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LIMA DISASTER PREPAREDNESS REPORT

VOLUME VI:

Airport and Aircraft Resources

by

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The Lima Disaster Preparedness Report has 15 sections:

Volume I: Methodology Employed

Volume II: Port of Callao Infrastructure Security and Emergency Evacuation Needs

Volume III: Electricity

Volume IV: Water and Sewerage

Volume V: Heavy Equipment Rehabilitation and Maintenance

Volume VI: Airport and Aircraft Resources

Volume VII: Education

Volume VIII: Food

Volume IX: Housing

Volume X: Health

Volume XI: International Donor Coordination

Volume XII: Critical Abstracts from the Literature: A field perspective on major earthquakes:

Peru, 5-31-70
Nicaragua, 12-23-72
Guatemala, 2-4-76

Volume XIII: Review of Earthquake Prediction by Brian Brady

Volume XIV: Other Issues

Volume XV: Summary

FOREWORD

This is one section of a fifteen volume report concerning disaster preparedness in Lima, Peru. It was researched in Lima by a team of disaster specialists during the period July - November, 1981, for the Agency for International Development's Office of U. S. Foreign Disaster Assistance and USAID Mission in Peru. The report is supplemented by a considerable number of maps, charts and resource documents which are located in the USAID/ Peru Disaster Preparedness Resource Library in Lima.

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TABLE OF CONTENTS

	Page No.
Executive Summary	3
Introduction	5
Review of the Literature	6
Part I: Airports	13
Part II: Aircraft Resources	24
Appendices	
Appendix I - Airfield Survey: Jorge Chavez Airport	35
Appendix II - Airfield Survey: Las Palmas Airport	61
Appendix III - Airfield Survey: Collique Airport	91
Appendix IV - Magazine Article: Meeting the Triple R Challenge	117

EXECUTIVE SUMMARY

Lima's three airports, and its considerable Armed Forces aircraft and helicopter capacities, would be vital resources in the event of a major earthquake in Lima. This report discusses these resources and provides some suggestions for disaster preparedness and response activities which international donors may wish to consider supporting. It also includes a review of literature relevant in a general way to the subject.

Lima is served by three airports: Jorge Chavez International Airport, with a capacity for about twelve C-141's if civilian traffic is cleared for emergency operations and a capability for night-time operations; the Peruvian Air Force LAS PALMAS Airport, which can support small numbers of C-141 and C-130 aircraft; and COLLIQUE airstrip, whose night-time operations would depend on flares and which has modest aircraft capacity. Detailed technical profiles for each airport are provided in appendices to the report.

Because of Lima's dependence on Jorge Chavez airport, it would be wise to review and strengthen emergency runway and airport repair and rehabilitation plans and to develop an inventory of locally available resources for this purpose. Some technology and experts developed as part of the U.S. Air Force "Rapid Runway Repair" program at Tyndall Air Force Base, Florida, might be able to provide some technical guidance or support for such an activity.

USAID/Peru should be prepared to assess damage and operating capacity of the three airports as part of its early post-disaster assessment response.

For this purpose, a brief checklist is provided.

After a disaster, a staff member should be assigned fulltime to observe and report on airport operations, and to act as a liaison and coordinator with the Government of Peru and other donors. But U.S. operations at the airport, where possible, should be segregated from general operations, and a fulltime labor force -- available when needed at odd hours -- should be arranged to support U.S. operations, if they will be substantial.

The Peruvian Armed Forces have 43 heavy transport aircraft (including 15 Canadian BUFFALO's and 15 AN-26's) and about 100 helicopters, 80 of which are generally located in Lima. The helicopters have a combined passenger carrying capacity of about 1,800, and a cargo capacity of about 250 tons. A statistical breakdown of the fleet is provided in charts which are part of this report. Unless circumstances change considerably, provision of U.S. aircraft for in-country operations for an earthquake in Lima does not seem necessary.

A short list of Government of Peru and U.S. technicians contacted in connection with this report is provided at the conclusion of the report.

INTRODUCTION

This section considers two vital transportation resources: the three airports located in the vicinity of Lima; and the aircraft resources of principally the Peruvian military. Part I considers the airports, Part II considers the aircraft. Immediately following this introduction, a Review of the Literature section considers both aspects.

Each section contains recommendations for activities and resources for which the AID should or should not play a direct role.

Finally, a list of contacts is provided. However, as a list of contacts for each airport is included in the Appendices -- airfield surveys -- they are not included in the general contacts lists.

Colonel Norman H. Runge, U.S. Air Force Attaché, U.S. Embassy, Lima, worked closely with the team in the development of this information.

A description of the Disaster Area Survey Team (DAST), its capabilities and appropriateness for a severe disaster in Lima, appears elsewhere. The provision of the DAST team for immediate survey work in Lima is not recommended.

Review of the Literature

There is a significant number of after-action reports and evaluations produced by the U.S. military in connection with previous experiences with airport problems and provision of aircraft and pilots. In this section, reports from three previous earthquake disasters -- Peru 1970, Managua 1972, and Guatemala 1976 -- are reviewed with respect to this issue.

PERU - 1970

About 48 hours after the May 31, 1970, earthquake in Ancash, the first U.S. C-130 aircraft from Panama touched down at JORGE CHAVEZ International Airport. It carried forty U.S. military personnel -- the DAST Team Complement -- and disassembled helicopters which were assembled and used in the survey and relief operations.

The DAST Commander raised as a critical problem the provision of fuel to helicopters which had to reach rather remote areas. Helicopters had to carry spare 55-gallon drums to forward points to insure that they were not stranded at the end of their Missions.

More critical, in his view, was an apparent miscommunication with regard to fuel specifications. "In the final phase (emphasis added) of our disaster relief operations," he comments, "it was determined that the fuel which we had been receiving at Anta was not JP4 fuel, as we had been assured, but rather JP-1. As a result, the CH-47 helicopter was not able to develop full power and lift capability, and it also experienced overheating. Furthermore, it became necessary to ground all UH-1H helicopters until information was received from technical personnel...as to how many hours the UH-1H may be flown safely using JP-1 fuel without being turned in for extensive maintenance."

Considering that two helicopters were lost through crashes, and one went out of service due to maintenance problems (out of a fleet which never exceeded five), it is interesting that this problem is not linked to the fuel problem. However, the U.S. Embassy Air Force Attaché in Lima confirms -- as described in greater detail later -- that the difference between the two fuels is not so great and that hundreds of flights each year use the JP-1 fuel with no problems.

The Ancash earthquake took place in the rural area of Peru, and as such helicopter assistance was valuable. U.S. helicopter operations were responsible for

125,000 pounds of relief supplies transported
224 medical evacuations
1,061 passengers transported
506 sorties
201 hours of mountain flying time
292 communities visited and surveyed

The DAST Commander recommended some modifications in the system:

(a) All DAST personnel should be fluent in the Spanish language. This is particularly essential and was in fact indispensable in the case of our physicians assigned to DAST. It is perhaps asking too much that all helicopters pilots be both expert in mountain flying and also bilingual, but it certainly would have helped.

(b) There should be some form of ground transportation support for DAST personnel (a suggestion strongly reiterated by all key members of the

DAST team, as its absence was a serious constraning factor).

(c) Previous experience (particularly for selection of helicopter pilots) should be taken into account in assigning them to high-altitude flying missions.

The U.S. Air Force Flight Surgeon's component of the same report concerns flight safety conditions in the Andes for U.S. pilots:

> This Valley in the high Andes was unfavorable for flight safety for many reasons. (However, it was essential to operate from Anta because it was the only usable airfield.) The Valley floor at Anta is approximately 9,000 feet above sea level and the pilots often had to fly above 14,000 feet in order to get through the passes. This constant exposure to altitude and its resultant low oxygen tension causes an increase in pilot fatigue. The lack of good rest accommodations made the situation even worse. Cold nights, poor food, and constant high altitude exposure are detrimental to personnel required to perform exacting physical and mental tasks.
>
> Oxygen discipline was observed to be poor. Walk around oxygen bottles were available but were used infrequently during the flight which I observed. Several reasons exist: Helicopter pilots are not accustomed to using oxygen. Their helmets are not equipped with oxygen fittings and the talk around bottle masks are not adapted for use on helmets since this required a special microphone within the mask. Consequently, when oxygen was used, the pilot had to swing his boom mike out of the way and use one hand to hold the mask on his face. This is not workable since both hands must be on the controls when flying a helicopter. The majority of the helicopter pilots had not had flight altitude indoctrination. This program stresses the effect of hyporia and the insidious nature of this physiological state.
>
> No physician was delegated to look after the physical and living needs of the aviation personnel. A flight surgeon was not provided as a member of the DAST.

The implementation at JORGE CHAVEZ International Airport of U.S. relief assistance apparently also suffered some setbacks. Colonel Dennis Muldoon, the MAAG Commander in Peru, relates considerable problems in Lima -- which had not suffered this disaster -- in obtaining the assistance of Peruvian Air Force authorities for such tasks as off-loading, storage, preparation for on-ward shipment, and loading of vital supplies required for the Ancash relief efforts. For example, at 5:30 each afternoon, the airport crews discontinued daily operations, as they would on a normal day, despite the emergency situation in the north.

This lack of assistance created two problems:

(a) The aircraft provided by Panama were underutilized, and

(b) Vital supplies, shipped by air at considerable expense, remained at the airport unused during critical emergency days in the disaster area.

