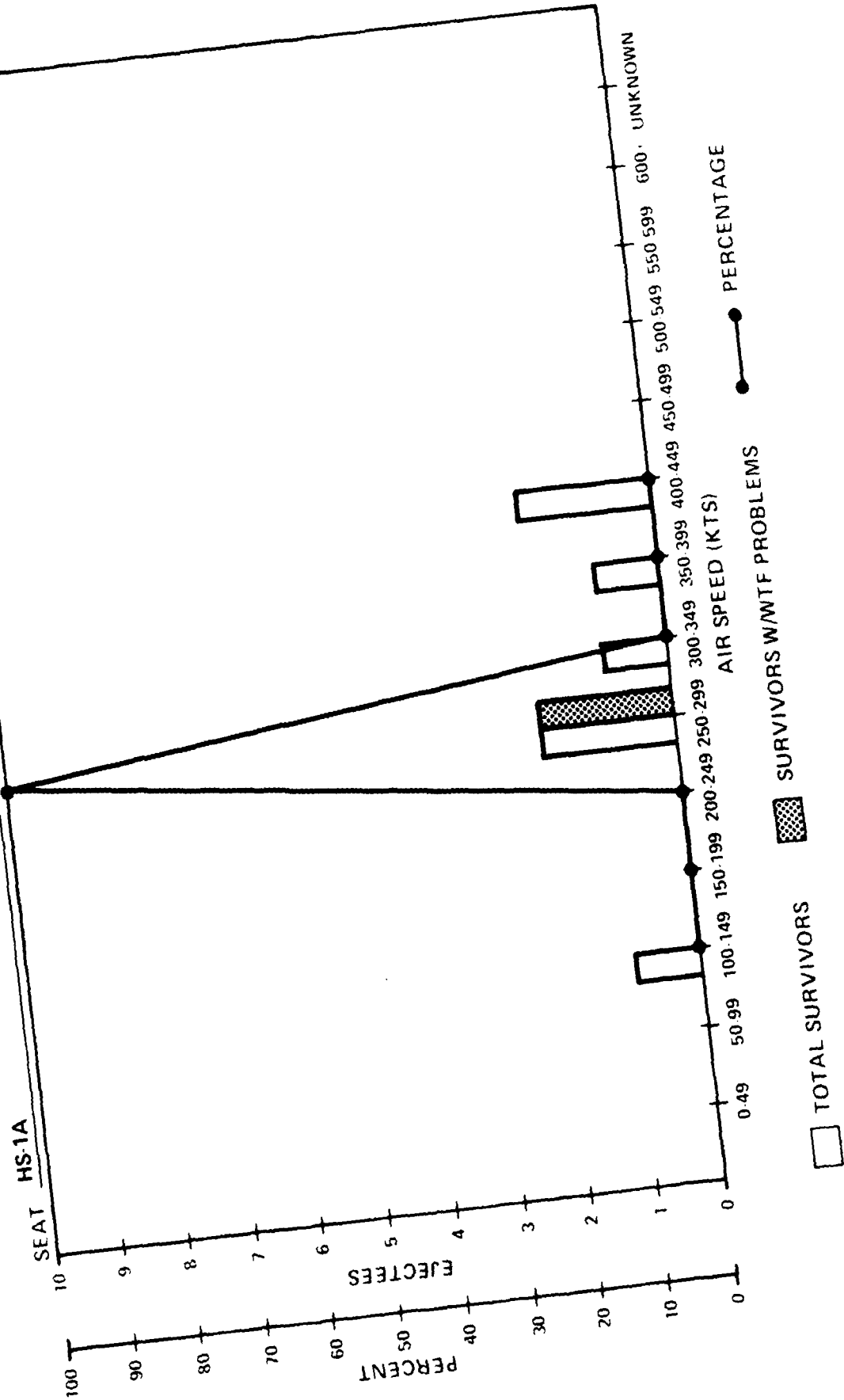
OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES

1 JANUARY 1969 THROUGH 31 DECEMBER 1979

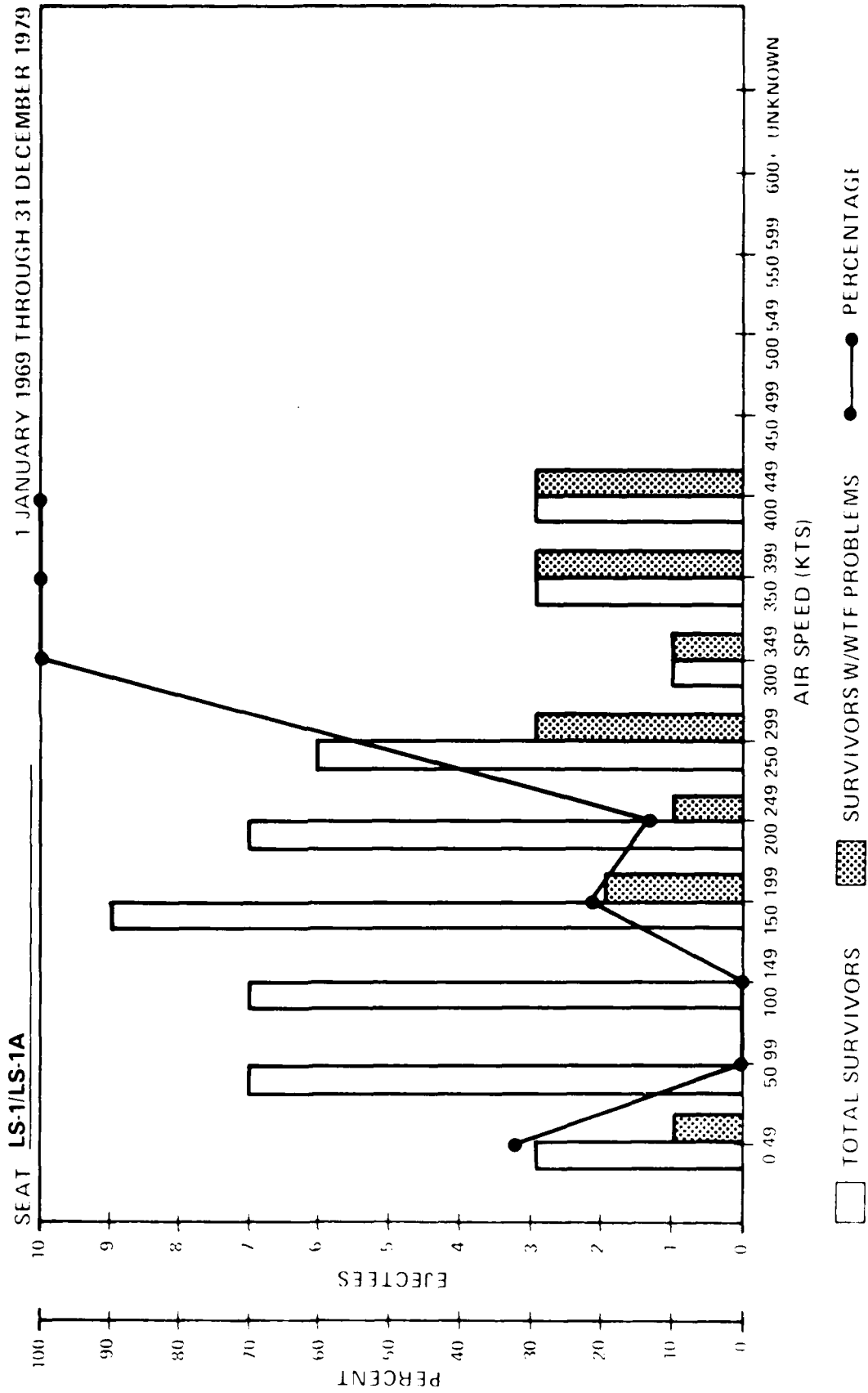


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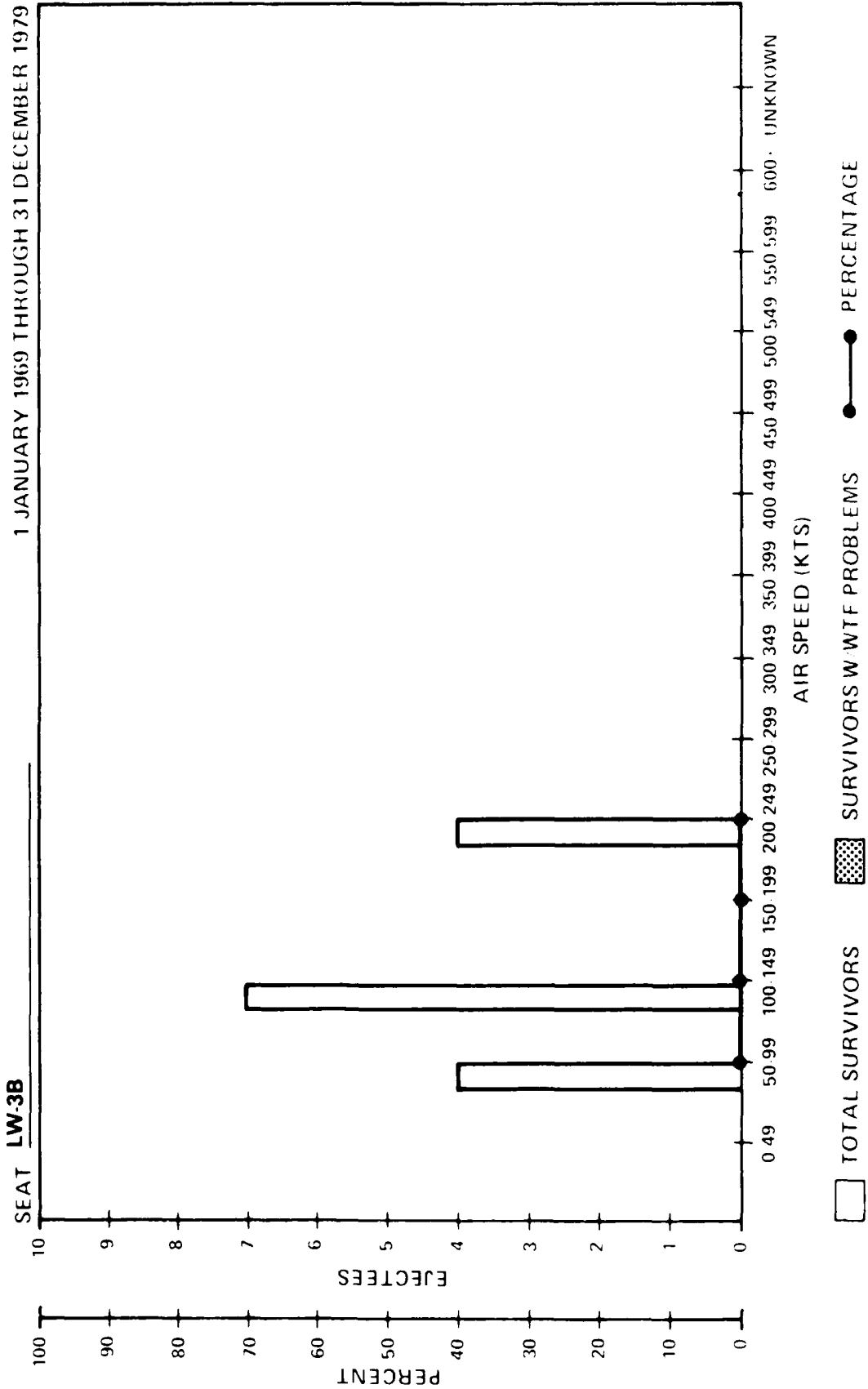
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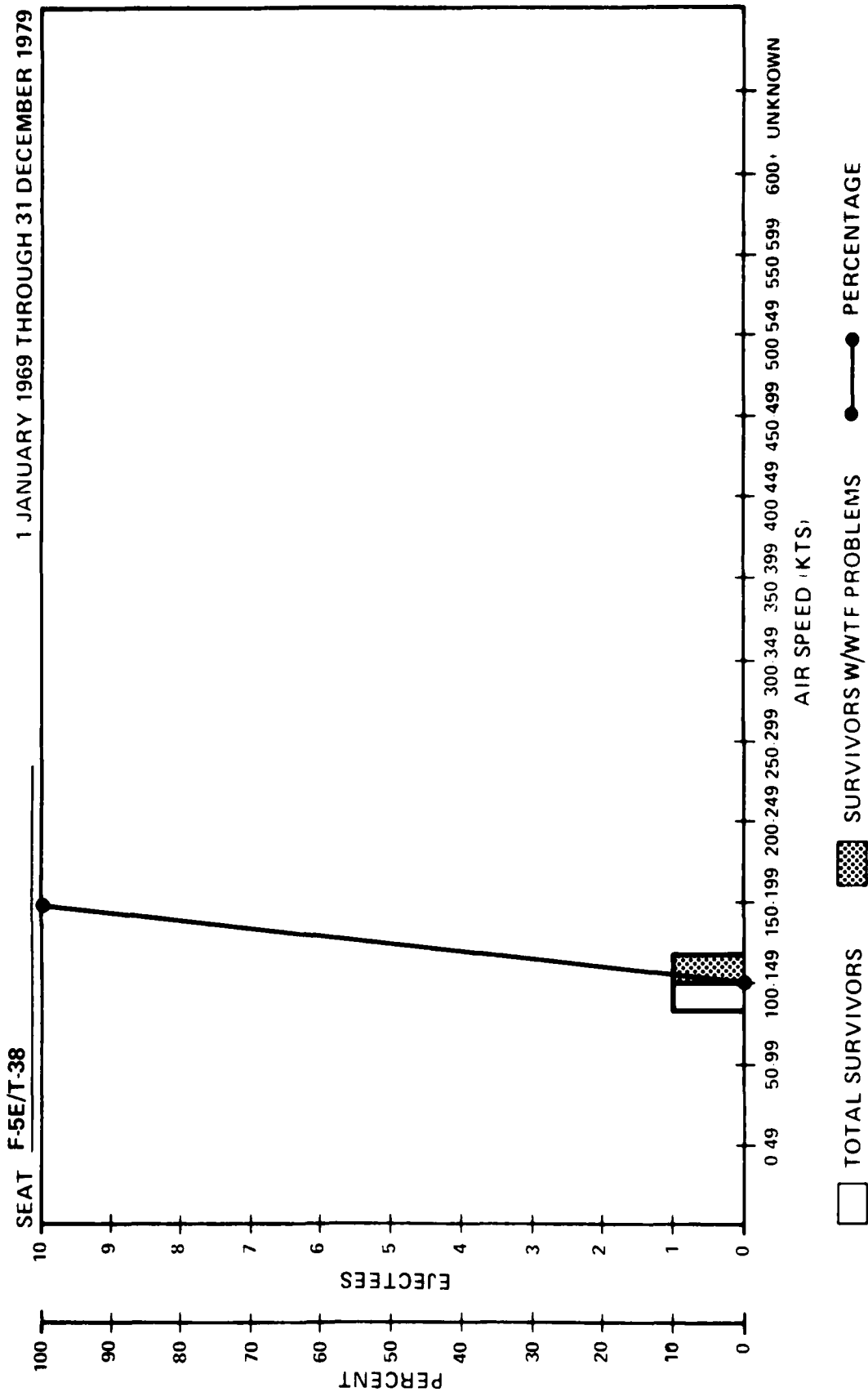
OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES



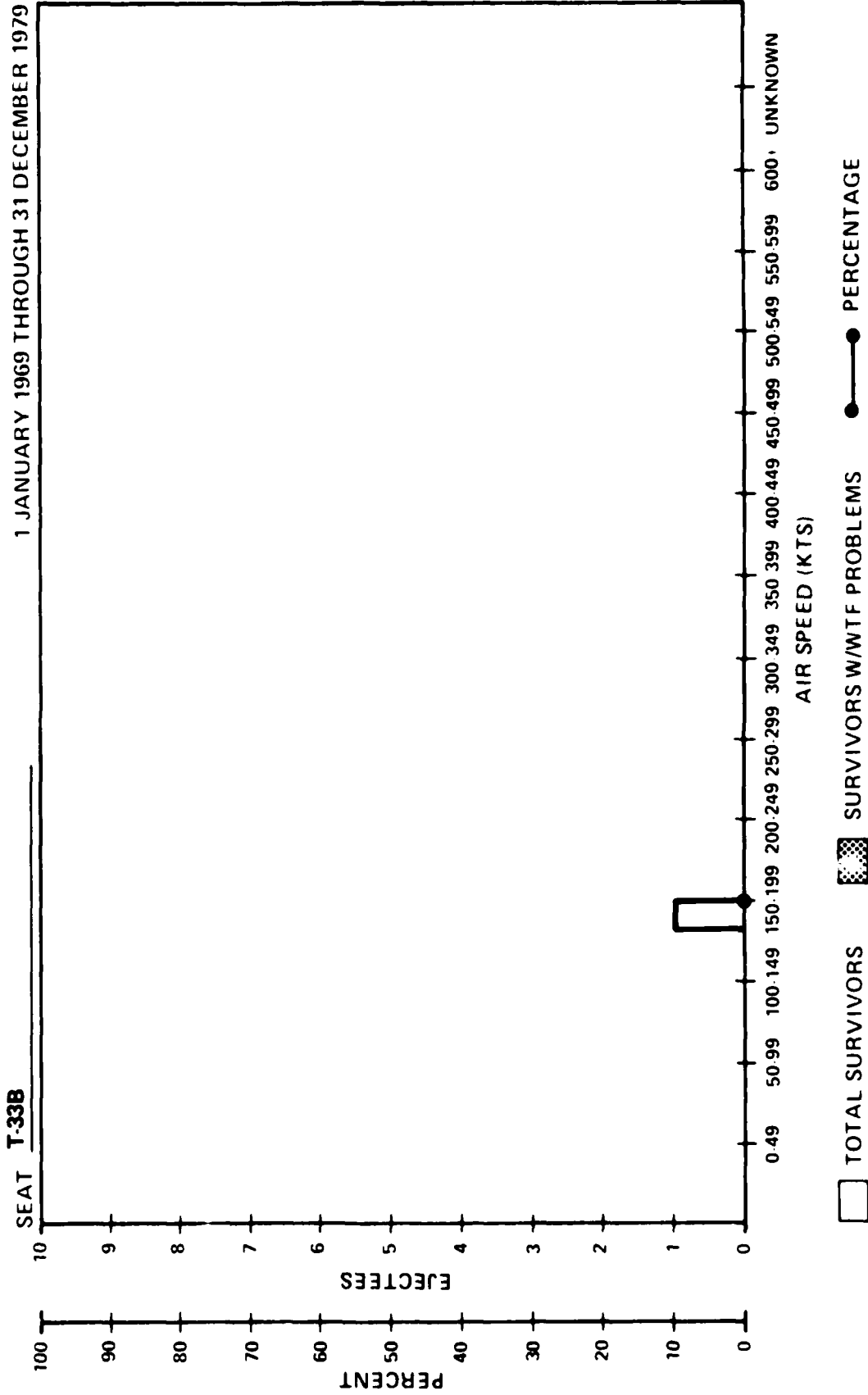
OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES



OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES



OCCURRENCES BY EJECTION AIRSPEED OF PROBLEMS & INJURIES ATTRIBUTED TO WINDBLAST TUMBLE AND/OR FLAIL AMONG U.S. NAVY SURVIVING EJECTEES



INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1A-1 (2921)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
THORAX		CONTUSION/1	
SHOULDER			SPRAIN/1
KNEE		STRAIN/2 TEAR OF MUSCLE/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1C-3 (2923)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		LACERATION/1 CONTUSION/1 ABRASION/1	
EYE		HEMORRHAGE/1	
SHOULDER		DISLOCATION/2 COMMINUTED/2 SPRAIN/2	
ARM, U			FRACTURE, SIMPLE/1
HAND/FINGER		LACERATION/1	
KNEE			STRAIN/1 DISLOCATION/2
MULTIPLE		CONTUSION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1, 1A-1, 1C-2, 1C-3

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		HEMORRHAGE/1 HEMATOMA/1 LACERATION/1 CONTUSION/1 ABRASION/1	
EYE		HEMORRHAGE/3	
THORAX		CONTUSION/1	
SHOULDER		SPRAIN/3 DISLOCATION/2 COMMINUTED/2	SPRAIN/1 FRACTURE, SIMPLE/1
ARM, U		FRACTURE, SIMPLE/1	FRACTURE, SIMPLE/1
HAND/FINGER		LACERATION/1	
LEG, U			FRACTURE, COMPOUND/1
KNEE		STRAIN/2	DISLOCATION/2 STRAIN/1
MULTIPLE		CONTUSION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1, 1A-1, 1C-3

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		LACERATION/1 CONTUSION/1 ABRASION/1	
EYE		HEMORRHAGE/1	
THORAX		CONTUSION/1	
SHOULDER		DISLOCATION/2 COMMINUTED/2 SPRAIN/2	SPRAIN/1
ARM, U			FRACTURE, SIMPLE/1
HAND/FINGER		LACERATION/1	
KNEE		STRAIN/2 TEAR OF MUSCLE/1	STRAIN/1 DISLOCATION/2
MULTIPLE		CONTUSION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1C-2 (2922)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		HEMORRHAGE HEMATOMA/1	
EYE		HEMORRHAGE/2	
SHOULDER		SPRAIN/1	FRACTURE, SIMPLE/1
ARM, U		FRACTURE, SIMPLE/1	
LEG, U			FRACTURE, COMPOUND/1
KNEE			DISLOCATION/2

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1F-3 (3041)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE	LACERATION/1	CONTUSION/1	
NECK		HEMATOMA/1 ABRASION/1	STRAIN/1
SHOULDER	CONTUSION/1		FRACTURE, SIMPLE/1
ARM, U			FRACTURE, SIMPLE/1
ELBOW			DISLOCATION/1
KNEE		STRAIN/1	STRAIN/1

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1G-3 (3043)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
SKULL		CONTUSION/1	
FACE		CONTUSION/2	
EYE		HEMORRHAGE/1	
NECK		LACERATION/1	
SHOULDER			STRAIN/1 CONTUSION/1
ARM, U			FRACTURE, SIMPLE/1
WRIST			LACERATION/1
KNEE		STRAIN/1	STRAIN/1
MULTIPLE		CONTUSION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1F-3 & 1G-3

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
SKULL		CONTUSION/1	
FACE	LACERATION/1	CONTUSION/3	
EYE		HEMORRHAGE/1	
NECK		LACERATION/1 HEMATOMA/1 ABRASION/1	STRAIN/1
SHOULDER	CONTUSION/1		FRACTURE, SIMPLE/1
ARM, U			FRACTURE, SIMPLE/2
ELBOW			DISLOCATION/1
WRIST			LACERATION/1
KNEE		STRAIN/2	STRAIN/2
MULTIPLE		CONTUSION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1G-2 (3042)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
KNEE			SPRAIN/1

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

ESCAPAC 1F-3, 1G-2, 1G-3

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
SKULL		CONTUSION/1	
FACE	LACERATION/1	CONTUSION/3	
EYE		HEMORRHAGE/1	
NECK		LACERATION/1 HEMATOMA/1 ABRASION/1	STRAIN/1
SHOULDER	CONTUSION/1		FRACTURE, SIMPLE/2 STRAIN/1 CONTUSION/1
ARM, U			FRACTURE, SIMPLE/2
ELBOW			DISLOCATION/1
WRIST			LACERATION/1
KNEE		STRAIN/2	STRAIN/2 SPRAIN/1
MULTIPLE		CONTUSION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK Z5 (2905)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
EYE		HEMORRHAGE/1	
SHOULDER		DISLOCATION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK 5 SERIES (LESS GRU5 & GRUE A5)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
EYE		HEMORRHAGE/1	
SHOULDER		DISLOCATION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK GRU5 (2906)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
SKULL		CONTUSION/1	
FACE		ABRASION/1 CONTUSION/1	
NECK		SPRAIN/1	
ELBOW			DISLOCATION/1
HAND/FINGER		CONTUSION/1	
KNEE			DERANGEMENT/1
MULTIPLE		ABRASION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK 5 SERIES

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
SKULL		CONTUSION/1	
FACE		ABRASION/1 CONTUSION/1	
EYE		HEMORRHAGE/1	
NECK		SPRAIN/1	
SHOULDER		DISLOCATION/1	
ELBOW			DISLOCATION/1
HAND/FINGER		CONTUSION/1	
KNEE			DERANGEMENT/1
MULTIPLE		ABRASION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK A7 (3020)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		CONTUSION/2	
SHOULDER		STRAIN/1	
ARM, U			FRACTURE, SIMPLE/1
GROIN		STRAIN/1	
LEG, U		FRACTURE, SIMPLE/1	
KNEE		STRAIN/1	DISLOCATION/1

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK F7 (3021)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
SHOULDER		STRAIN/1 FRACTURE, SIMPLE/1	
T. BODY	COMPRESSION/1		
LEG, U		CONTUSION/1	
KNEE		STRAIN/2	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK GRU7A (3024)

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
ARM, U			SPRAIN/1

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK H7 (3022)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		LACERATION/1 ABRASION/2 INJURY, INTERNAL/1	
EYE		ABRASION/1 HEMORRHAGE/2 CONTUSION/2	
THORAX		PNEUMO/HEMOTHORAX/1	
ARM, U			FRACTURE, SIMPLE/1
ELBOW		DISLOCATION/1	SPRAIN/1 STRAIN/1
KNEE		STRAIN/1 TEAR OF MUSCLE/2	DISLOCATION/1 TEAR OF MUSCLE/1
LEG, L		COMMINUTED/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES MARTIN-BAKER MK 7 SERIES (LESS GRU7 & GRUEA7)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		CONTUSION/2 ABRASION/1 LACERATION/1	
EYE		ABRASION/1 HEMORRHAGE/2 CONTUSION/2	
THORAX		PNEUMO/HEMOTHORAX/1	
ARM, U			FRACTURE, SIMPLE/2
ELBOW		DISLOCATION/1	SPRAIN/1 STRAIN/1
T. BODY	COMPRESSION/1		
GROIN		STRAIN/1	
LEG, U		CONTUSION/1 FRACTURE, SIMPLE/1	
KNEE		STRAIN/4 TEAR OF MUSCLE/2	DISLOCATION/2 TEAR OF MUSCLE/1
LEG, L		COMMINUTED/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK GRU7 (3023)

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
SHOULDER ARM, U WRIST HAND/FINGER			DISLOCATION/1 LACERATION/1 STRAIN/1 CONTUSION/1

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

MARTIN-BAKER MK 7 SERIES

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		CONTUSION/2 LACERATION/1 ABRASION/2	
EYE		ABRASION/1 HEMORRHAGE/2 CONTUSION/2	
THORAX		PNEUMO/HEMOTHORAX/1	
SHOULDER		STRAIN/2 FRACTURE, SIMPLE/1	DISLOCATION/1
ARM, U			LACERATION/1 SPRAIN/1 FRACTURE, SIMPLE/2
ELBOW		DISLOCATION/1	SPRAIN/1 STRAIN/1
WRIST			STRAIN/1
HAND/FINGER			CONTUSION/1
T. BODY	COMPRESSION/1		
GROIN		STRAIN/1	
LEG, U		CONTUSION/1 FRACTURE, SIMPLE/1	
KNEE		STRAIN/4 TEAR OF MUSCLE/2	DISLOCATION/2 TEAR OF MUSCLE/3
LEG, L		COMMUNUTED/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES

NORTH AMERICAN HS-1 (3001)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
EYE		CONTUSION/1	
THORAX		FOREIGN BODY/1	
ELBOW		DISLOCATION/1	
PELVIS		DISLOCATION/1	

INJURY DISTRIBUTION BY CAUSAL FACTORS, BODY LOCATION AND DIAGNOSES NORTH AMERICAN LS-1 (3003)

JANUARY 1969 – DECEMBER 1979

CAUSAL FACTORS	TUMBLE	WINDBLAST	FLAIL
BODY PART/ LOCATION	DIAGNOSES/COUNTS		
FACE		STRETCHING/1	
NECK		ABRASION/1	
CERVICAL 4		TRANSECTION/1	
CERVICAL 5		TRANSECTION/1	
SHOULDER	FRACTURE,SIMPLE/1	FRACTURE, SIMPLE/1	
ARM, U		COMMINUTED/1	
LEG, U			FRACTURE, SIMPLE/1
KNEE		FRACTURE, SIMPLE/1 AVALSION/1 DISLOCATION/1	LACERATION/1
LEG, L		FRACTURE, SIMPLE/1	FRACTURE, SIMPLE/1 LACERATION/1

OFFICE OF NAVAL RESEARCH

**ANALYSIS OF COMBAT EJECTION INJURY
VERSUS METHOD OF EJECTION SEAT INITIATION**

25 September 1981

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BioTechnology, Inc.