This problem was resolved when U.S. operations were segregated from other airport operations. The Peruvian Navy assigned ten sailors to assist the U.S. contingent. Thereafter, cargo was expeditiously unloaded, prepared in advance to make best use of available air transport, and quickly reloaded.

The MAAG Commander perceived as a problem that the Peruvian Air Force tended to control and handle all resources -- despite limited capacity and commitment to the emergency job -- resulting in a major bottleneck in relief operations. Failure by the Canadians and Argentines in another instance to deliver promised air transport assistance caused still further delays.

Finally, two recommendations are made by Colonel Muldoon:

(a) U.S. operations must be self-contained, with augmentation personnel automatically provided by Panama to support the local Commander.

(b) There must be a control system for resources. Cargo left Panama unmanifested, and often left JORGE CHAVEZ International Airport in the same condition.

Managua 1972

According to the DAST Commander in Managua, some of the same problems recurred. More rapid augmentation by support forces from Panama is needed, he argues; this strategy should be considered at the outset of operations. He adds that no heavy duty forklifts or operators were immediately available to remove the heavy pallets of supplies from aircrafts. "DAST teams should bring at least two heavy duty forklifts and operators on the first aircraft."

Guatemala 1976

The Guatemala case, which was similar to the Peru case in that the disaster occurred predominantly in the rural areas, was also supported by considerable U.S. aircraft.

C-130 aircraft are described by U.S. military sources as the "mainstay of the operation". They conducted 22 missions, carrying 298 passengers and 186 short tons of cargo from the Canal Zone to LA AURORA International Airport, Guatemala City. The U.S. Military Air Command furnished 24 C-141's and 2 C-5's carrying 345 passengers, 515 tons of cargo, including a full

field hospital.

Operations used a combination of eight U.S. Chinooks (CH-47's) from Fort Hood, Texas; nine UH-1H's from the Canal Zone; and one OH-58 observational helicopter also from the Canal Zone.

At first, CHINOOKS were bringing medical evacuees back to a central base and then transferring them to UH-1H's for onward flight to hospitals. In the end, they decided it was better to have the UH-1H pickup and deliver patients directly to the hospital.

One initial conceptual problem was the ability of the Government of Guatemala's National Emergency Committee to conceive of the carrying power, especially of the Chinooks, with which they had little experience. Not until they actually saw the carrying loads in action did they adjust their own planning to fully utilize the resource.

> "Among the most important early relief cargo was water. Without the unique ability of the CH-47 to lift 400-gallon water trailers many areas...would have suffered even greater hardships."

The Guatemala case produced excellent documentation on the volume of response to a disaster of magnitude which can be expected from a country's neighbors. The chart at the following page documents the volume of assistance actually received except for flights arriving in the first 72 hours. Twelve countries flew 90 sorties, with Mexico alone accounting for 38 of them. All of these flights used their countries' military aircraft, and the total weight of cargo delivered is shown on the chart.

These military after-action reports provide some useful data on a

number of sectors other than the aircraft-component described here. Information gathered on these subjects is included under the respective sector report.

LATIN AMERICAN NATIONS AIRLIFT TO GUATEMALA CITY

BY MILITARY AIRCRAFT

FEBRUARY 4-25, 1976

COUNTRY	TYPE AIRCRAFT	SORTIES	CARGO WEIGHT
Argentina	C130	2	63,500
	707	1	12,000
BOLIVIA	Electra	1	13,000
BRAZIL	C130	5	127,000 (1)
CHILE	C130	1	8.000
COLUMBIA	C130	3	71,400
ECUADOR	748 (?)	3	17,600
	C118	1	16,500
HONDURAS	C47	5	6,500 *
	C54	1	19,000
	C118	3	64,400
MEXICO	C54	16	125,300 *
	C118	22	213,500
NICARAGUA	C46	1	PAX Only
	C47	8	22.000 *
	C118	2	51,100
PANAMA	C47	1	6,000
	C118	1	16,000
	Electra	3	44,000
PERU	C130	1	*
VENEZUELA	C130	9	236,400 *

(1) Brazilian figures do not include cargo flown into El Salvador or Tegucigalpa for road transport to Guatemala.

* Weight figures for first 72 hours of operation are not available. Indicates aircraft (s) arrived during that period are not included in weight totals.

LIMA'S AIRPORT RESOURCES

In the event of a severe earthquake disaster, the airports in the Lima area would be vital lifelines for the City: emergency air operations, deliveries of vital disaster relief supplies, and other life-saving and recovery functions would require the use of aircraft and working airfields. International donor emergency programs would also require the use of an airfield for the same types of reasons. If technical assistance personnel and supplies are to be sent from Panama or from the Continental United States, U.S. authorities will require detailed information about the airports and an up-to-date assessment of their condition.

Lima is served by three airports capable of handling substantial air traffic:

(a) JORGE CHAVEZ International Airport, the major airport, contains both civilian and military operations. It is located about five miles from Lima, an automobile drive of about thirty minutes.

(b) LAS PALMAS Airport is operated by the Fuerza Aerea Peruana (FAP), the Peruvian Air Force, located at approximately the same distance from Lima.

(c) COLLIQUE Airport is a small but serviceable stand-by resource located in the Collique area of Lima.

Lima relies principally on JORGE CHAVEZ International Airport. While the other two airports could, in an emergency, serve as back-up facilities, they have considerably lower capability than JORGE CHAVEZ.

Up-to-date information has been developed recently for each airport. U.S. Air Force personnel, in coordination with the U.S. Air Force Attache, U.S. Embassy, Lima, have conducted airfield surveys for JORGE CHAVEZ (September, 1980), LAS PALMAS and COLLIQUE (both June, 1981) within the last year. The corresponding airfield surveys are attached as Appendices I, II and III, respectively. They provide exhaustive data on the operations and capabilities of the three airports, including such information as:

List of Contact Persons	Material Support
Runway, Taxiway, Parking Data	Navigational Aids
Operations Support	Hours of Operation
Weather and Communications	Transportation
Maintenance and Supply	Medical Support
Personnel	Security
Fire Protection	Number of C-130's/C-141's which can be accommodated
Airfield Maps	

As an indication of the magnitude of capability of the three airfields, the following information concerning recommended levels of aircraft is excerpted from the respective reports:

(a) JORGE CHAVEZ Airfield could service an MOG*of 12 C-141's if civilian traffic is cleared for emergency or contingency operations. Otherwise, anticipate an MOG of two C-141's or C-130's, primarily during daylight hours. It is inadvisable to send C-5 aircraft except in an emergency due to lack of ramp space for overnight parking.

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* Maximum on the ground

(b) LAS PALMAS Airfield could support C-141 and C-130 operations with deployed ALCE.* C-141 should be limited to a MOG of two due to limited ramp space. Ramp area available may vary depending on number of Peruvian Air Force aircraft on the field. C-130's should be limited to an MOG of six.

(c) COLLIQUE Runway does not meet the minimum requirement in MACR 3-3. There is only 3,463 feet of runway with no overruns (MACR 3-3 requires 3,500 feet of runway with 300 feet of overrun on each end.) This does not present a significant hazard to safe operations of C-130 aircraft for contingency operations. The parking ramp is limited and would require aircraft to be backed to the extreme edge of the ramp with tail over dirt to allow another C-130 to pass.

According to the U.S. Air Force Attaché's office, JORGE CHAVEZ and LAS PALMAS are set up for night-time operations; COLLIQUE is not but could be so prepared with advance notice (they use flares). The first two airports have generators; COLLIQUE does not.

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* Aircraft Landing Control Element

Airport Vulnerabilities

All three of the airports could be vulnerable to damage to their airstrips, towers, navigational aids, and operations in an earthquake. In addition, JORGE CHAVEZ could be vulnerable to Tsunami-flooding damage.

Possible Disaster Preparedness and Response Activities

As the foregoing data and the Appendices indicate, Lima is considerably dependent on the operation of JORGE CHAVEZ International Airport. One of the dangers the airport faces in the event of a severe earthquake is that its runways receive cracks which displace the airstrip horizontally or vertically. Depending on exactly where on the runway this damage might occur, it might render the airport inoperable. It would be of greatest importance to re-establish air operations from JORGE CHAVEZ as quickly as possible.

In the United States, numerous advances in airfield repair technology have been made. Appendix IV is an article from the Air Force Quarterly Engineering and Services entitled "North Field: Meeting the Triple R Challenge". The article describes a simulation exercise conducted in North Field, South Carolina, to test new developments in the RAPID RUNWAY REPAIR (RRR) system being developed by researchers at Tyndall Air Force Base, Florida.

The purpose of the runway repair program is to prepare U.S. military forces to repair airfields in such a short time that they can "launch aircraft within five minutes after a successful attack...and to prepare a suitable expedient runway that can sustain limited operations within one

hour." Within this concept, the emergency repairs "must not pose a hazard to operating aircraft. Excessive roughness may damage aircraft tires, structures, personnel or pylon-suspended weapons. The RRR 'HAVE BOUNCE' research is analyzing and testing a number of aircraft to determine specific roughness tolerance levels."

The article describes the techniques, timing and success of the simulation exercise at North Field in repairing large craters and smaller potholes created by explosives. One excerpt:

> Based upon 'HAVE BOUNCE' test data, potholes in the runway surface deeper than 1-1/2 inches required repair. Compressed air was used to remove loose material, dust and moisture from the potholes. A quick-setting patented polymer concrete, SILIKAL, was used to fill in potholes. Liquid hardener is mixed with the power catalyst and pea-gravel in a polyethylene mixing bag. Contents were mixed thoroughly and then placed directly into the damaged area. The mixture set in 20 minutes after troweling flush with the runway surface. Mixture hardening times vary according to surface and temperature conditions.

L.M. Womack, Chief of the Engineering Research Division, Tyndall Air Force Base, was contacted concerning the application of this technology to post-disaster earthquake repairs. His comment was that the concept of preparing critical airfields for rapid repair is a valid one. The particular situation of JORGE CHAVEZ would have to be studied. However, given the fairly low or medium probability of the case arising, the storage of the specialized equipment and materials required for the RRR program might not be warranted. They are fairly costly.

He also mentioned that there are different rapid technologies for different time-frames in which repairs must be accomplished: for example,

the RRR system, designed for tactical use principally in Europe, demands that five-minutes after an attack, Air Force aircraft can be launched. In Peru, a four to six hour period after a disaster might be an adequate time-frame. For this time-frame, there are other more economical repair strategies.

Thus, the RRR-solution might be the wrong one to a problem correctly identified. Womack suggests that an assessment of local runway repair planning and capability should be made; an inventory of available materials and equipment should be developed; and a strategy for post-earthquake rapid-repair elaborated. This might include technical training for Peruvian personnel.

The management of JORGE CHAVEZ airport in an emergency would be the responsibility of the Air Force. However, the amount of heavy equipment in the Air Force inventory is limited; thus, they may have to rely on the Peruvian Army for the engineering support. As far as was ascertained during the survey leading to this report, there are no specific contingency plans for runway repair in the event of an earthquake or other disaster (for example, the crash of a heavy aircraft on the runway). U.S. Air Force regulations for U.S. runways provide specific strategies and requirements for immediate action in such a case.

Womack concluded that what might be needed is a brief, on-the-scene assessment team. Technicians from his Division, from the Corps of Engineers, or other U.S. military personnel might be able to provide such assistance.

USAID Post-Disaster Operations

One of the first steps which USAID should take in assessing the damage and needs generated by an earthquake in Lima, and in conceptualizing its own response, is to verify the condition of the three airports in the Lima area. Appendices I, II and III provide detailed base-data for such an assessment. The following page suggests a number of points which should be checked for each airport as part of early assessment procedures. This checklist was developed by a group of USAID veteran management experts at a Post-Disaster Assessment Seminar sponsored by the Office of Foreign Disaster Assistance (OFDA), USAID, in June, 1981. In completing the checklist, it would probably be useful to make reference to the base data, the Airfield Surveys.

EMERGENCY AIRPORT OPERATIONS

CHECKLIST*

1. Is the airport operational? Daylight Only _____

   Darkness (Hours) _____

2. Usable length of runway: _____

3. Are communications and navigational aids available and working? _____

4. Capability and speed for handling cargo offloading _____

   handling _____

   warehousing _____

   equipment for handling aircraft _____

   surface fuel _____

5. Availability and cost of aircraft fuel? _____

6. Transportation between airport and disaster site _____

7. Overflight and landing clearances _____

8. Waiver of fees, duties or charges on delivering aircraft and on donated disaster relief resources: _____

9. Working hours of customs and airport authority offices: _____

10. Will commercial as well as U. S. Military aircraft flights be accepted: _____

11. What facilities are available for aircraft crew: _____

12. Are there adequate USAID personnel to receive, record and account for the donated disaster items at arrival _____

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* As presented by Management Sub-Committee spokesman Milton D. Freundel, Office of Foreign Disaster Assistance (OFDA)/USAID Post-Disaster Assessment Techniques Seminar, June 1 - 2, 1981.

With respect to emergency fuel for U.S. Military aircraft delivering disaster items, payment arrangements should not present a problem. Both PETRO-PERU and the Peruvian Air Force honor U.S. Air Force Form 15. Almost all aircraft use the locally available TA-1 fuel outside the United States. J-4 fuel, referred to in the literature review, is simply not available. The difference between the two fuels is, in large part, the difference in water content. J-4 fuel is needed for high-altitude flying. For example, when NASA comes to Peru to conduct high altitude sampling at 40,000 feet, J-4 fuel must somehow be made available for them. Otherwise, about 200 - 300 flights each year coordinated by the U.S. Air Force Attaché of the U.S. Embassy, Lima, rely on TA-1 fuel.

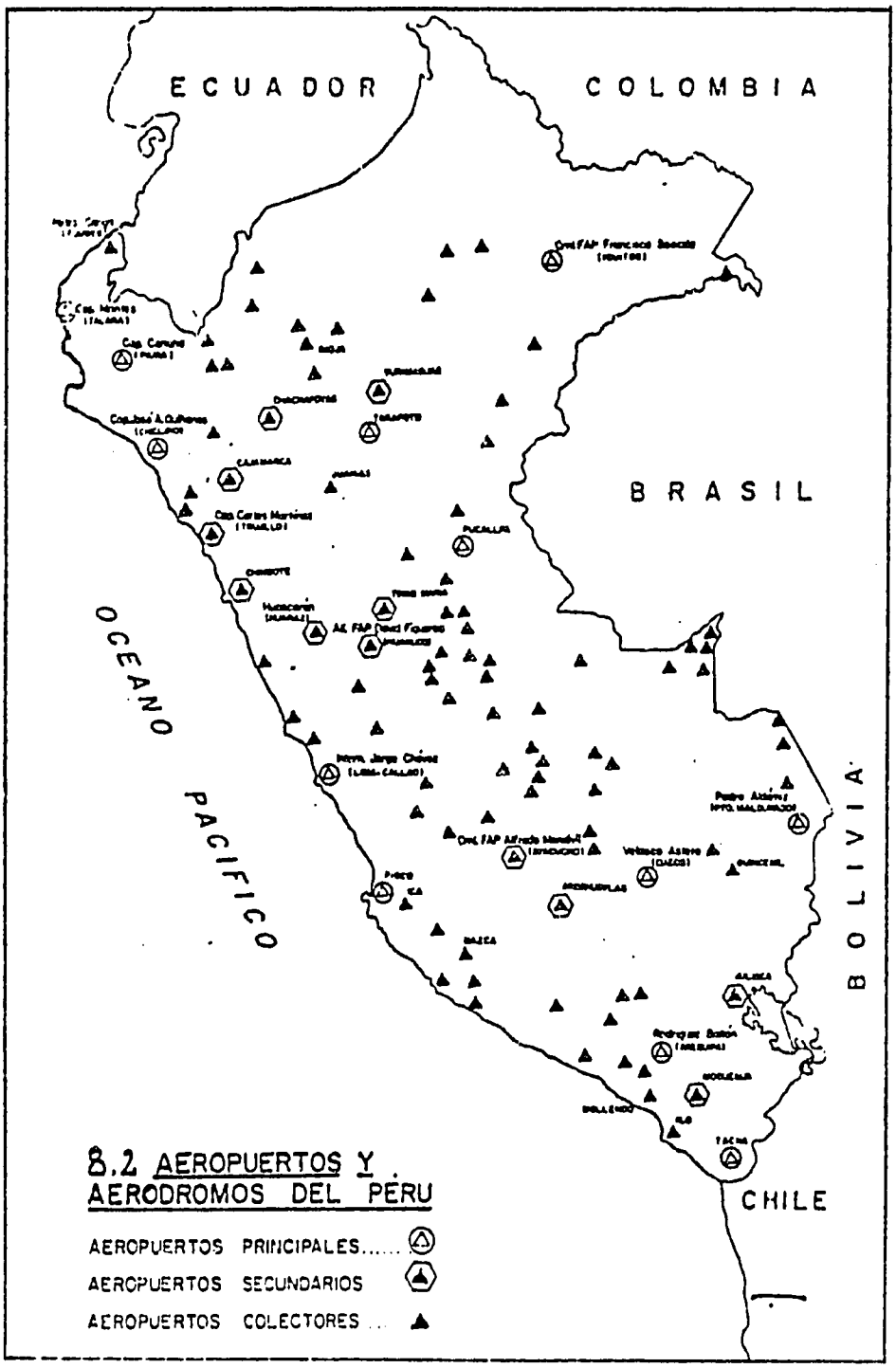
Based on previous experience not only in Peru (as referred to in literature review) but in other countries, it is recommended that to the degree possible USAID provide through contract or otherwise its own labor force, maintaining discrete warehousing and distribution systems.

Recommendations concerning USAID's need to tie into the MAAG communications network at the airport are included elsewhere.

Finally, it is recommended that a staff member be assigned to observe and report on airport operations. This person should remain at the airport on a fulltime basis during the period of peak disaster relief operations. Information about resources received at the airport from elsewhere in Peru or from outside donors should be recorded, to assist in overall coordination to avoid duplication, and to maintain adequate records for reporting purposes. Such information should he passed to the USAID Director and staff.

In the unlikely event that all of Lima's three airports are out of order, or if there is a need to rely for refueling or other in-country operations on other airports, the chart at the following page illustrates the distribution of primary and secondary airports in Peru.