3027 ROSEMARY LANE · FALLS CHURCH, VIRGINIA

OFFICE OF NAVAL RESEARCH

Contract No. N00014-77-C-0253
Task No. 207-007

**ANALYSES OF COMBAT EJECTION INJURY
VERSUS METHOD OF EJECTION SEAT INITIATION**

by
Martin G. Every

*Prepared for Use
in the Automated Airborne Escape System Symposium*
**Naval Air Station
Norfolk, Va.**

25 September 1981

INTRODUCTION

This study was carried out under a BioTechnology, Inc. (BTI) contract with the Office of Naval Research (No. N00014-77-C-0253). This effort is in support of analyses being conducted by the Naval Air Systems Command (NAVAIR) and the Naval Weapons Engineering Support Activity (NAVWESA), which examine problems associated with Automated Airborne Escape Systems (AAES). The specific analyses in this report focused on using combat data to examine the etiology of ejection and high speed flail injuries and their possible relation to method of ejection initiation. The results of these analyses will be integrated with NAVAIR and NAVWESA efforts for presentation at a symposium to be conducted 6-8 October 1981 at the Naval Safety Center, Norfolk, Virginia.

PROCEDURES

This section will present a short summary of the data collection procedures for the Recovered (REC) and Prisoner of War (POW) casualty groups utilized in this effort. The population was defined as follows:

Personnel:	Navy pilots and aircrewmembers
Aircraft:	Fixed-wing jet only; restricted to A-4, A-6, F-4, F-8, and RA-5C aircraft
Area of Loss:	Combat zone of Southeast Asia
Event:	Loss caused by or during enemy action.

The Missing and Killed in Action cases were excluded from the present study because of the large amounts of missing data within this group relative to the method of ejection. Consequently, the study group consisted of 104 Recovered and 137 Prisoner of War cases.

Data collection was accomplished principally through use of an aviation combat casualty report form which covered all phases of the emergency sequence. This form was slightly modified for each of the casualty groups, depending primarily on whether the individual was rescued or captured. In order to facilitate comparison with noncombat data from the Naval Safety Center, every attempt was made to keep these forms compatible with the Medical Officers' Report of Aircraft Accident Incident or Ground Accident Form (Form 3750-7), which is the form required for all noncombat aircraft accidents and incidents. The BTI forms were pretested on a number of pilots who were not part of the study group.

Injury classifications for this study were made using the coding instructions contained in OPNAVINST 3750.6G, as follows:

Major Injury—Any injury requiring five days or more hospitalization and/or "sick in quarters." Also any of the following, regardless of hospitalization/sick in quarters time:

1. Unconsciousness due to head trauma (transient unconsciousness due to hypoxia, hyperventilation, G forces, etc., are not to be classified as injury).
2. Fractures of any bone except *simple* fracture of nose or phalanges.
3. Traumatic dislocation of major joints/internal derangement of the knee.
4. Moderate or severe lacerations resulting in severe hemorrhage or extensive surgical repair.
5. Injury to any internal organ.
6. Any third degree burns. Any second degree burns involving more than 5 percent of the body surface. Any friction burn regardless of degree that requires less than five days hospitalization or "sick in quarters" is classified as a minor injury.

Minor Injury—Any injury less than major which:

1. Results in the loss of 24 hours from full performance of regularly assigned duties, but less than five days.
2. Results in loss of regular working time for civilians beyond the day or shift in which injury occurs.
3. Hospitalization for observation not to exceed 48 hours from the time of admission is not classified as an injury.

No Injury—Minimal injuries which do not meet the criteria for minor injury.

In those cases where injury description and information on days of hospitalization left doubt as to the exact injury classification, the narratives, days-grounded information, or the aircrewman's own estimate of injury severity was used to effect a categorization.

For the repatriated POW aircrewmen, additional injury information was obtained from medical records on file at the Naval Aerospace Medical Institute (NAMI), Pensacola, Florida. These medical data were available as part of the "Repatriated Prisoner of War Program." As the injury data were taken by BioTechnology personnel from NAMI files, each injury was coded in terms of the following: description, specific anatomical location, time, severity, and probable cause. The coded medical data were then transferred onto 80-column punch cards and combined with prisoner-of-war event data already on computer file.

It should be noted here that this improved injury data base for the POW group is the reason why certain analyses in this effort were conducted utilizing only that group.

SECTION 1

This section presents a distribution of all ejection injuries of Navy aircrewmembers in the study group when separated into categories based on: person initiating ejection sequence, method of dealing with aircraft canopy, and method of initiating ejection sequence.

Part A of this section shows the injury rates, by aircraft type, for the combined Recovered and Prisoner of War groups. The following is a summary from Part A giving the percentage of ejectionees who: initiated their own ejection, jettisoned the canopy (or, in the A-6, went through the canopy), and sustained a major ejection injury.

Major Ejection Injury Rates (POW & REC)

<u>Type Aircraft</u>	<u>Lower Handle</u>	<u>Face Curtain</u>
A-4	33%	23%
A-6	No Ejections	61%
A-7	33%	25%
F-4	26%	21%
F-8	25%	28%
RA-5C	20%	50%

Part B represents the same type of distribution for the POW group alone. The following is a summary for this group and represents injury ratios for the same conditions as Part A.

Major Ejection Injury Rates (POW only)

<u>Type Aircraft</u>	<u>Lower Handle</u>	<u>Face Curtain</u>
A-4	40%	42%
A-6	No Ejections	64%
A-7	100%*	0%
F-4	27%	19%
F-8	0%	30%
RA-5C	25%	50%

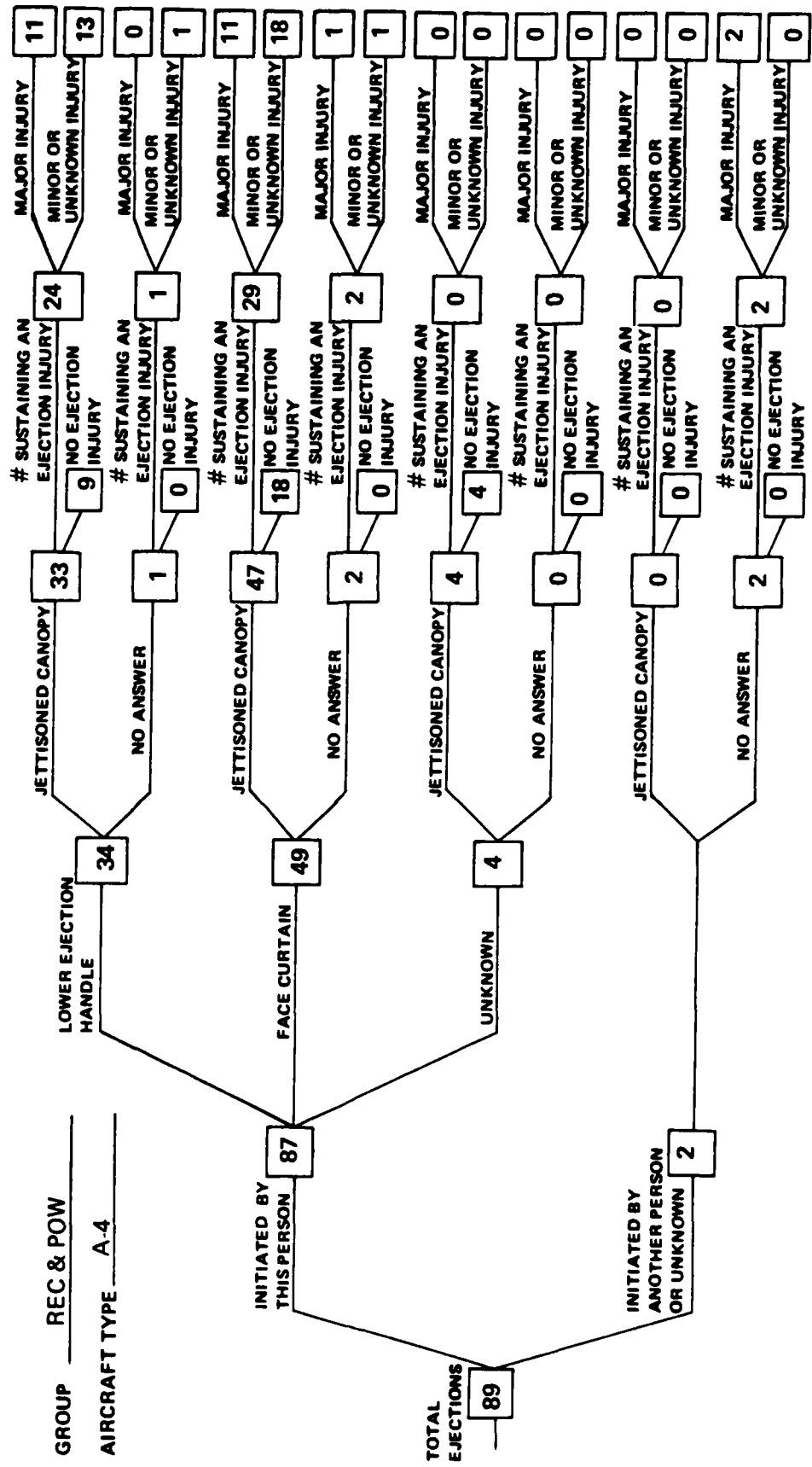
*Only in one case.

SECTION 1

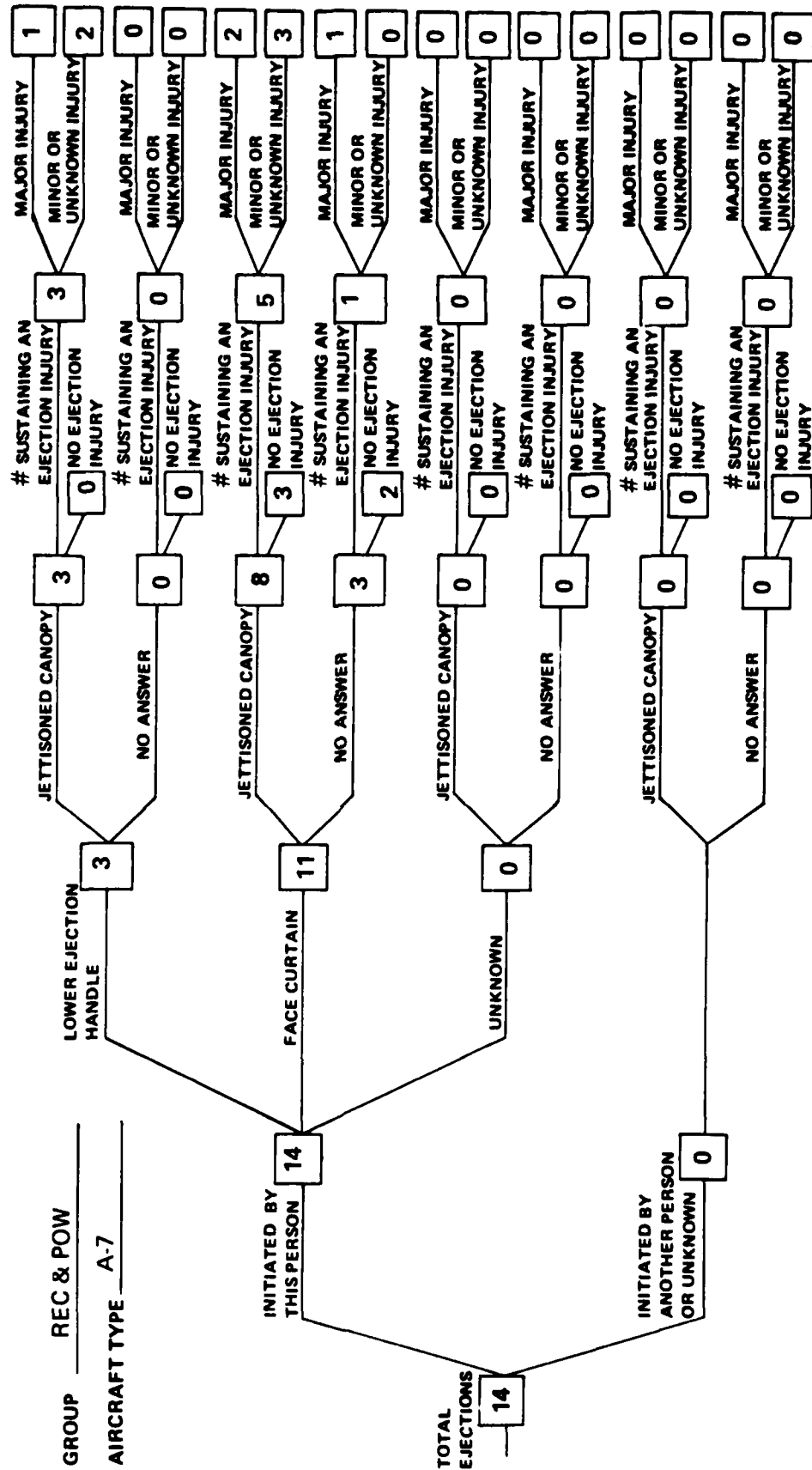
Part A

**Distribution of Recovered and Prisoner of War Ejection Injuries Incurred
During Southeast Asia Combat by Canopy Disposition and Method of
Ejection Seat Initiation**

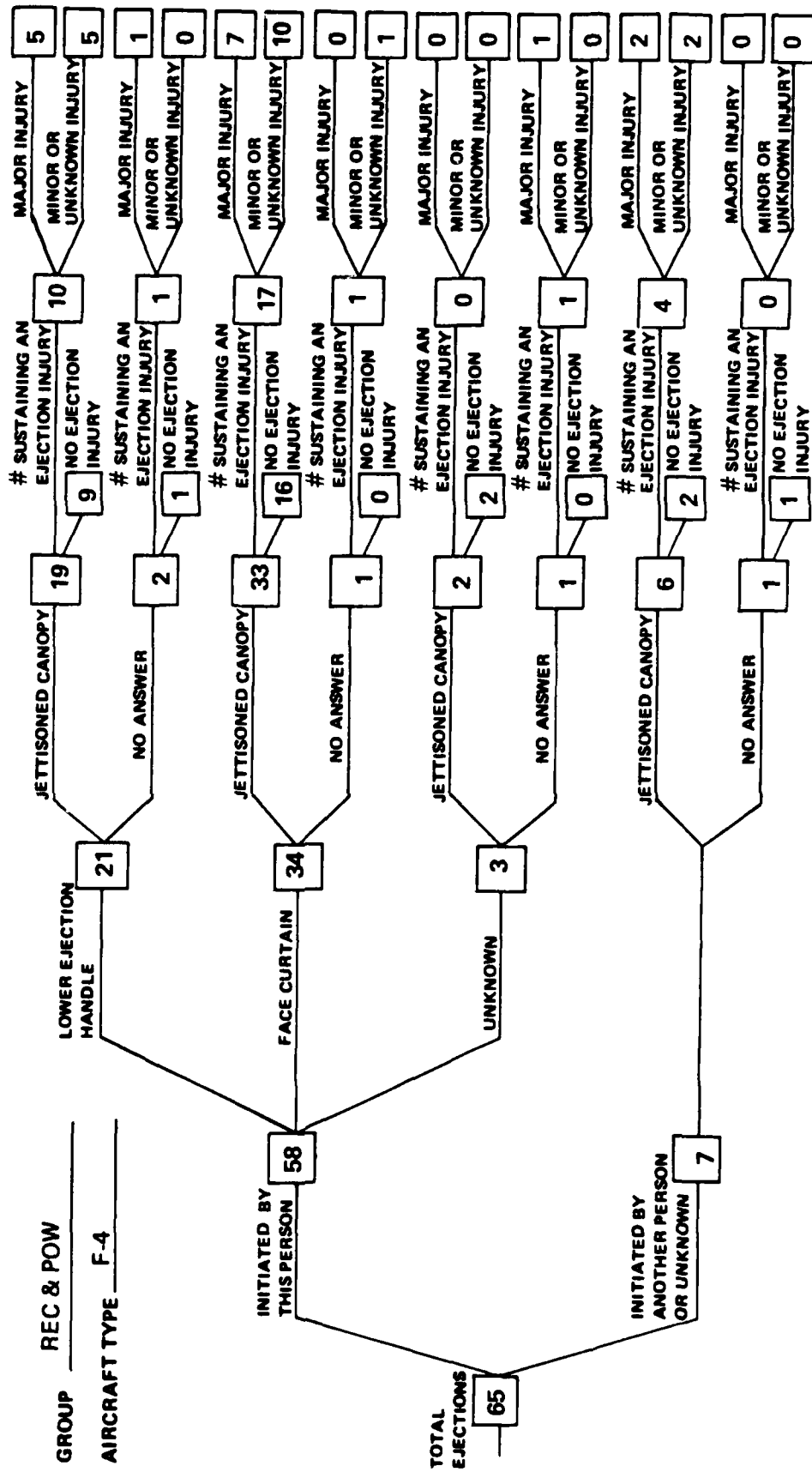
DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED



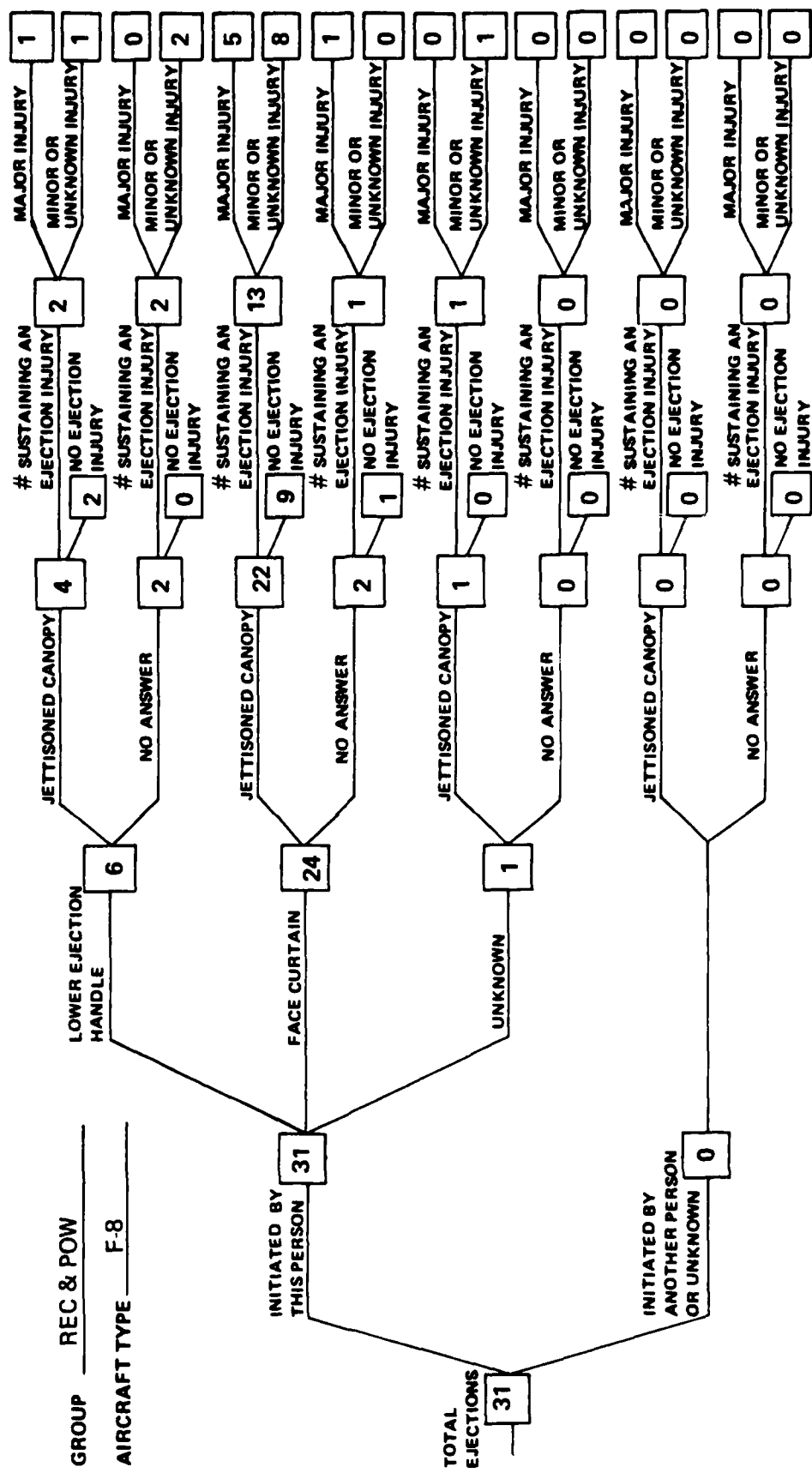
DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED



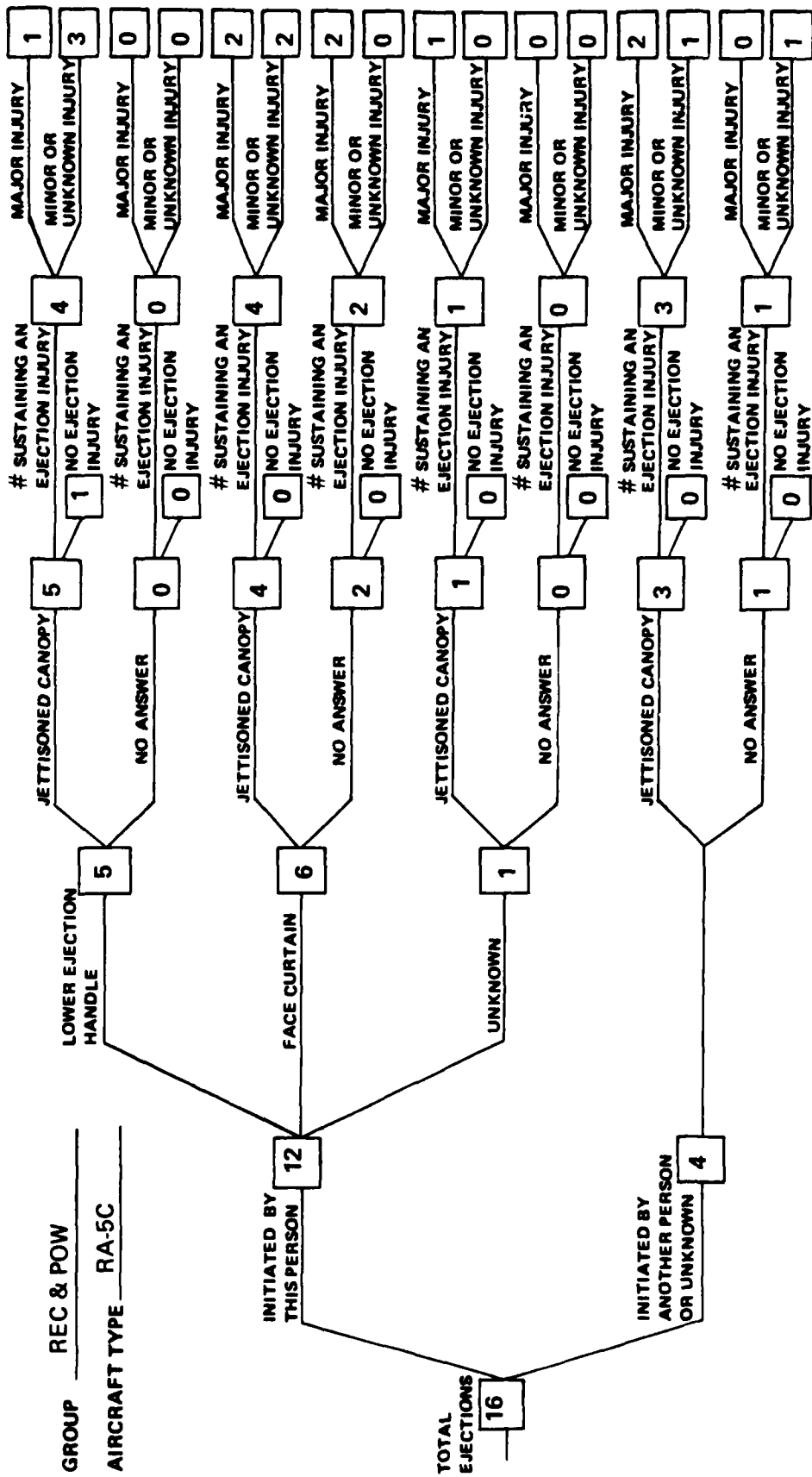
DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED



DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED



DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED

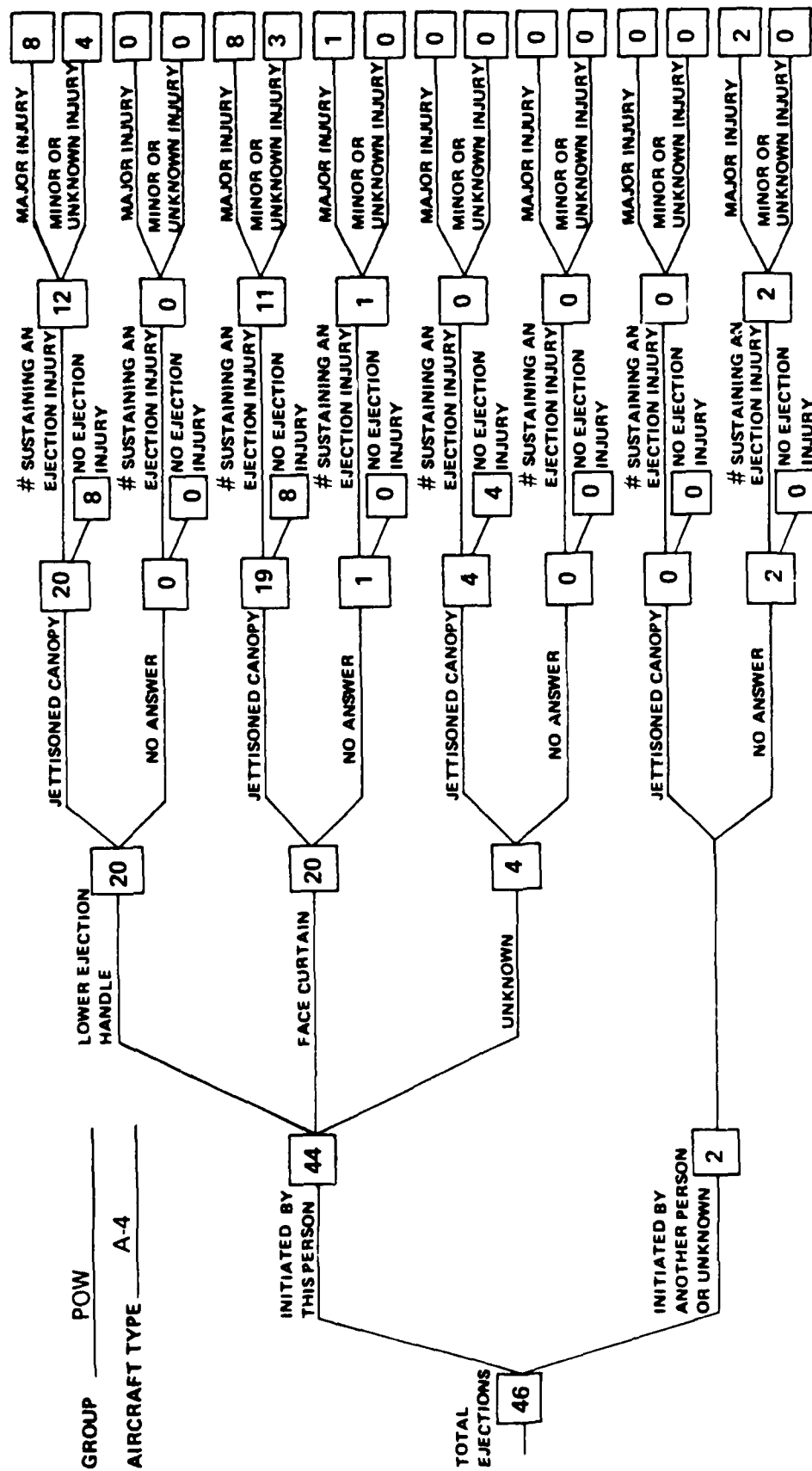


SECTION 1

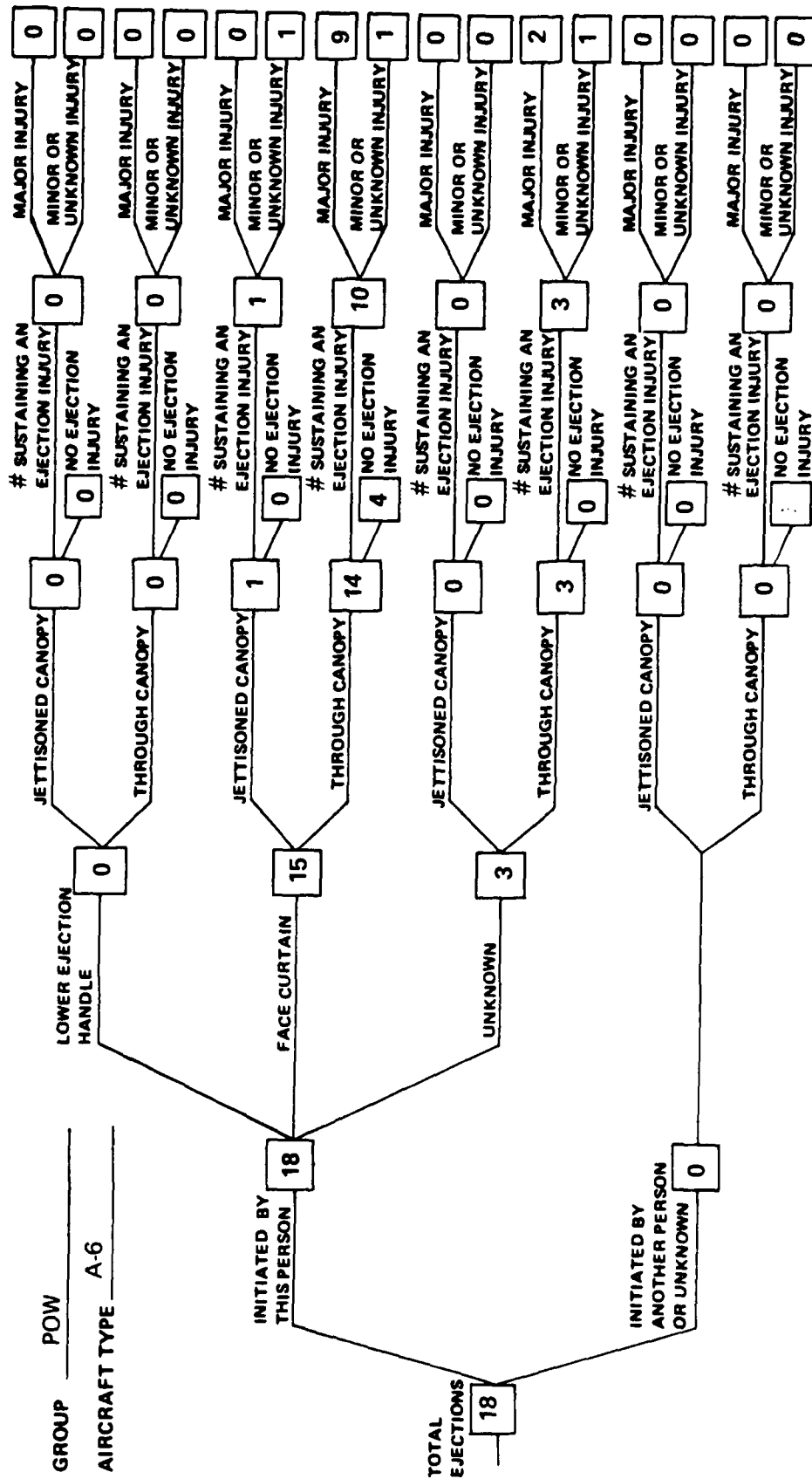
Part B

Distribution of Prisoner of War Ejection Injuries Incurred During Southeast Asia Combat by Canopy Disposition and Method of Ejection Seat Initiation

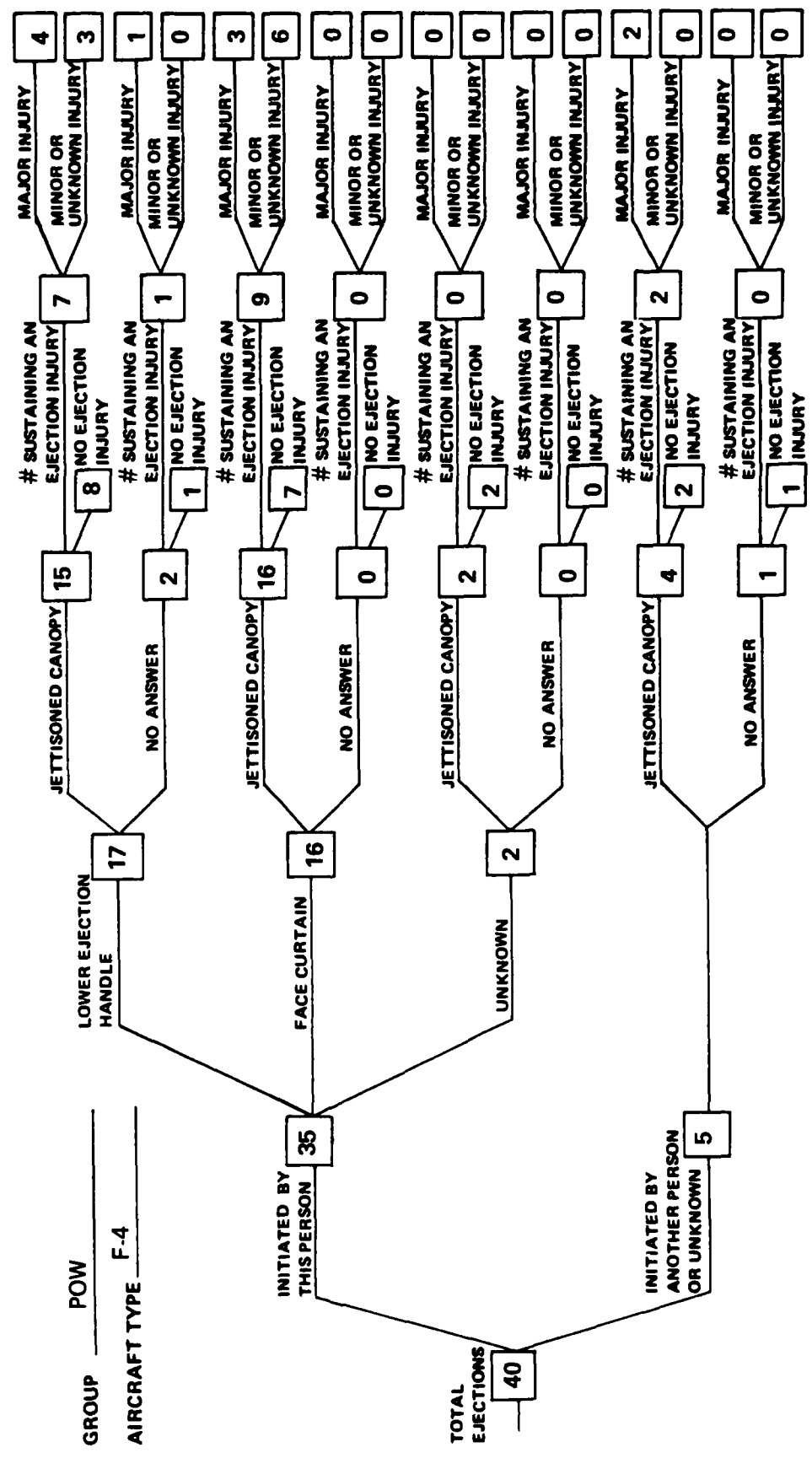
DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED



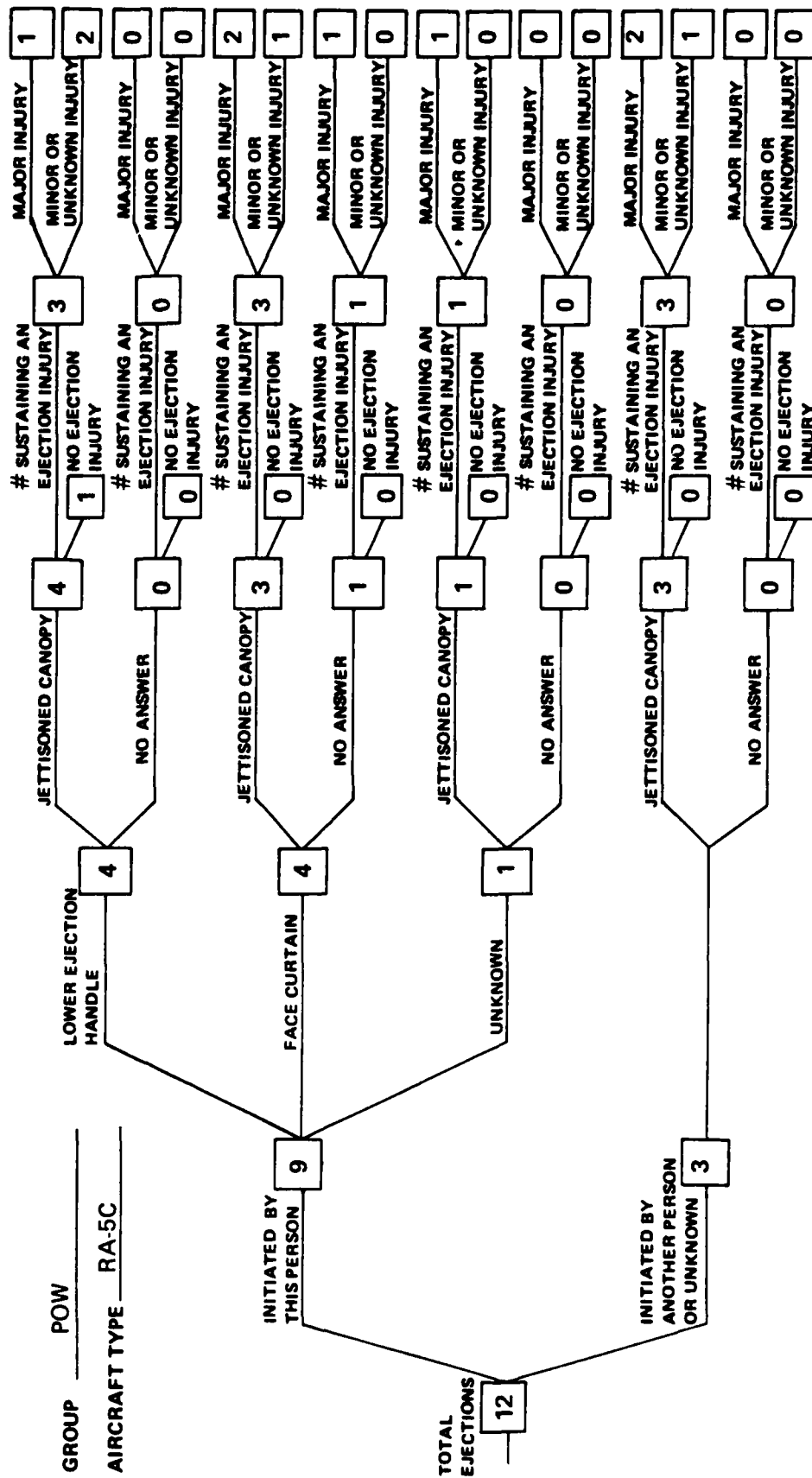
DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED



DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED



DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY TYPE INITIATION AND HANDLE USED



SECTION 2

This section shows the distribution of major upper-extremity ejection injuries, by speed at time of ejection and method of seat initiation. Part A shows the distribution for the combined REC and POW groups. Part B shows the same distribution for just the POW group. In both groups, there are approximately 5 percent fewer major upper-extremity injuries among the aircrewmembers who utilized the face curtain to initiate ejection. In the higher speed ranges (e.g., greater than 450 KIAS) for the REC and POW groups, the major injury rate is 34.8 percent for those utilizing the lower handle and 23.8 percent for those utilizing the face curtain.

SECTION 2

Part A

Distribution of Recovered and Prisoner of War Ejection Injuries During Southeast Asia Combat by Ejection Speed and Method of Ejection Seat Initiation

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP REC & POW AIRCRAFT TYPE All Types TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	5	3	1	2	0
150 - 199	14	3	0	11	0
200 - 249	26	10	0	16	0
250 - 299	31	8	0	23	1
300 - 349	20	6	0	14	2
350 - 399	21	6	2	15	1
400 - 449	27	6	1	21	1
450 - 499	30	7	2	23	2
500 - 549	23	11	4	12	4
550 - 599	5	1	0	4	1
600 - 649	6	3	1	3	3
650 - 699	0	0	0	0	0
700 - 749	1	1	1	0	0
TOTALS	209	65	12	144	15

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP _____ REC & POW _____ AIRCRAFT TYPE _____ A-4 _____ TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	3	2	0	1	0
150 - 199	9	0	0	9	0
200 - 249	14	6	0	8	0
250 - 299	14	4	0	10	1
300 - 349	7	4	0	3	1
350 - 399	8	4	1	4	0
400 - 449	8	4	0	4	0
450 - 499	7	4	2	3	0
500 - 549	8	3	1	5	3
550 - 599	1	0	0	1	0
600 - 649	0	0	0	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	79	31	4	48	5

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP REC & POW AIRCRAFT TYPE A-6 TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	0	0	0	0	0
150 - 199	0	0	0	0	0
200 - 249	2	0	0	2	0
250 - 299	2	0	0	2	0
300 - 349	2	0	0	2	1
350 - 399	3	0	0	3	1
400 - 449	6	0	0	6	1
450 - 499	6	0	0	6	2
500 - 549	1	0	0	1	0
550 - 599	0	0	0	0	0
600 - 649	0	0	0	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	22	0	0	22	5

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP REC & POW AIRCRAFT TYPE A-7 TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	0	0	0	0	0
150 - 199	1	0	0	1	0
200 - 249	1	0	0	1	0
250 - 299	3	1	0	2	0
300 - 349	2	1	0	1	0
350 - 399	0	0	0	0	0
400 - 449	5	0	0	5	0
450 - 499	2	1	0	1	0
500 - 549	0	0	0	0	0
550 - 599	0	0	0	0	0
600 - 649	0	0	0	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	14	3	0	11	0

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP REC & POW AIRCRAFT TYPE F-4 TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	2	1	1	1	0
150 - 199	1	1	0	0	0
200 - 249	5	3	0	2	0
250 - 299	7	1	0	6	0
300 - 349	6	1	0	5	0
350 - 399	7	2	1	5	0
400 - 449	6	2	1	4	0
450 - 499	10	2	0	8	0
500 - 549	8	6	3	2	0
550 - 599	1	0	0	1	1
600 - 649	2	2	1	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	55	21	7	34	1

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP REC & POW AIRCRAFT TYPE F-8 TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	0	0	0	0	0
150 - 199	3	2	0	1	0
200 - 249	4	1	0	3	0
250 - 299	3	0	0	3	0
300 - 349	3	0	0	3	0
350 - 399	3	0	0	3	0
400 - 449	0	0	0	0	0
450 - 499	5	0	0	5	0
500 - 549	5	2	0	3	0
550 - 599	1	0	0	1	0
600 - 649	0	0	0	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	27	5	0	22	0

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP REC & POW AIRCRAFT TYPE RA-5C TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	0	0	0	0	0
150 - 199	0	0	0	0	0
200 - 249	0	0	0	0	0
250 - 299	2	2	0	0	0
300 - 349	0	0	0	0	0
350 - 399	0	0	0	0	0
400 - 449	2	0	0	2	0
450 - 499	0	0	0	0	0
500 - 549	1	0	0	1	1
550 - 599	2	1	0	1	0
600 - 649	4	1	0	3	3
650 - 699	0	0	0	0	0
700 - 749	1	1	1	0	0
TOTALS	12	5	1	7	4

SECTION 2

Part B

**Distribution of Prisoner of War Ejection Injuries During Southeast Asia
Combat by Ejection Speed and Method of Ejection Seat Initiation**