CHART ____: PRIMARY AND SECONDARY AIRPORTS IN PERU



PERUVIAN AIRCRAFT RESOURCES

In the event of a severe disaster, in Lima or elsewhere in Peru, air mobility can be crucial. In considering the possible provision of U.S. aircraft to supplement Peruvian efforts, it would be wise to assess Peru's own national ability. The provision of U.S. aircraft should be implemented only if absolutely needed, as the cost of such resources, sooner or later, is deducted from the funds available to Peru in the overall disaster effort.

The purpose of this section is to provide some statistical data on Peruvian Air Force Aircraft Resources. This information is provided in the following narrative, and elaborated upon in numerous charts.

TRANSPORT AIRCRAFT

At the time this study was developed, the Peruvian Air Force had an inventory of 43 transport aircraft. Of these, 15 were Canadian BUFFALO's and 15 were USSR AN-26's. The following page, presents a breakdown of the entire fleet, with passenger and cargo carrying capacities.

Except for five of the C-47's shown on the inventory, the remaining aircraft are generally garaged at JORGE CHAVEZ International Airport, Lima.

HELICOPTER CAPACITY

The Peruvian Armed Forces have about 100 helicopters, 80 of which are generally garaged in the Lima area (JORGE CHAVEZ International Airport, LAS PALMAS Peruvian Air Force facility). The moment that the danger of a Tsunami is perceived, helicopters are evacuated from JORGE CHAVEZ to LAS PALMAS.

Of the total fleet of 100 helicopters, approximately half are held

PERUVIAN ARMED FORCES AIRCRAFT TRANSPORT CAPABILITY

Type of Aircraft	Producer/Origin	Number of Units	Max. Payload	Passengers	Litters
BUFFALO	DeHavilland/Canada	15 (only 12 operational)	18,000	41	24
AN-26	U S S R	15	10,000	40	24
C-47 (DC-3)	Douglass/USA	7	8,000	28	N/Avail.
HERCULES	Lockheed/USA	6	47,400	64	74
		43			

by the Peruvian Air Force and half by the Peruvian Army (the Navy has a small number).

The combined carrying capacity of the 100 helicopters is:

Passenger Carrying Capacity:	1,764 - 1,914
Stretcher Capacity:	800
Cargo Capacity:	544,000 pounds = 250 metric tons

About 80% of the fleet is operational at any given time; 20% would be under repair or in normal maintenance operations.

At the following pages, a breakdown of the helicopter fleet is provided by branch of the Armed Forces; Producer/Designation/Origin; and carrying capabilities; recapitulation of the fleet and a recapitulation of the carrying capacity and number of units by percentage for each branch of the Armed Forces.

It should be noted that although the transport and helicopter aircraft have stretcher/litter carrying capacities, the Peruvian Armed Forces reportedly do not have the litters which correspond to this capacity.

PERUVIAN HELICOPTER CAPABILITY

No. of Units	Designer	Designation	Origin	Passengers	Stretchers	Carrying Capacity	Internal/ External	Cubic Storage Capacity
AIR FORCE								
6	Mikoyan	MI-6	USSR	65 - 90	41	17,640	I & E	2,825 c/feet
5	Mikoyan	MI-8	USSR	32	12	8,820	I & E	812
14	Bell	212	USA	14	6	5,000	I & E	-
5	Alouette	A-III	France	6	2	2,350 E 1,650 I	I & E	-
8	Bell	206-B	USA	4	2	1,600	I & E	32
12	Bell	47-G	USA	1	1	1,000	E	-
50				804 - 954	428	256,490		
ARMY								
27	Mikoyan	MI-8	USSR	32	12	8,820	I & E	812
7	Alouette	A-II	France	1	1	1,000	E	-
34				871	331	245,140		
NAVY								
4	Aguatabelle	A-212	Italy	14	6	5,000	I & E	-
2	Alouette	A-III	France	6	2	2,350 E 1,650 I	I & E	-
3	Bell	206	USA	4	2	1,600	I & E	32
5	Bell	47-G	USA	1	1	1,000	E	-
2	Sikorsky	SH3D	Italy	2	1	4,000	(Submarine Detection)	

(PERUVIAN HELICOPTER CAPACITY, CONTINUED)

(Sub-Total - NAVY)

No. of Units	Designer	Designation	Origin	Passengers	Stretchers	Carrying Capacity	Internal/ External	Cubic Storage Capacity
16				89	41	42,500		

GRAND TOTAL - PERUVIAN ARMED FORCES

100 helicopters	1,764 - 1,914 Passengers	800 Stretchers	544,130 Pounds of Cargo

Note: 80% of equipment based in Lima area.

(-) Indicates information not available at this time.

ANALYSIS

COMBINED PERUVIAN MILITARY HELICOPTERS

(In Order of Numerical Predominance)

Origin	Designer	Designation	Number of Units	SubTot
USA	Bell	47-G	17	
	Bell	212	14	
	Bell	206(B)	11	
				42
USSR	Mikoyan	MI-8	32	
	Mikoyan	MI-6	6	
				38
France	Alouette	III	7	
	Alouette	II	7	
				14
Italy	Agustabelle	212	4	
	Sikorsky	SH3D	2	
				6
TOTAL				100

615

PERUVIAN MILITARY HELICOPTER CAPACITY: COMPARATIVE CARRYING CAPACITY

AMONG SERVICE BRANCHES

	Passengers	Stretchers	Cargo in Pounds	Number of Helicopters
AIR FORCE	48%	54%	47%	50%
ARMY	47%	41%	45%	34%
NAVY	5%	5%	8%	16%
TOTAL	100%	100%	100%	100%

PRIVATE SECTOR

In a disaster, principal reliance for transport would be placed on the Peruvian Armed Forces. However, for in-country passenger or cargo carrying, there are some private sector aircraft companies. The principal ones are:

ALFA Charter	Destinations:	Iquitos
Grupo Aereo No. 8		Madre de Dios
AEROPERU/FAUCETT		Piura
		Chicalayo
		Trujillo
		Arequipa
		Tacna
		Cuzco
		Ayacucho

This report's overall recommendations concerning provision of aircraft and personnel for a severe disaster in Lima are:

(a) Unless circumstances change considerably, U.S. aircraft should probably not be provided in Peru for in-country operations. Peruvian air capacity is considerable.

(b) Emergency supplies delivered by U.S. aircraft from Panama or elsewhere should be handled in a manner segregated from other operations being conducted simultaneously at the airport. The literature suggests that personnel or heavy equipment should be provided from Panama to augment management capability under U.S. control. Unless the local Management Officer can assure himself of round-the-clock personnel and/or equipment support for such operations, this seems like the best available option.

(c) In case of a rural disaster -- not the subject of this report -- the lessons learned and reports from the previous three similar disasters, especially in Peru, should be considered in the organization of emergency U.S. aircraft operations.

LIST OF CONTACTS

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APPENDICES

APPENDIX I

Airfield Survey: JORGE CHAVEZ INTERNATIONAL AIRPORT

UNCLASSIFIED

AIRFIELD SURVEY

JORGE CHAVEZ

LIMA, PERU

INSTRUCTIONS AND CHECKLIST

FOR

AIRLIFT OPERATIONS

NOTE: The MAJCOM having the primary responsibility for the airlift operation will conduct the airfield survey.

AIRFIELD SURVEY

TABLE OF CONTENTS

	PARA	PAGE
INSTRUCTIONS		
General	1	1
Runway, taxiway, and parking area data	2	1
Material Support	3	2
Navigational Aids	4	2
AIRFIELD SURVEY CHECKLIST		
PART I - Airfield Suitability		
Runways	1	4
Taxiways	2	5
Parking Areas	3	6
Engine Blast	4	7
Aircraft Movement on the Ground	5	7
Aids to Navigation	6	8
PART II - Airfield Support		
Section I - Operations Facilities		
ALCE Operations Facilities	1	9
Base Operations	2	9
Weather	3	9
Communications	4	11
Section II - Transportation		
Aerial Port	1	14
Vehicle Transportation	2	15
Section III - Logistics		
Aircraft Support	1	16
Equipment	2	16
Maintenance and Supply Facilities and Capabilities	3	17
POL	4	18
Section IV - Base Support		
Base Facilities	1	19
Medical	2	19
Personnel	3	20
Security	4	20
Fire Protection		20/21
Section VI - Summary		22

AIRFIELD SURVEY INSTRUCTIONS

1. General:

a. The Airfield Survey Checklist is in two parts; Part I Airfield Suitability and Part II Airfield Support. Part I is designed to provide information which will be used to determine if the airfield can physically accept an airlift aircraft, e.g., C-5, C-141, C-130, etc. Part II is designed to provide information which will be used to determine if the airfield has the facilities to support an airlift operation.

b. Personnel accomplishing the airfield survey should contact appropriate host airfield officials to obtain required information.

c. The Airfield Survey Checklist should be completed in as much detail as possible. Attach additional sheets to the survey checklist, as necessary, to furnish required information.

2. Runway, taxiway, and parking area data:

a. Identify and complete data blocks on <u>all</u> runways, taxiways and parking areas whether they are active or inactive.

b. Include an airfield diagram or sketch labeling <u>each</u> of the above.

c. Identify specific taxi routes and parking areas on the airfield diagram/sketch.

d. List the published runway, taxiway or apron strength by at least one of the following designations:

T - Twin gear rating

ST - Single tandem gear rating

TT - Twin tandem gear rating

TDT - Twin delta tandem gear rating

ESWL - Equivalent single wheel loading (include associated tire pressure if available)

LCN - Load classification number

(: listing either T, ST, TT or TDT include the other ratings if available (e.g., if a T is given attempt to obtain the ST, TT, and TDT ratings). If data source is current FLIP, confirm with appropriate airport officials/civil engineers. If other ratings are not available, do not convert.

e. Identify and locate all obstructions adjacent to all runways, taxiways, and parking aprons. For example, runway distance markers 4 feet high every 1000 feet along runway 04,22, 8 feet from runway edge. If obstacle data is listed in the current FLIP, confirm its accuracy.

f. Identify and include all obstructions in the approach and departure zones which violate standards of AFM 88-8. Identify all obstructions and associated heights and locate them from a known reference point adjacent or near to the obstruction.

g. Record distances between adjacent runways, taxiways, and parking areas, e.g., 1000 feet between runway 20 and parallel taxiway.

h. Record condition of area surfaces in regard to possible repair, FOD, and engine blast damage.

i. List and locate ATC equipment, buildings, barriers, etc which are subject to possible blast damage.

j. Designate tiedown rings which qualify as aircraft grounding points.

Best Available Document

k. Include any gross weight or other limitation imposed by airfield operator/manager.

l. Materiel Support:

a. Determine AGE equipment available from base and procurement resources.

b. Determine whether warehouse or open storage is available.

4. Navigational Aids:

a. Determine if replacements or additions to existing facilities are expected.

b. Determine if published SID can be used in lieu of radar vectors. Attach a copy of current SIDs to survey.

AIRFIELD SURVEY CHECKLIST

Airfield Name Jorge Chavez, Peru

Airfield Location Lima, Peru

Date Survey Completed 11 September 1980

Personnel Conducting Survey:

Name/Rank	Position	Organization	Phone
W. T. Joyce, Major, ALCE	Ops Officer	437 MAW/DOXL	583-3668
T. R. Harvey, Major, ALCE	Ops Officer	437 MAW/DOXL	583-3668

Host Airfield Representatives:

Name/Rank	Position	Organization	Phone
Bunge, Norman H., Col	Air Attache	USDAO, Lima APO Miami 34031	286000 X363
Juan Carpio Villegas	Aprt Manager	Jorge Chavez Aprt	522765
Jerry Neff	MAC Station Mgr	USMAAG, Lima, Peru APO Miami 34031	523765 X363
Pedro Chanco	Asst MAC Station Mngr	" " " "	523765 or 286000 X373

Distribution:

1 cy - Each MAC AF, DOX
2 cy - MAC/INO
1 cy - DMAAC/ADPA, South Annex, St. Louis AFS MO 63125
1 cy - MAC Station Mgr, USMAAG, APO Miami 34031
4 cy - USDAO/USAIRA, US Embassy Lima, APO Miami 34031
1 cy - 437 MAW/LGX
1 cy - 437 MAW/DOXL (file)
1 cy - 1300 MAS/DOO

PART I

AIRFIELD SUITABILITY

1. Runways

a. Runway data

Designation	15/33			
Length	11,506'			
Width	148'			
Surface	concrete			
**Condition	good			
Slope	+0.53(15)			
Published Strength (ESWL)	59.511 lbs 165 psi			
*Imposed Weight Limits	C-141 - 320,000 lb; C-5 - 646,000 lb			
Centerline Marked	lights			
Distance Markers	no			
Edge Lights	yes			
Approach Lights	yes (Rwy 15)			
Threshold Lights	yes (both ends)			
VASI Lights	yes - left side Rwy 15 only			
Shoulders (Surface)***	asphalt			
(Width)	24.6'			
(Condition)	good			
Overrun (Length)	197' (both ends)			
(Surface)	asphalt			
(Condition)	good			

*Imposed by host airport manager or officials.
**Excellent, good, fair, poor. If fair or poor, give details.
*** additional 16 ft soft asphalt shoulder outside primary shoulder.

b. Description, location, and height of obstructions along runways.
Example: Radar reflector 72 inches high, 300 feet left of centerline F'a 36, 550 feet from the approach end. (Include lighting data.)

Raised runway edge lights.

NOTE: Runway ~~resurfacing~~ repaving to commence late 1980 - main runway to be closed 10 A.M. - 10 P.M. (local). Runway has a dip on the southend

c. Description, location, and height of obstructions in the approach and departure zones. Example: Trees, 322 ft MSL, 1000 ft prior to threshold R/W 22, 70 ft left of R/W centerline. (Include lighting data.)

Lighted hill 352' AMSL, just left of ILS approach path, 1¼ NM from approach end runway 15, bearing 345° mag from rwy 15. Standard lighting.

d. Describe approach illusions.

None

2. Taxiways:

a. Taxiway data

Designation	Ctr rwy	exit all others				
Width	74'	100'				
Surface		concrete				
Condition		good				
Published Strength	59,511 lb 7165 psi (all)					
*Imposed Weight Limit	C-141 - 320,000 lb; C-5 - 646,000 lb (all)					
Centerline Marked	No	No				
Edge Lights	Yes	Yes				
Shoulders Stabilized	Yes	Yes				
Stabilizing Surface	asphalt	asphalt				
Stabilized Width	16.4'	16.4'				

*Imposed by host airport manager or officials

b. Description, location, and height of obstructions along taxiways. (Include lighting data)

None

3. Parking Area

a. Parking Data.

Designation	Civil	Air Force	Navy			
**Dimensions	See attached drawing					
Surface						
Condition	good	good	good			
Published Strength	59,511 lb @ 165 psi					
*Imposed Wt Limit	C-141	320,000	lb, C-5	646,000	lb	
Taxi Stripes	No	No	No			
Tiedown Rings	No	No	No			
Grounding Points	Yes	No	No			
Shoulders Stabilized	No	No	No			
Stabilizing Surface	No	No	No			
Stabilized Width	No	No	No			
Flood Lighting	Yes	No	No			

*Imposed by host airport manager or officials.
**If irregular size, indicate dimensions on attached drawing.

b. Description, location, and height of obstructions adjacent to a parking area that will restrict aircraft movement while complying with taxi obstacle clearance requirements. (Include lighting data.)

Civil - terminal wings when parked.

c. Are remote (explosive) parking spaces available? Yes
Designate number and explosive limits for each. (Indicate location on attached drawing) Unknown - see attached drawing

Are parking spots marked (C-5, C-141, C-130, etc)?

d. How much of the total parking space available can be allotted? Is LCN waiver required? If so, will local officials grant waivers?

Air Force area - 8 C-141 A/C max; Civil terminal - 6 (130OL-230OL); 3 (230OL). LCN waiver not required.

e. Does the slope of the parking apron aggravate the break-away and taxi power requirements? No

If yes, designate the parking area or spot and explain in detail: N/A

6

f. Remark on any aspect of parking aircraft not covered: C-5 cannot use elliptical parking area on civil ramp - see drawing. Max of one C-5 on AF ramp, parked facing south, parallel to taxiway.

g. Is space adequate for emergency vehicles to maneuver around aircraft? Yes.

4. Engine blast.

a. Can engines be run-up to max power in parking position without damage to ground surfaces or structures? No.

b. Is an engine trim pad available for max power run-up? No, taxiways only

c. Is a blast fence installed or planned for the engine trim pads? No.

d. Are other aircraft, structures, or surfaces likely to be damaged by engine blast from application of break-away power when moving from parking spot or from taxi power application as the aircraft follows designated taxi routes to and from the parking area? Yes.

If yes, explain: Air Force area - C-5 would cause damage to other aircraft/structures if parked other than specified in 3f.

e. Is any damage to structures, surfaces or vehicular traffic likely to occur while the aircraft is in the take-off position when max engine power is applied? No - blowing sand only.

If yes, explain:

f. Remark on any aspect of jet blast not covered:

5. Aircraft movement on the ground.

a. Designate any area not accessible to the aircraft because of surface strength, obstacles, or probable engine jet blast damage.

C-5 not on elliptical area of civil ramp by pits # 1 & 2.

C-5 may not be able to park in Air Force area due to engine blast.

b. Designate any specified taxi route that aircraft would have to follow from landing to the parking areas and from parking areas to the runway for take-off:

None.

NOTE: Routing should be displayed on an airfield diagram.

c. Can the aircraft taxi in and out of: (If no, for what reason)

(1) Refueling area yes

(2) On/Offload area yes (C-5, no)

(3) Maintenance area yes (C-5, no)

d. Attach to the completed survey checklist an airfield drawing (8" X 10") showing designated taxiways and proposed parking plan that the aircraft will have to comply with while observing limitations imposed by obstacles, weight bearing capacity, probably blast damage, width, etc.

e. Remark on any aspect of ground movement difficulties not covered:

6. Aids to navigation:

Facility	Yes	No
VOR (DME)	X	
TACAN		X
RBN (LMM) (NDB)	X	
ILS	X, Rwy 15	
Radar (PAR) (ASR)	ASR to both	PAR
Instm Approach Procedure		
USAF	X	
*Other (Type)	Jeppesen	
Standard Instrument Departure		
USAF	X	
*Other (Type)	Jeppesen	

*FLIP, Jeppesen, host nation only.

PART II

AIRFIELD SUPPORT

SECTION I

OPERATIONS FACILITIES

1. ALCE Operations Facilities

a. Room or building for operations functions-briefings, flight planning:

(1) Yes X No _____

(2) Bldg No MSM Office

(3) Limitations No flightline visibility - 1 mile to AF ramp.

b. Methods for control of classified material available:

(1) Yes _____ No X

(2) Limitations Use American Embassy storage or bring safe.