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP POW's AIRCRAFT TYPE All TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	2	1	0	1	0
150 - 199	3	1	0	2	0
200 - 249	10	6	0	4	0
250 - 299	6	1	0	5	1
300 - 349	10	5	0	5	1
350 - 399	12	4	2	8	1
400 - 449	16	3	1	13	1
450 - 499	20	6	2	14	2
500 - 549	19	8	3	11	4
550 - 599	3	1	0	2	0
600 - 649	6	3	1	3	3
650 - 699	0	0	0	0	0
700 - 749	1	1	1	0	0
TOTALS	108	40	10	68	13

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP POW AIRCRAFT TYPE A-4 TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	1	1	0	0	0
150 - 199	2	0	0	2	0
200 - 249	4	3	0	1	0
250 - 299	3	0	0	3	1
300 - 349	4	3	0	1	1
350 - 399	5	3	1	2	0
400 - 449	4	1	0	3	0
450 - 499	5	4	2	1	0
500 - 549	7	2	0	5	3
550 - 599	1	0	0	1	0
600 - 649	0	0	0	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	36	17	3	19	5

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP POW AIRCRAFT TYPE A-6 TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	0	0	0	0	0
150 - 199	0	0	0	0	0
200 - 249	0	0	0	0	0
250 - 299	0	0	0	0	0
300 - 349	0	0	0	0	0
350 - 399	3	0	0	3	1
400 - 449	6	0	0	6	1
450 - 499	5	0	0	5	2
500 - 549	1	0	0	1	0
550 - 599	0	0	0	0	0
600 - 649	0	0	0	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	15	0	0	15	4

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP POW AIRCRAFT TYPE A-7 TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	0	0	0	0	0
150 - 199	0	0	0	0	0
200 - 249	1	0	0	1	0
250 - 299	1	0	0	1	0
300 - 349	1	1	0	0	0
350 - 399	0	0	0	0	0
400 - 449	2	0	0	2	0
450 - 499	1	0	0	1	0
500 - 549	0	0	0	0	0
550 - 599	0	0	0	0	0
600 - 649	0	0	0	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	6	1	0	5	0

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP POW AIRCRAFT TYPE F-4 TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	1	0	0	1	0
150 - 199	0	0	0	0	0
200 - 249	5	3	0	2	0
250 - 299	2	1	0	1	0
300 - 349	4	1	0	3	0
350 - 399	2	1	1	1	0
400 - 449	3	2	1	1	0
450 - 499	6	2	0	4	0
500 - 549	7	5	3	2	0
550 - 599	0	0	0	0	0
600 - 649	2	2	1	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	32	17	6	15	0

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP _____ POW _____ AIRCRAFT TYPE _____ F-8 _____ TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	0	0	0	0	0
150 - 199	1	1	0	0	0
200 - 249	0	0	0	0	0
250 - 299	0	0	0	0	0
300 - 349	1	0	0	1	0
350 - 399	2	0	0	2	0
400 - 449	0	0	0	0	0
450 - 499	3	0	0	3	0
500 - 549	3	1	0	2	0
550 - 599	1	0	0	1	0
600 - 649	0	0	0	0	0
650 - 699	0	0	0	0	0
700 - 749	0	0	0	0	0
TOTALS	11	2	0	9	0

DISTRIBUTION OF EJECTION INJURIES DURING SEASIA COMBAT BY EJECTION SPEED AND HANDLE USED

GROUP POW AIRCRAFT TYPE RA-5C TYPE INJURY Major Upper Ext. Only

EJECTION SPEED (KIAS)	TOTAL NUMBER OF EJECTIONS	LOWER HANDLE		FACE CURTAIN	
		NUMBER USING	NUMBER OF INDIVIDUALS INJURED	NUMBER USING	NUMBER OF INDIVIDUALS INJURED
0 - 49	0	0	0	0	0
50 - 99	0	0	0	0	0
100 - 149	0	0	0	0	0
150 - 199	0	0	0	0	0
200 - 249	0	0	0	0	0
250 - 299	0	0	0	0	0
300 - 349	0	0	0	0	0
350 - 399	0	0	0	0	0
400 - 449	1	0	0	1	0
450 - 499	0	0	0	0	0
500 - 549	1	0	0	1	1
550 - 599	1	1	0	0	0
600 - 649	4	1	0	3	3
650 - 699	0	0	0	0	0
700 - 749	1	1	1	0	0
TOTALS	8	3	1	5	4

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

SECTION 3

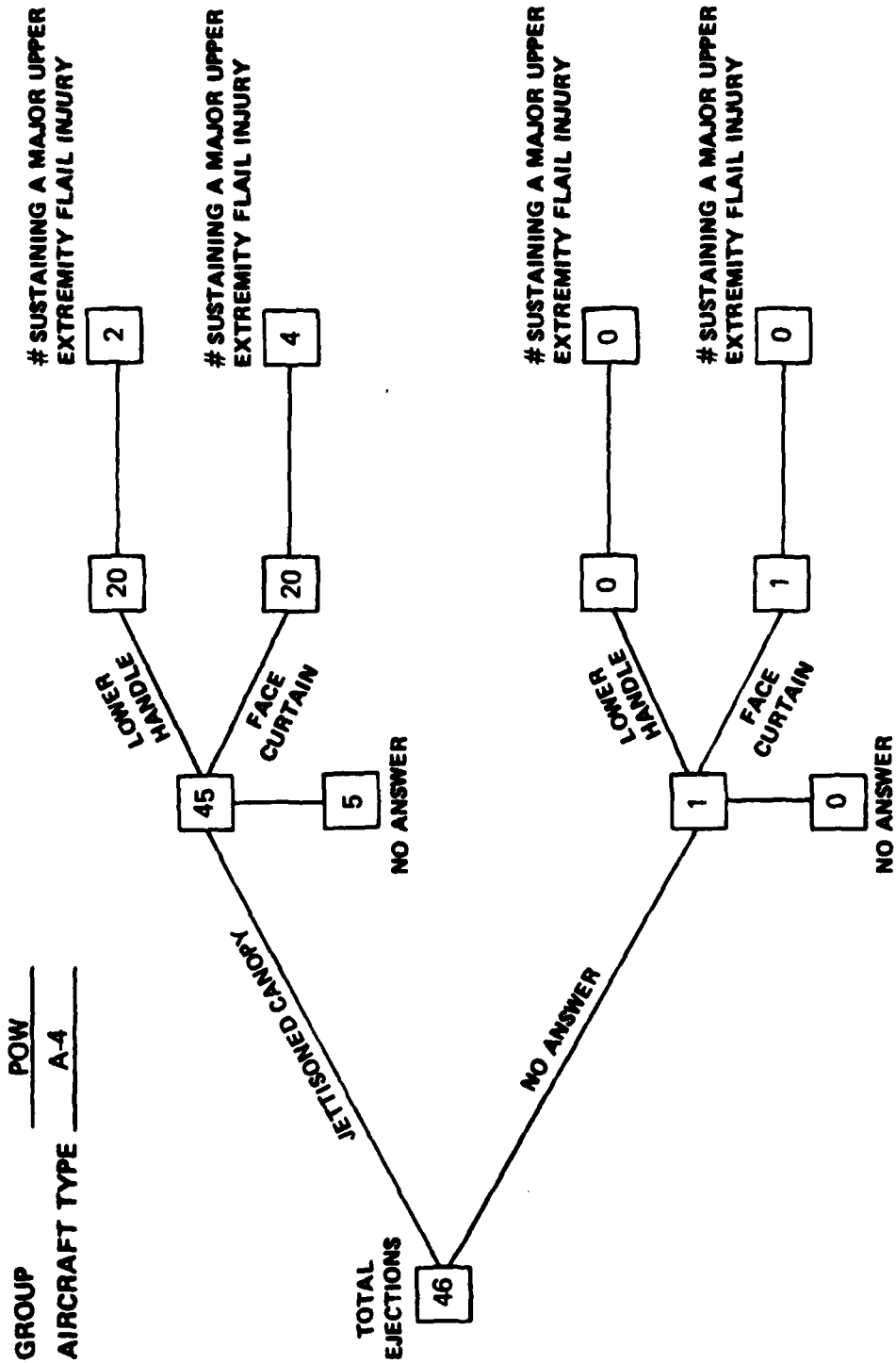
This section utilizes only the POW data to show distribution of major upper-extremity injuries caused by high speed ejection *flail*. The variables used to categorize the injuries included: was the ejection through the canopy, or was the canopy jettisoned, and what method was used to initiate ejection.

The results, by ejection seat type, for those aircraft in which it was known whether aircrewmembers jettisoned or went through the canopy are summarized below:

Major Upper Extremity Flail Injury Rates, by Seat Type (POW only)

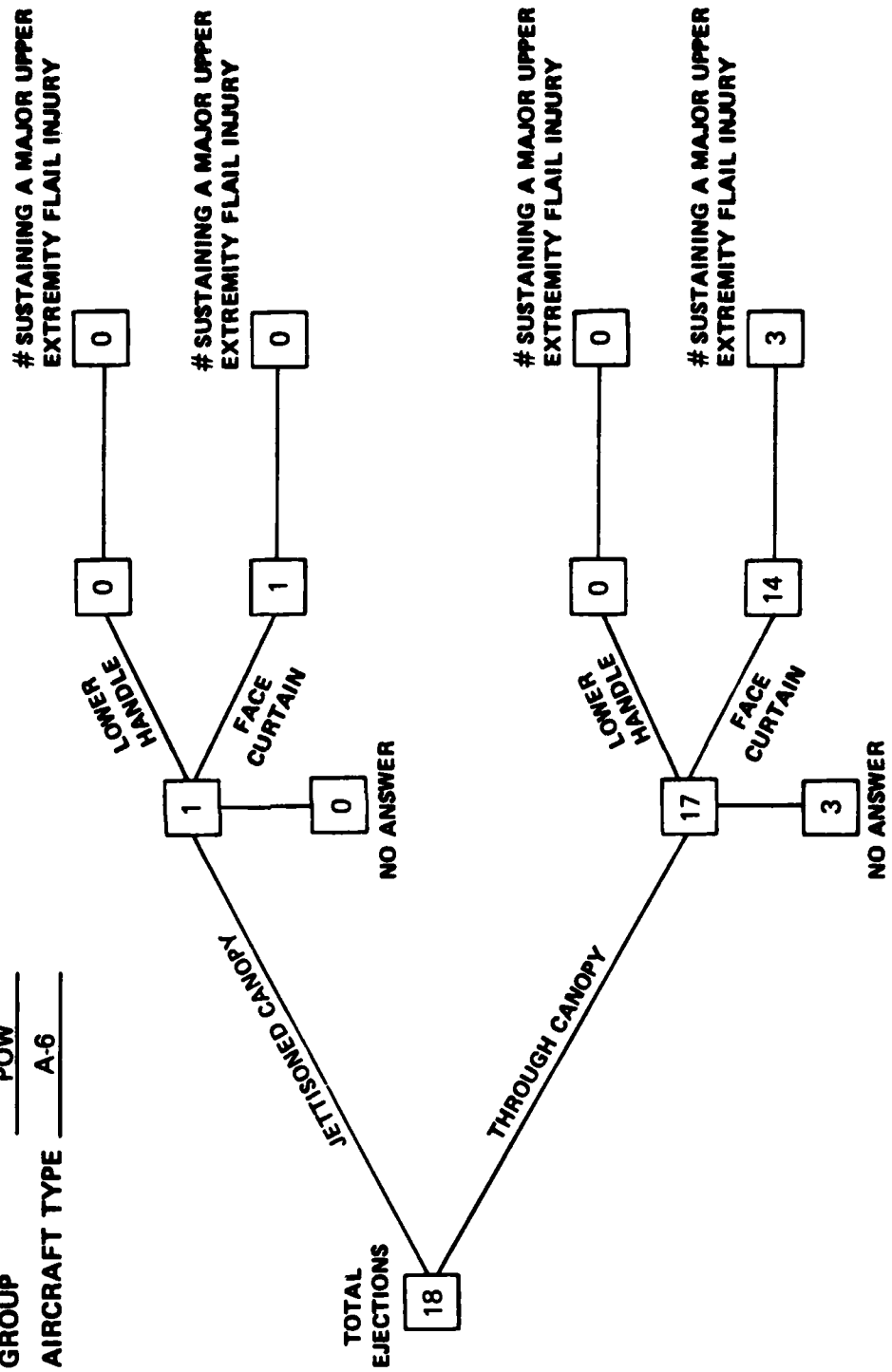
<u>Ejection Seat Type</u>	<u>% Major Upper-Extremity Flail Injury</u>	
	<u>Lower Handle</u>	<u>Face Curtain</u>
Douglas (A-4, A-7)	9.5%	16.6%
Martin Baker (F-4, A-6, F-8)	17.3%	7.3%