2. Base Operations:

a. Building number: Main Terminal Phone: 52-95-70, ext 19

b. NOTAMS: Yes X No _____

c. Flight Pubs: Yes USAF/DOD No _____

d. Customs: Yes X No _____

e. RCR Measuring Equipment: Yes _____ No X

Remarks Temp NOTAMS in Spanish; briefing available on request.

f. Control Tower:

(1) Does position and construction of control tower afford the operators unrestricted vision of all approaches, runways, and taxi strips?

Yes X No _____

(2) What are equipment limitations for guarding and transmitting on A/G frequencies? Both A/G and Ground Cont freqs have B/U transmitters. No UHF avai

(3) Is emergency power available for the tower? Yes X No _____

(4) Are up-to-date charts and diagrams, including crash grid maps maintained in the tower? Yes _____ No X

(5) Who operates tower facility? Air Traffic Control Agency - Peru Center - 5295-70, ext 192

3. Weather Facilities.

a. Observations.

(1) Agency responsible for observations Air Traffic Control Agency

Phone number 51-65-82

(2) Observing hours 24 hrs

(3) Location of observing site N end of r/w

(4) Frequency of observations hourly

9

*(5) Dissemination code(s) Intl Met to Buenos Aires

(6) Upper Air Observations:

Rawinsonde yes } together Scheduled times 1 daily

PIBAL yes Scheduled times 1 daily

b. Forecasts.

(1) Domestic Yes

(2) Overseas Yes

(3) Agency responsible for forecast CORPAC Metro

Phone number 52-95-70, ext 251 or 265

(4) Forecasting hours every 6 hrs updating

*(5) Weather warning Yes ____ No X

(6) Aera weather advisories Yes ____ No X

c. Weather Communications.

(1) Pilot to Forecaster Radio N/A Frequency

*(2) By what means are observations and forecasts transmitted?

Teletype thru ATC Comm Center at Field.

Direct comm to local site and Intl Met Office.

(3) Receipt of data/communications equipment (teletype, fax, circuits, etc.). Teletype (-tapes)

(Note: List circuit number and agency, HF frequency and time. commercial company to some city, etc)

d. Weather Equipment.

(1) Radar Yes ____ No X Type

(2) Wind Equipment Yes X No ____ Type

(3) Visibility equipment Yes X No ____ Type RVR

(4) Other Satellite readout; ceilometers

(5) Equipment maintenance performed by Met Office

Note: *Not required for AWS, US NWS, or US Navy stations.

e. Weather Briefings:

(1) English capability Yes - always available

(2) Flight folders (HWD, en route winds/temps, destination forecast, etc.).

Yes - full service

(3) Computer flight plan Not available

f. Other:

(1) Alternate sources of weather information None

10

(autovon/commercial telephone to AWS, US Navy or other stations - list numbers).

(2) Contracts for service None

(3) Plans for increasing/improving service None

q. Remarks

4. Communications:

a. Telephones

(1) Base telephone exchange Yes X No

(2) Commercial Yes X No

(3) Direct circuit

(a) To Lima only.

(b) Type termination

1. Switchboard (PBX) Yes No X

2. Console Yes X No
Patching Capability Yes No X

(4) AUTOVON None

(a) Quantity (number of incoming, outgoing, 2-way lines)

1. PBX

2. 4-Wire (where is it located?)

(b) Precedence capability (Flash, Priority, etc)

1. PBX

2. 4-Wire

(c) Maximum call area (world-wide, CONUS, Pacific, etc)

1. PBX

2. 4-Wire

(d) Number (area code, operator assist)

(5) Local commercial number (area code, operator assist) 51-65-82

(6) Secure voice communications

a. Available Yes X No

b. Type AUTOSEVCOM at Embassy

c. Number/Listing N/A

b. Record Communications American Embassy

(1) Teletype Yes

(a) Speed (wpm) 2400 wpm FASTCAST System

11

(b) Type (Point-to-Point, TELEX, TWX, etc)

(c) Highest security classification circuit can process (TS, S, SPECAT, etc) N/A.

(2) AUTODIN terminal Yes X No _____ at Embassy.

(a) DSTE type (AE, AB, etc) N/A

(b) Other (Mode V, II, etc) SKYLINK (SATCOM)

(c) Highest security classification circuit can process TS

(3) Distance and travel time between operating location and communications center

10 miles/30 minutes

(4) Hours of operation

(a) 24 hr/day, 7 day/wk _____

(b) 8 hr/day, 5 day/wk Yes

(c) Other (specify) Night action required

(5) Routing indicator RUESLM

c. Radio

(1) UHF/VHF VHF only in tower

(a) Type (AN nomenclature) N/A

(b) Quantity 10

(c) Frequencies available set tuned

(2) Intra base radio (by net)

Frequency 121.5

d. Nearest FAA center or FSS facility at terminal

(1) Location at field

(2) Type both FSS at ATC Center

(3) Phone number 529570, ext 190

(4) Distance at field

e. Auxiliary power for communications equipment Volts 220 V Hertz 60.

f. Type of communications support to be augmented and building and room number where service is required

HF radio (KWM-2) operated by MAC Station Manager in office at field.

g. Person to contact and telephone number for coordination of additional communications required

USDAO, US Embassy, Lima, Peru.

h. General Remarks (reliability of communications equipment and long-haul

circuits and other pertinent comments) _____

_____

1. Major C-E facilities/capabilities program change N/A

_____

11

PART II

AIRFIELD SUPPORT

SECTION II

TRANSPORTATION

1. Aerial Port Facilities:

a. Cargo Terminal:

(1) Covered space available None

(2) Outside storage space available Yes

(3) Bldg No MSM Bldg Space 20,000 sq ft at MSM

(4) Aircraft loaders (quantity) 40K _____ 25K _____ 10K F/L _____ 4K F/L _____ other (explain type and rate capacity) MAC has one 6K F/L - others available on request.

(5) Pallet/container trailers 40 available from A.F.

(6) Pallet/cargo scales (type/make weight capability) None

(7) Flat bed trucks (type rollerized length) leasable

(8) Truck off/on loading ramp(s) Two at CORPAC, 4 at PAF

(9) MHE repair location at PAF Space Unknown

b. Passenger Facilities:

(1) Location at terminal maximum capacity 1000

(2) Eating facilities available at terminal

(3) Passenger stairs (type, height capability) Truck-mounted, 20' +

c. Fleet Service:

(1) Location at field - contract Space N/A

(2) In-Flight Kitchen Marriott; DOCMPO - contract agencies

(3) Latrine servicing truck (type/capacity) avail - CORPAC

(4) Disposal facility (distance/availability) Yes - near field

d. Cargo Storage Area:

(1) Inside Storage None Sq Ft. Type flooring _____ (i.e., concrete, dirt, gravel, asphalt, USP, etc.)

(2) Outside storage Yes - see below Sq Ft. Type surface _____ Is area fenced Yes _____ No _____ Are outside lights available Yes _____ No _____

(3) What cargo storage vehicle parking capability other than the designated cargo storage area is available for:

(a) Vehicles (give dimensions) see below Wheeled _____ Tracked _____

(b) Cargo Must park outside immediate airfield environment

e. Hazardous Cargo Buildup Area:

(1) Distance to remote parking End of Rwy; adjacent Peruvian Air Force ramp.

14

(2) Size Additional 20,000 sq ft at Peruvian AF ramp Sq Ft.

(3) Type surface Concrete

(4) Revetment type No

(5) Maximum NEW allowable in holding area N/A

2. Transportation: All leasable from National, AVIS, etc.

a. Staff cars Contact USDAO - US Embassy

b. Station wagon

c. Buses

d. Trucks

e. Wreckers

f. Car rental service

g. Taxi service

3. Airfield Throughput Capacity (This section will be accomplished by qualified transportation team member or base transportation personnel).

a. Throughput capacity is comprised of the personnel, equipment and facilities required to perform the functions necessary for receiving, parking, off-loading processing, and clearing of all types of cargo and passengers at an airport, and is constrained by airfield reception, aircraft parking and off-load, and clearance capabilities. In this regard, it is necessary to determine tonnage estimates for each airfield in terms of both the amount of work which could be accomplished each data over a sustained period of 30 days.

b. Considering the above factors, please specify below, the tonnages that could be moved completely through the airfield during each 24 hour period.

CURRENT AVERAGE DAILY THROUGHPUT	EST MAXIMUM DAILY THROUGHPUT CAPABILITY (with current manpower & equipment)	EST MAXIMUM THROUGHPUT CAPABILITY (Not constrained by current manpower equip
See below S/T	S/T	S/T

c. Arriving personnel, vehicles, and cargo will be moved to their final destination by rail, road or a combination of both. The following information is required:

(1) Identify, and indicate the distance, to the nearest railhead(s) with the capacity to load wheeled and tracked vehicles, to include capabilities of loading ramps and marshalling areas.

(2) Identify the number and type (dual lane, etc.) of major roads serving the airfield and any movement restrictions that exist in the vicinity of the airfield and/or between the airport and railhead(s) to prevent movement of large wheeled or tracked vehicles.

Throughput capacity limited by MHE. USAF has only one 6K forklift at field. Peruvian Air Force could provide 3-5 forklifts on request.

15

PART II

AIRLIFT SUPPORT

SECTION III

LOGISTICS

1. Aircraft support:

a. Deicing equipment, fluid and status No

b. Transient Alert:

(1) Follow-me vehicle available No

Operating hours: N/A

(2) Aircraft marshallers available Yes

(3) Fire guards available Yes

(NOTE: If aircraft jacking must be accomplished outdoors, designate an area where ramp has sufficient strength and where jet/prop blast of taxiing aircraft will not affect jacked aircraft.)

2. Equipment:

a. Power units by type available. MA-1A _____ MD-3 8 self-propelle equivalent -
MA-2 _____ MJ2A 60 _____ Other 2 MD - 3 equiv in Peruvian A.F.

Additional needed N/A

b. Air carts available (include MA-2 and MJ2A-60) 5 (civil); 2-3 (Peru A.F.
Additional needed N/A

c. Type of hydraulic test stands available on request from airlines or AF.

d. Air compressors available. Hi press Airlines or Peruvian A.F. Lo Press _____

e. Heaters available No Additional needed N/A

f. Light carts available 2(Peruvian A.F.) Additional needed N/A

g. Other powered AGE _____

_____ Additional needed _____

h. Jacks available (list by type and purpose; i.e., R-6n C-130 nose available 3 Additional needed 1)

TYPE	PURPOSE	AVAILABLE (NR)	ADDITIONAL NEEDED
UNK	C-130	2	N/A
UNK	C-141	0	N/A

i. Maintenance stands

TYPE	AVAILABLE (NR)	ADDITIONAL NEEDED

All types available in considerable quantity from Peruvian Air Force.

16

j. Aircraft airconditioners available N/A

7. Maintenance and supply facilities and capabilities:

a. What repair capability exists on station that is compatible with the type aircraft in this operation. (If complete field repair capability exists for an MDS state C-141 - complete - all)

MDS	FIELD LEVEL REPAIR CAPABILITY	SYSTEMS
All MAC A/C -	Depot-level facilities available.	ALCE would have to provide parts, tools, and specialists.

b. What facilities are available for specialist dispatch pools? (List shop, type and ft^2.)

SHOP(s)	TYPE Perm or Temp	FT^2	ADDITIONAL NEEDED FT^2
See 3a.			

c. Are LOX/Gaseous Oxygen, Oils, and Tires/Wheels (build up) available or procureable? What is your source of resupply? Is it provided in your OPLAN?

yes, Peruvian Air Force

4. POL: Capacities in gallons by grade of fuel (JP-4, JP-5, COM Jet A, A-1, Jet B, 115/145, 100/130).

a. Storage capability (by grade of product).

(1) Capacities 580,000 gallons - Jet A-1

(2) Receiving rates (simultaneously) Trucks would service a/c first rather than storage.

(3) Transfer rate to hydrant systems 400 GPM

(4) How does the storage facility receive fuel (truck, pipeline, etc)? truck

b. Hydrant refueling (by grade of product).

(1) Number of refueling positions 9 portable hydrants & 4 trucks.

(2) Number of aircraft that can be serviced:

(a) Simultaneously 13

(b) In one hour 9

(c) In 8 hours 36

(d) In 24 hours 48

(e) In 5 days 120

(3) Hydrant dispensing rate per lateral (GPM) 400 GPM

(4) Number of laterals Unknown

c. Fuel servicing vehicles (by grade or product).

(1) Number of capacity and dispensing rate 4,800 gallons, 400 GPM

(2) Turn around time from flight line to fillstand, fill, and return to flightline 1 hour

d. Runway Clearance Vehicles (i.e., snow removal, runway sweepers, etc.). N/A

e. General Remarks.

f. Peruvian Air Force
3 trucks, normally only one available - count on no support in emergency.

*Assumptions - (1) C-141 fuel load of 120,000 lbs.
(2) Civil aircraft flights cancelled.
(3) No fuel support from Peruvian Air Force.

PART II

AIRLIFT SUPPORT

SECTION V

BASE SUPPORT

1. Base Facilities:

a. Billets:

(1) On base

(a) Yes _____ No X

(2) Off base in Lima

(a) Yes X No _____

(b) Type & No Hotels in city; limited during peak periods.

(c) Distance 5 miles - 30 minutes.

b. Messing:

(1) On base two cafeterias

Hours of Operation 24 hours/day

(2) Off base Numerous restaurants

Hours of Operation Vary

c. General remarks: All billeting would be in Lima hotels. Hotels are numerous, but rooms may be limited during peak periods.

2. Medical:

a. In-patient care available:

(1) On base: Yes X No _____

(2) Off base: Yes X No _____

b. Out-patient care available:

(1) On base: Yes X No _____

(2) Off base: Yes X No _____

c. Number of ambulances:

(1) Crash ambulances w/radio Two at field

(2) Other ambulances (civilian/Military _____

d. Nearest hospital: Name/Location San Juan de Dios - 2 miles from airfield.

Distance from airfield _____

e. General Remarks: Peruvian Air Force has small clinic at field. Also large hospital in Lima with heliport.

3. Personnel

a. CBPO facilities available. Yes ___ No X

b. CBPO is Phase II. Yes ___ No Y

c. CBPO's Major Command N/A

4. Security

a. Type Guards: (Military/Civilian, US/Indigenous) Both military and civili including Guardia Civil and CORPAC.

b. Number on each shift 200+.

c. Does flight line have restricted access? Yes

d. Is flight line area fenced? If so, what type (e.g., chain link, wood, etc)? Yes - concrete walls.

e. Are roving patrols used? If so, how many? No

f. Are patrol dogs used? No

g. Does security force use an intrabase radio net? Yes

h. Are weapon storage facilities available? Yes, with Peruvian Air Force.

i. Are aircraft stanchion and ropes available for aircraft perimeter security? Yes, at Embassy.

j. Are local forces providing security check of passengers? Yes

5. Fire Protection

a. MANPOWER: Indicate the number of fighters on each shift.

12 men plus supervisor each shift.

b. FACILITIES:

(1) Are rescue crews housed and messed on the flight line?

Yes

(2) Is a full suit of protective clothing available for each on-duty fire fighter; i.e., hood, coat, trousers, boots, gloves? Yes

(3) Is any aluminized protective clothing available?

Yes

(4) Is a water supply available on the airfield for refilling crash trucks? Yes - 3 locations spread out around field.

c. OPERATIONS:

(1) Is each fire fighting vehicle radio equipped? Yes

(2) Can vehicles communicate with the tower? Yes

(3) Is an ambulance normally located on the field? Yes - two

d. EQUIPMENT:

(1) List the type and quantity of USAF fire protection vehicles

Type	Quantity
None	

(2) Provide the following information for non-USAF fire protection vehicles:

Make	IH Magnum 480	IH Magnum 440
Number	four	two
Water Capacity	700 gal	100 gal
Foam Capacity	1350 lb powder	450 lb powder
Number of Turrets	two	hose only
Water rate (gpm) of turrets	133 gpm	133 gpm

+1000 liter water truck (Mercedes)

Rescue equipment available - all necessary to enter A/C in each truck.

*Navy and AF have fire fighting equipment also to back up civilians.

PART II

AIRLIFT SUPPORT

SECTION VI

SUMMARY

Summarize the airfield's capability to support C-130/C-141/C-5 aircraft. Include whether the airfield is capable to support an on/offload, en route stop or emergency/alternate capability. Include also any limiting factors not covered by this checklist and measures necessary to correct all limiting factors.

1. It is inadvisable to send C-5 A/C except in an emergency due to lack of ramp space for overnight parking.

2. Airfield could service an MOG of 12 C-141s if civilian traffic is cleared for emergency or contingency operations. Otherwise, anticipate an MOG of two C-141s or C-130s, primarily during daylight hours.