DISTRIBUTION OF UPPER EXTREMITY EJECTION FLAIL INJURIES DURING SEASIA COMBAT BY METHOD USED TO INITIATE EJECTION



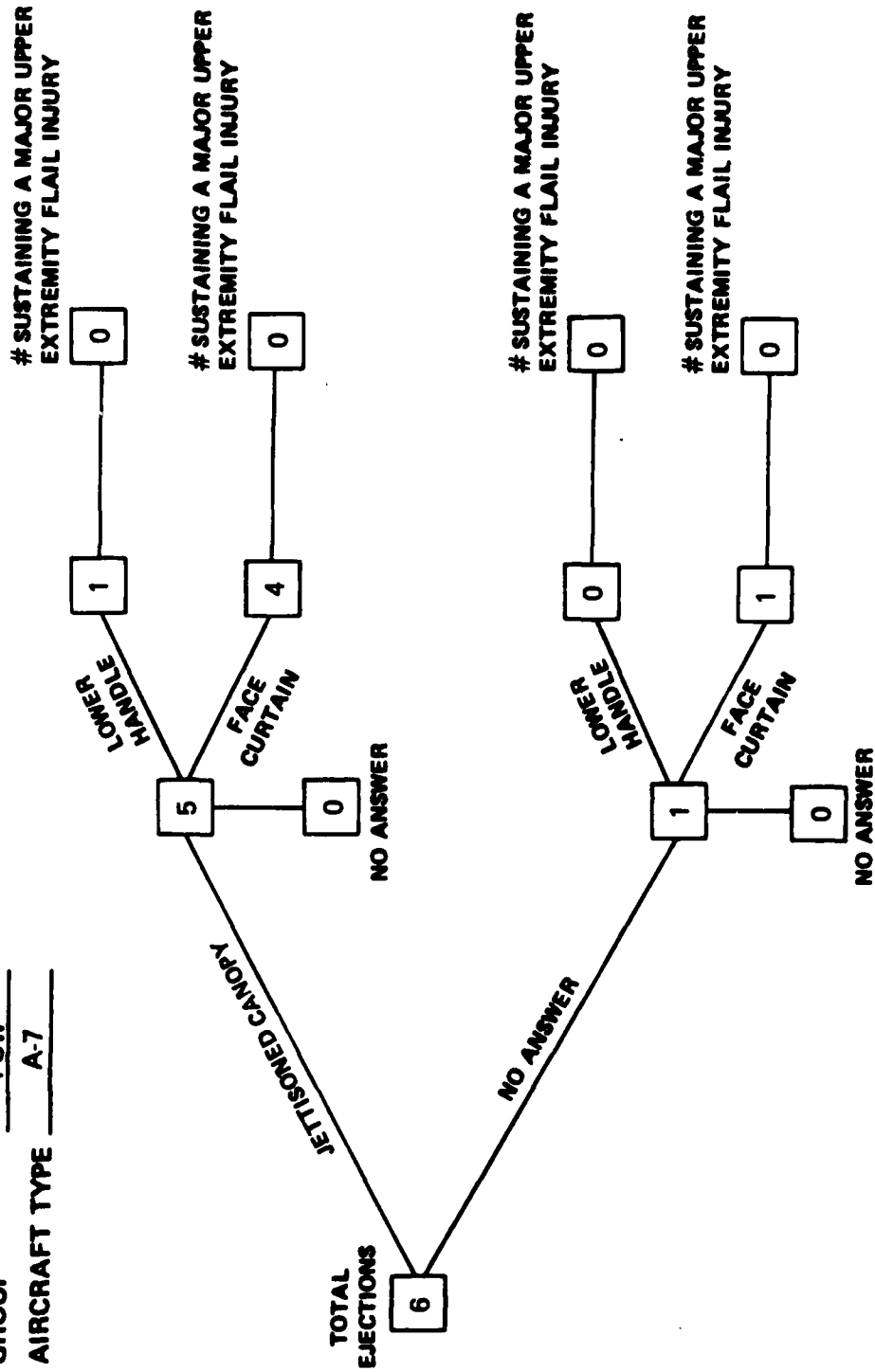
DISTRIBUTION OF UPPER EXTREMITY EJECTION FLAIL INJURIES DURING SEASIA COMBAT BY METHOD USED TO INITIATE EJECTION

GROUP POW
 AIRCRAFT TYPE A-6



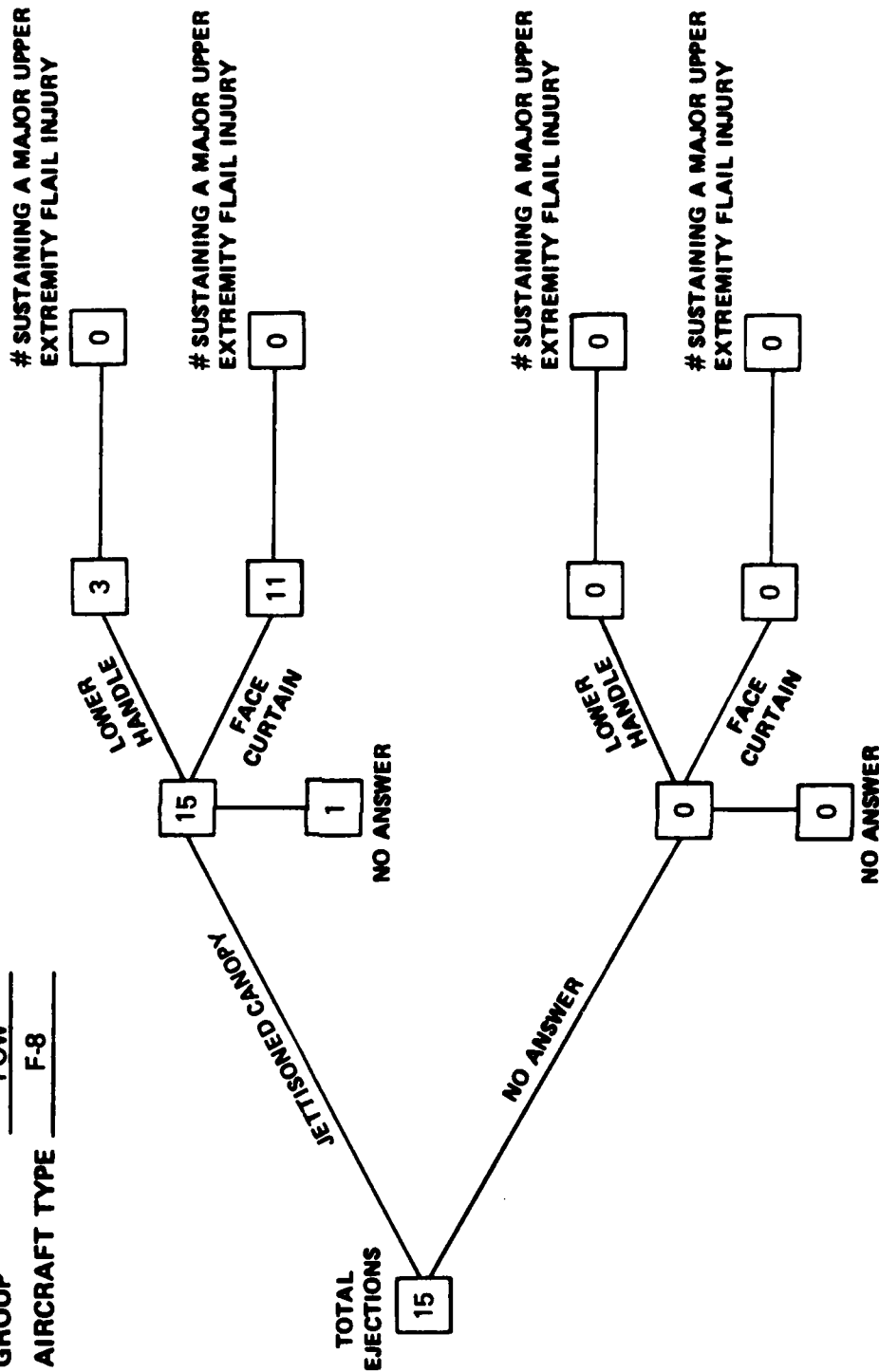
DISTRIBUTION OF UPPER EXTREMITY EJECTION FLAIL INJURIES DURING SEASIA COMBAT BY METHOD USED TO INITIATE EJECTION

GROUP POW
 AIRCRAFT TYPE A-7



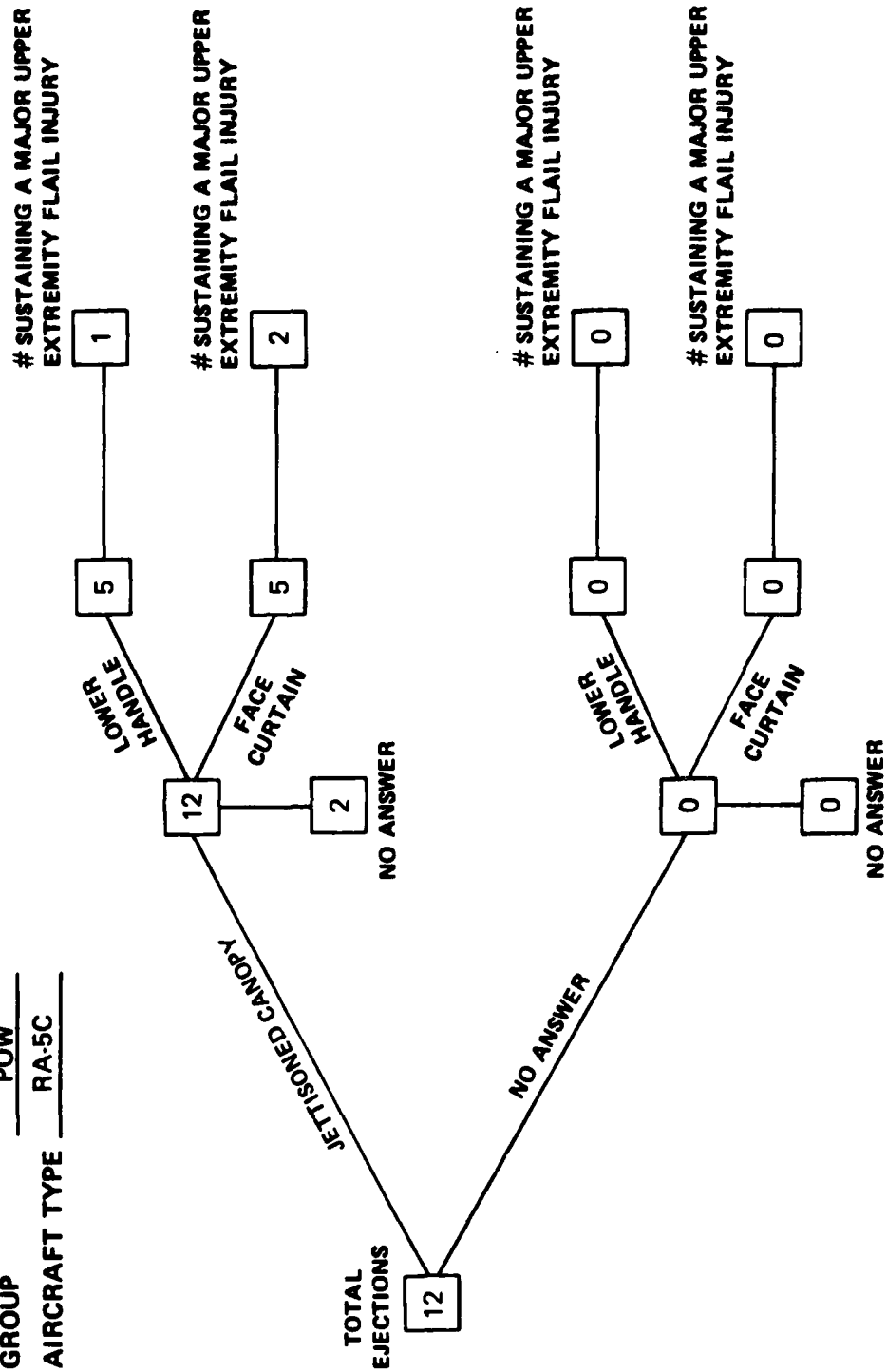
DISTRIBUTION OF UPPER EXTREMITY EJECTION FLAIL INJURIES DURING SEASIA COMBAT BY METHOD USED TO INITIATE EJECTION

GROUP POW
 AIRCRAFT TYPE F-8



DISTRIBUTION OF UPPER EXTREMITY EJECTION FLAIL INJURIES DURING SEASIA COMBAT BY METHOD USED TO INITIATE EJECTION

GROUP POW
AIRCRAFT TYPE RA-5C



SECTION 4

Section 4 is divided into five parts. The first four parts present ejection injury frequency for specific aircraft by matrixing the injury against anatomical location. Tables are grouped according to type of injury and method of ejection seat initiation.

Part A—Major Ejection Injury and Face Curtain

Part B—Major Flail Injury and Face Curtain

Part C—Major Ejection Injury and Lower Handle

Part D—Major Flail Injury and Lower Handle

Part E in this section summarizes the injury rates from the four tables. Injury rates, by aircraft type and method of ejection seat initiation, are shown for all major ejection injuries, for major flail injuries, for major upper-extremity flail injuries, and for major lower-extremity flail injuries.

SECTION 4

Part A

**Major Ejection Injury Frequency and Locations for Prisoners of War
Utilizing the Face Curtain to Initiate Ejection**

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							TOTAL
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	
DISLOCATION			4		4		2	
SIMPLE FRACTURE			1		8	2	8	
COMP. FRACTURE					3			
LACERATION						1	1	
SPRAIN		2					1	
TORN MUSCLE							1	
TORN LIGAMENT			1				5	
SPINAL COMP. FRACTURE		2						
TOTAL		4	6	15	3	17	1	

INJURY TYPE Major Ejection
 GROUP POW
 EJECTION HANDLE USED Face Curtain
 AIRCRAFT TYPE All
 NUMBER OF EJECTIONS 72
 NUMBER OF INDIVIDUALS INJURED 26
 TOTAL NUMBER OF INJURIES INCURRED 46

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION			4		1		1	
SIMPLE FRACTURE			1		3	1	4	
COMP. FRACTURE					3			
LACERATION								1
SPRAIN							1	
TORN MUSCLE								
TORN LIGAMENT							3	
SPINAL COMP. FRACTURE		1						
TOTAL		1	5		7	1	9	1

INJURY TYPE Major Ejection

GROUP POW

EJECTION HANDLE USED Face Curtain

AIRCRAFT TYPE A-4

NUMBER OF EJECTIONS 20

NUMBER OF INDIVIDUALS INJURED 10

TOTAL NUMBER OF INJURIES INCURRED 24

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							TOTAL
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	
DISLOCATION					2		1	
SIMPLE FRACTURE					2	1		
COMP. FRACTURE							2	
LACERATION						1		
SPRAIN								
TORN MUSCLE							1	
TORN LIGAMENT								
SPINAL COMP. FRACTURE		1						
TOTAL		1			4	2	4	

INJURY TYPE _____ Major Ejection _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Face Curtain _____
 AIRCRAFT TYPE _____ A-6 _____
 NUMBER OF EJECTIONS _____ 15 _____
 NUMBER OF INDIVIDUALS INJURED _____ 8 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 11 _____



EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT							1	
SPINAL COMP. FRACTURE								
TOTAL							1	

INJURY TYPE Major Ejection
 GROUP POW
 EJECTION HANDLE USED Face Curtain
 AIRCRAFT TYPE A-7
 NUMBER OF EJECTIONS 5
 NUMBER OF INDIVIDUALS INJURED 1
 TOTAL NUMBER OF INJURIES INCURRED 1

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE Major Ejection
 GROUP POW
 EJECTION HANDLE USED Face Curtain
 AIRCRAFT TYPE F-4
 NUMBER OF EJECTIONS 16
 NUMBER OF INDIVIDUALS INJURED 1
 TOTAL NUMBER OF INJURIES INCURRED 1

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE							1	
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL							1	

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE							1	
COMP. FRACTURE								
LACERATION								
SPRAIN		1						
TORN MUSCLE								
TORN LIGAMENT							1	
SPINAL COMP. FRACTURE								
TOTAL		1					2	

INJURY TYPE Major Ejection
 GROUP POW
 EJECTION HANDLE USED Face Curtain
 AIRCRAFT TYPE F-8
 NUMBER OF EJECTIONS 11
 NUMBER OF INDIVIDUALS INJURED 2
 TOTAL NUMBER OF INJURIES INCURRED 3

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION								
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT	
DISLOCATION					1				
SIMPLE FRACTURE					3				
COMP. FRACTURE									
LACERATION									
SPRAIN		1							
TORN MUSCLE									
TORN LIGAMENT			1						
SPINAL COMP. FRACTURE									
TOTAL		1	1		4				

INJURY TYPE _____ Major Ejection _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Face Curtain _____
 AIRCRAFT TYPE _____ RA-5C _____
 NUMBER OF EJECTIONS _____ 5 _____
 NUMBER OF INDIVIDUALS INJURED _____ 4 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 6 _____

SECTION 4

Part B

**Major Flail Injury Frequency and Locations for Prisoners of War Utilizing
the Face Curtain to Initiate Ejection**

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION			4		3		1	
SIMPLE FRACTURE			1		8	1	5	
COMP. FRACTURE					3			
LACERATION								
SPRAIN		1					1	
TORN MUSCLE								
TORN LIGAMENT			1				4	
SPINAL COMP. FRACTURE								
TOTAL		1	6	14	1	11		

INJURY TYPE _____ Major Flail _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Face Curtain _____
 AIRCRAFT TYPE _____ All _____
 NUMBER OF EJECTIONS _____ 72 _____
 NUMBER OF INDIVIDUALS INJURED _____ 16 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 33 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							TOTAL	
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG		FOOT
DISLOCATION			4		1			1	
SIMPLE FRACTURE			1		3	1		3	
COMP. FRACTURE					3				
LACERATION									
SPRAIN								1	
TORN MUSCLE									
TORN LIGAMENT								3	
SPINAL COMP. FRACTURE									
TOTAL			5		7	1		8	

INJURY TYPE Major Flail
 GROUP POW
 EJECTION HANDLE USED Face Curtain
 AIRCRAFT TYPE A-4
 NUMBER OF EJECTIONS 20
 NUMBER OF INDIVIDUALS INJURED 8
 TOTAL NUMBER OF INJURIES INCURRED 21

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION					1			
SIMPLE FRACTURE					2			2
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL					3			2

INJURY TYPE _____ Major Flail _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Face Curtain _____
 AIRCRAFT TYPE _____ A-6 _____
 NUMBER OF EJECTIONS _____ 15 _____
 NUMBER OF INDIVIDUALS INJURED _____ 3 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 5 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT							1	
SPINAL COMP. FRACTURE								
TOTAL							1	

INJURY TYPE _____ Major Flail
 GROUP _____ POW
 EJECTION HANDLE USED _____ Face Curtain
 AIRCRAFT TYPE _____ A-7
 NUMBER OF EJECTIONS _____ 5
 NUMBER OF INDIVIDUALS INJURED _____ 1
 TOTAL NUMBER OF INJURIES INCURRED _____ 1

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY LOCATION

	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL	None							

INJURY TYPE

INJURY TYPE _____ Major Flail _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Face Curtain _____
 AIRCRAFT TYPE _____ F-4 _____
 NUMBER OF EJECTIONS _____ 16 _____
 NUMBER OF INDIVIDUALS INJURED _____ 0 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 0 _____

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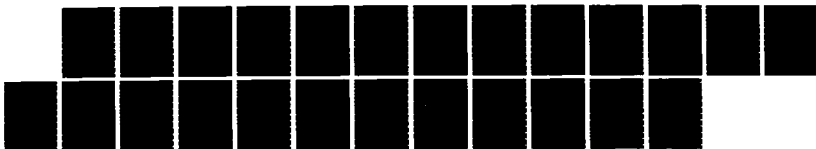
AIRCRAFT AUTOMATED ESCAPE SYSTEMS (AAES) DATA ANALYSIS
PROGRAM SYMPOSIUM H. (U) NAVAL SAFETY CENTER NORFOLK VA
1981

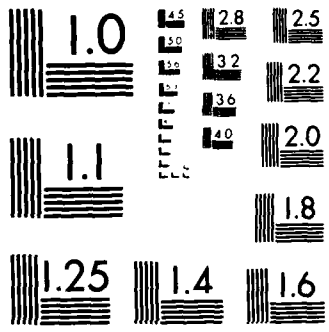
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY LOCATION

	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL	None							

INJURY TYPE

INJURY TYPE _____ Major Flail _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Face Curtain _____
 AIRCRAFT TYPE _____ F-8 _____
 NUMBER OF EJECTIONS _____ 11 _____
 NUMBER OF INDIVIDUALS INJURED _____ 0 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 0 _____

SECTION 4

Part C

**Major Ejection Injury Frequency and Locations for Prisoners of War
Utilizing the Lower Handle to Initiate Ejection**

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY LOCATION

INJURY TYPE	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION			4		3		5	
SIMPLE FRACTURE			1		6	1	1	
COMP. FRACTURE					2			
LACERATION								
SPRAIN		1						
TORN MUSCLE								
TORN LIGAMENT							1	
SPINAL COMP. FRACTURE		9						
TOTAL		10	5		11	1	7	

INJURY TYPE _____ Major Ejection _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ All _____
 NUMBER OF EJECTIONS _____ 50 _____
 NUMBER OF INDIVIDUALS INJURED _____ 18 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 34 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION			3				3	
SIMPLE FRACTURE			1		2		1	
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE		8						
TOTAL		8	4		2		4	

INJURY TYPE _____ Major Ejection _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ A-4 _____
 NUMBER OF EJECTIONS _____ 20 _____
 NUMBER OF INDIVIDUALS INJURED _____ 8 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 18 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE _____ Major Ejection _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ A-6 _____
 NUMBER OF EJECTIONS _____ None _____
 NUMBER OF INDIVIDUALS INJURED _____ None _____
 TOTAL NUMBER OF INJURIES INCURRED _____ None _____

INJURY TYPE	INJURY LOCATION							TOTAL
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL								None

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE		1						
TOTAL		1						

INJURY TYPE _____ Major Ejection _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ A-7 _____
 NUMBER OF EJECTIONS _____ 1 _____
 NUMBER OF INDIVIDUALS INJURED _____ 1 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 1 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							TOTAL	
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG		FOOT
DISLOCATION					3			2	
SIMPLE FRACTURE					2	1			
COMP. FRACTURE					2				
LACERATION									
SPRAIN		1							
TORN MUSCLE									
TORN LIGAMENT							1		
SPINAL COMP. FRACTURE									
TOTAL		1			7	1	3		

INJURY TYPE _____ Major Ejection _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ F-4 _____
 NUMBER OF EJECTIONS _____ 21 _____
 NUMBER OF INDIVIDUALS INJURED _____ 8 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 12 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL	None							

INJURY TYPE _____ Major Ejection _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ F-8 _____
 NUMBER OF EJECTIONS _____ 3 _____
 NUMBER OF INDIVIDUALS INJURED _____ 0 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 0 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION			1					
SIMPLE FRACTURE					2			
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL			1		2			

INJURY TYPE Major Ejection
 GROUP POW
 EJECTION HANDLE USED Lower
 AIRCRAFT TYPE RA-5C
 NUMBER OF EJECTIONS 5
 NUMBER OF INDIVIDUALS INJURED 1
 TOTAL NUMBER OF INJURIES INCURRED 3

SECTION 4

Part D

**Major Flail Injury Frequency and Location for Prisoners of War Utilizing
the Lower Handle to Initiate Ejection**

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							TOTAL
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	
DISLOCATION			3		3		5	
SIMPLE FRACTURE			1		4		1	
COMP. FRACTURE					1			
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT							1	
SPINAL COMP. FRACTURE								
TOTAL			4		8		7	

INJURY TYPE _____ Major Flail
 GROUP _____ POW
 EJECTION HANDLE USED _____ Lower
 AIRCRAFT TYPE _____ All
 NUMBER OF EJECTIONS _____ 50
 NUMBER OF INDIVIDUALS INJURED _____ 9
 TOTAL NUMBER OF INJURIES INCURRED _____ 19

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							TOTAL	
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG		FOOT
DISLOCATION			2					3	
SIMPLE FRACTURE			1		2			1	
COMP. FRACTURE									
LACERATION									
S'RAIN									
TORN MUSCLE									
TORN LIGAMENT									
SPINAL COMP. FRACTURE									
TOTAL			3		2			4	

INJURY TYPE _____ Major Flail _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ A-4 _____
 NUMBER OF EJECTIONS _____ 20 _____
 NUMBER OF INDIVIDUALS INJURED _____ 4 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 9 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL	None							

INJURY TYPE _____ Major Flail _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ A-6 _____
 NUMBER OF EJECTIONS _____ None _____
 NUMBER OF INDIVIDUALS INJURED _____ None _____
 TOTAL NUMBER OF INJURIES INCURRED _____ None _____



EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL							None	

INJURY TYPE _____ Major Flail
 GROUP _____ POW
 EJECTION HANDLE USED _____ Lower
 AIRCRAFT TYPE _____ A-7
 NUMBER OF EJECTIONS _____ 1
 NUMBER OF INDIVIDUALS INJURED _____ 0
 TOTAL NUMBER OF INJURIES INCURRED _____ 0

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							TOTAL	
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG		FOOT
DISLOCATION									
SIMPLE FRACTURE					3			2	
COMP. FRACTURE					1				
LACERATION					1				
SPRAIN									
TORN MUSCLE									
TORN LIGAMENT								1	
SPINAL COMP. FRACTURE									
TOTAL					5			3	

INJURY TYPE _____ Major Flail _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ F-4 _____
 NUMBER OF EJECTIONS _____ 21 _____
 NUMBER OF INDIVIDUALS INJURED _____ 4 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 8 _____



EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION								
SIMPLE FRACTURE								
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL	None							

INJURY TYPE _____ Major Flail _____
 GROUP _____ POW _____
 EJECTION HANDLE USED _____ Lower _____
 AIRCRAFT TYPE _____ F-8 _____
 NUMBER OF EJECTIONS _____ 3 _____
 NUMBER OF INDIVIDUALS INJURED _____ 0 _____
 TOTAL NUMBER OF INJURIES INCURRED _____ 0 _____

EJECTION INJURY FREQUENCY BY AIRCRAFT TYPE AND EJECTION HANDLE USED

INJURY TYPE	INJURY LOCATION							
	HEAD	VERT. COL.	SHOULDER	RIBS	ARM	WRIST	LEG	FOOT
DISLOCATION			1					
SIMPLE FRACTURE					1			
COMP. FRACTURE								
LACERATION								
SPRAIN								
TORN MUSCLE								
TORN LIGAMENT								
SPINAL COMP. FRACTURE								
TOTAL			1		1			

INJURY TYPE _____ Major Flail
 GROUP _____ POW
 EJECTION HANDLE USED _____ Lower
 AIRCRAFT TYPE _____ RA-5C
 NUMBER OF EJECTIONS _____ 5
 NUMBER OF INDIVIDUALS INJURED _____ 1
 TOTAL NUMBER OF INJURIES INCURRED _____ 2



SECTION 4

Part E

**Summaries of Major Ejection and Flail Injury Rates by Aircraft Type
and Method of Ejection Seat Initiation**

SUMMARY OF INJURY RATES BY AIRCRAFT TYPE AND HANDLE USED:

INJURY TYPE (COLUMNS: C AND F) Major Ejection GROUP POW

AIRCRAFT TYPE	A* MEAN EJECTION SPEED*	LOWER HANDLE			FACE CURTAIN		
		B # EJECTING USING LOWER HANDLE	C TOTAL # OF INJURY TYPE IN GROUP B	D - C/B INJURY RATE	E # EJECTING USING FACE CURTAIN	F TOTAL # OF INJURY TYPE IN GROUP E	G - F/E INJURY RATE
A-4	378	20	18	90%	20	24	120%
A-6	408	0	0	N.A.	15	11	73%
A-7	337	1	1	100%	5	1	20%
F-4	403	21	12	57%	16	1	6%
F-8	420	3	0	0%	11	3	27%
RA-5C	588	5	3	60%	5	6	120%

*Mean ejection speed for all aircraft types in group.

SUMMARY OF INJURY RATES BY AIRCRAFT TYPE AND HANDLE USED:

INJURY TYPE (COLUMNS: C AND F) Major Flail GROUP POW

AIRCRAFT TYPE	LOWER HANDLE			FACE CURTAIN			
	A*	B	C	D = C/B	E	F	G = F/E
	MEAN EJECTION SPEED*	# EJECTING USING LOWER HANDLE	TOTAL # OF INJURY TYPE IN GROUP B	INJURY RATE	# EJECTING USING FACE CURTAIN	TOTAL # OF INJURY TYPE IN GROUP E	INJURY RATE
A-4	378	20	9	45%	20	21	105%
A-6	408	0	0	N.A.	15	5	33%
A-7	337	1	0	0%	5	1	20%
F-4	403	21	8	38%	16	0	0%
F-8	420	3	0	0%	11	0	0%
RA-5C	588	5	2	40%	5	6	120%

*Mean ejection speed for all aircraft type in group.

SUMMARY OF INJURY RATES BY AIRCRAFT TYPE AND HANDLE USED:

INJURY TYPE (COLUMNS: C AND F) Major Upper Ext. Flail GROUP POW

AIRCRAFT TYPE	LOWER HANDLE			FACE CURTAIN			
	A* MEAN EJECTION SPEED*	B # EJECTING USING LOWER HANDLE	C TOTAL # OF INJURY TYPE IN GROUP B	D = C/B INJURY RATE	E # EJECTING USING FACE CURTAIN	F TOTAL # OF INJURY TYPE IN GROUP E	G = F/E INJURY RATE
A-4	378	20	4	20%	20	13	65%
A-6	408	0	NA	NA	15	3	20%
A-7	337	1	0	0%	5	0	0%
F-4	403	21	5	24%	16	0	0%
F-8	420	3	0	0%	11	0	0%
RA-5C	588	5	2	40%	5	5	100%

*Mean ejection speed for all aircraft type in group.

SUMMARY OF INJURY RATES BY AIRCRAFT TYPE AND HANDLE USED:

INJURY TYPE (COLUMNS: C AND F) Major Lower Ext. Flail _____ GROUP _____ POW _____

AIRCRAFT TYPE	A* MEAN EJECTION SPEED*	LOWER HANDLE			FACE CURTAIN			G = F/E INJURY RATE
		B # EJECTING USING LOWER HANDLE	C TOTAL # OF INJURY TYPE IN GROUP B	D = C/B INJURY RATE	E # EJECTING USING FACE CURTAIN	F TOTAL # OF INJURY TYPE IN GROUP E		
A-4	378	20	4	20%	20	8	40%	
A-6	408	0	N.A.	N.A.	15	2	13%	
A-7	337	1	0	0%	5	1	20%	
F-4	403	21	3	14%	16	0	0%	
F-8	420	3	0	0%	11	0	0%	
RA-5C	588	5	0	0%	5	0	0%	

*Mean ejection speed for all aircraft type in group.

END

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