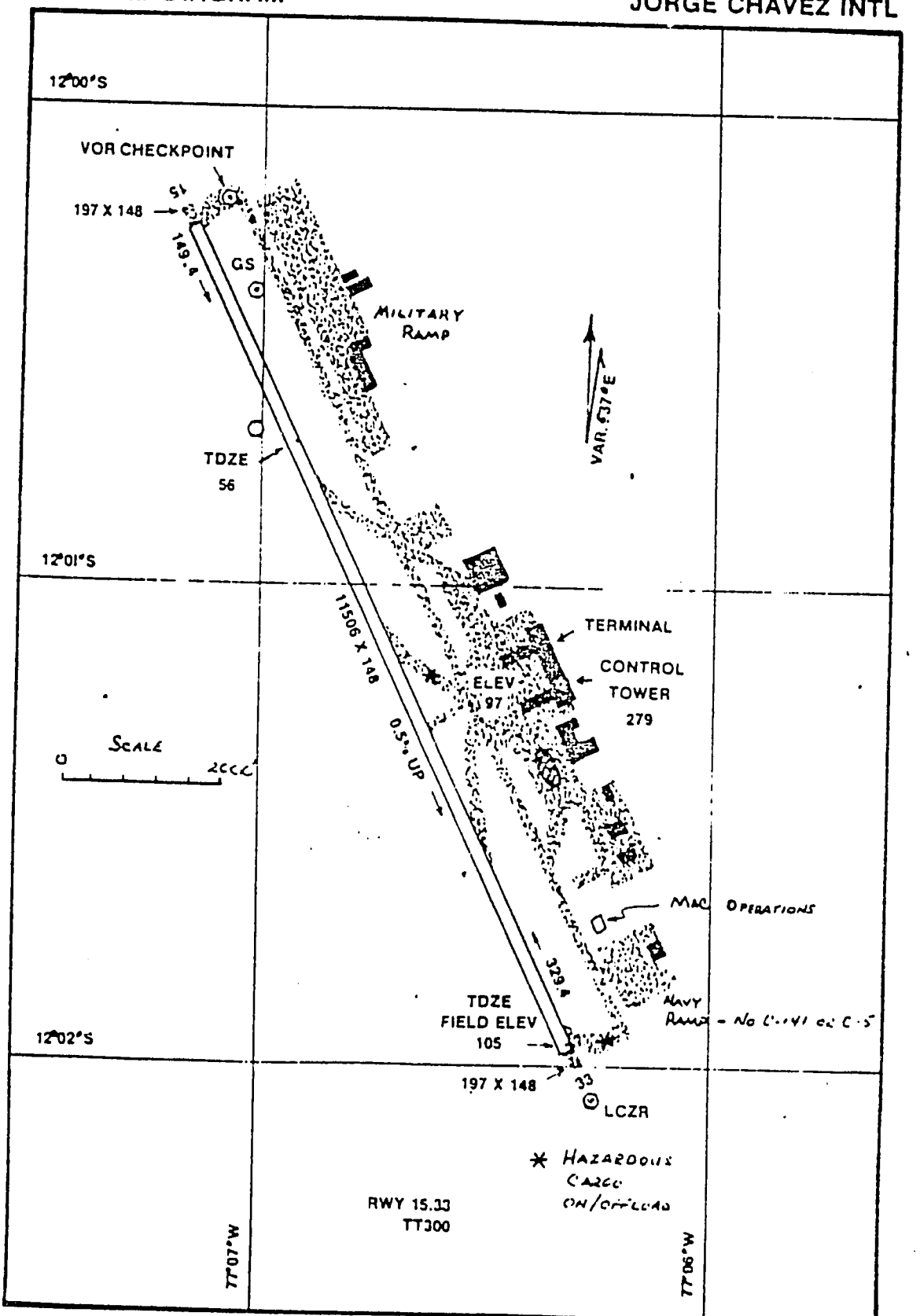
3. MHE is limited to one USAF 6K forklift, plus 3-5 Peruvian AF forklifts. Extensive on/offload operations would require complete aerial port augmentation.

4. Maintenance is limited to transient alert, plus Peruvian AF maintenance stands and jacks. ALCE would require specialists, tools, and spares.

1 Atch
Airfield Diagram

AIRFIELD DIAGRAM

JORGE CHAVEZ INTL



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ST. LOUIS AFS, MO. 63118

LIMA, PERU
JORGE CHAVEZ INTL

APPENDIX II

Airfield Survey: LAS PALMAS Air Force Airport

AIRFIELD SURVEY

INSTRUCTIONS AND CHECKLIST

FOR

AIRLIFT OPERATIONS

Las Palmas, Lima, Peru

NOTE: The MAJCOM having the primary responsibility for the airlift operation will conduct the airfield survey.

MAC FORM MAR 77 174 PREVIOUS EDITION WILL BE USED

AIRFIELD SURVEY

TABLE OF CONTENTS

	PARA	PAGE
INSTRUCTIONS		
General	1	1
Runway, taxiway, and parking area data	2	1
Material Support	3	2
Navigational Aids	4	2
AIRFIELD SURVEY CHECKLIST		
PART I - Airfield Suitability		
Runways	1	4
Taxiways	2	5
Parking Areas	3	6
Engine Blast	4	7
Aircraft Movement on the Ground	5	7
Aids to Navigation	6	8
PART II - Airfield Support		
Section I - Operations Facilities		
ALCE Operations Facilities	1	9
Base Operations	2	9
Weather	3	9
Communications	4	11
Section II - Transportation		
Aerial Port	1	14
Vehicle Transportation	2	15
Section III - Logistics		
Aircraft Support	1	16
Equipment	2	16
Maintenance and Supply Facilities and Capabilities	3	17
POL	4	18
Section IV - Base Support		
Base Facilities	1	19
Medical	2	19
Personnel	3	20
Security	4	20
Fire Protection		20/21
Section VI - Summary		22

AIRFIELD SURVEY INSTRUCTIONS

1. General:

a. The Airfield Survey Checklist is in two parts; Part I Airfield Suitability and Part II Airfield Support. Part I is designed to provide information which will be used to determine if the airfield can physically accept an airlift aircraft, e.g., C-5, C-141, C-130, etc. Part II is designed to provide information which will be used to determine if the airfield has the facilities to support an airlift operation.

b. Personnel accomplishing the airfield survey should contact appropriate host airfield officials to obtain required information.

c. The Airfield Survey Checklist should be completed in as much detail as possible. Attach additional sheets to the survey checklist, as necessary, to furnish required information.

2. Runway, taxiway, and parking area data:

a. Identify and complete data blocks on <u>all</u> runways, taxiways and parking areas whether they are active or inactive.

b. Include an airfield diagram or sketch labeling <u>each</u> of the above.

c. Identify specific taxi routes and parking areas on the airfield diagram/sketch.

d. List the published runway, taxiway or apron strength by at least one of the following designations:

T - Twin gear rating

ST - Single tandem gear rating

TT - Twin tandem gear rating

TDT - Twin delta tandem gear rating

ESWL - Equivalent single wheel loading (include associated tire pressure if available)

LCN - Load classification number

Rating either T, ST, TT or TDT include the other ratings if available (e.g., if T given attempt to obtain the ST, TT, and TDT rating). If data source is current FLIP, confirm with appropriate airport officials/civil engineers. If other data are not available, do not convert.

e. Identify and locate all obstructions adjacent to all runways, taxiways, parking aprons. For example, runway distance markers 4 feet high every 1000 along runway 04/22, 8 feet from runway edge. If obstacle data is listed in current FLIP, confirm its accuracy.

f. Identify and include all obstructions in the approach and departure which violate standards of AFM 86-8. Identify all obstructions and related heights and locate them from a known reference point adjacent or near the obstruction.

g. Record distances between adjacent runways, taxiways, and parking areas, 1100 feet between runway 20 and parallel taxiway.

h. Record condition of area surfaces in regard to possible repair, and engine blast damage.

i. List and locate AGE equipment, building, barriers, etc which are to possible blast damage.

j. Designate tiedown rings which qualify as aircraft grounding points.

k. Include any gross weight or other limitation imposed by airfield operator/manager.

3. Materiel Support:

a. Determine AGE equipment available from base and procurement resources.

b. Determine whether warehouse or open storage is available.

4. Navigational Aids:

a. Determine if replacements or additions to existing facilities are expected.

b. Determine if published SID can be used in lieu of radar vectors. Attach a copy of current SIDs to survey.

AIRFIELD SURVEY CHECKLIST

Airfield Name Las Palmas

Airfield Location Lima, Peru

Date Survey Completed 23 June 1981

Personnel Conducting Survey:

Name/Rank	Position	Organization	Phone
B. Parks, Capt	OIC, Airlift Control	1300 MAS/DOC	84-5714
L. Whitten, TSgt	CCT	1300 MAS/DOXX	84-3752
J. Placencia, Sgt	CCT	1300 MAS/DOXX	84-3752

Host Airfield Representatives:

Name/Rank	Position	Organization	Phone
Norman H. Runge, Col	Air Attache	USDAO Lima, Peru	286000 x363
		APO Miami 34031	
Escobendo Banberger, Col	Commander	Air Group 51	

Distribution:

1 cy - Each MAC AF/DOX
2 cy - MAC/INO
1 cy - DMAAC/ADPA, South Annex, St. Louis AFS MO 63125
3 cy - USDAO/USAIRA, US Embassy Lima, APO Miami 34031
1 cy - 437 MAW/LGX
1 CY - 437 MAW/DOXL
1 cy - 1300 MAS/DO (file)

PART I

AIRFIELD SUITABILITY

1. Runways

a. Runway data

Designation	01/19			
Length	8,200'			
Width	150			
Surface	concrete/asphalt			
**Condition	Fair			
Slope	(01)-0.12% (19) +0.12%			
Published Strength	52529 lbs @ 132 PSI			
*Imposed Weight Limits				
Centerline Marked	stripes			
Distance Markers	1000'			
Edge Lights	yes			
Approach Lights	None			
Threshold Lights	None			
VASI Lights	None			
Shoulders (Surface)	Hard dirt			
(Width)	50'			
(Condition)	fair			
Overrun (Length)	None			
(Surface)				
(Condition)				

*Imposed by host airport manager or officials.
**Excellent, good, fair, poor. If fair or poor, give details.

b. Description, location, and height of obstructions along runways. Example: Radar reflector 72 inches high, 300 feet left of centerline R/W 04, 150 feet from the approach end. (Include lighting data.)

(01) First 2000' ft Rwy surface is uneven with several small cracks. Edge lights are temporary with above ground wiring.

4

c. Description, location, and height of obstructions in the approach and departure zones. Example: Trees, 322 ft MSL, 1000 ft prior to threshold R/W 22, 70 ft left of R/W centerline. (Include lighting data.)

d. Describe approach illusions.

None

2. Taxiways:

a. Taxiway data

Designation	App end	19 Exit	all others			
Width	130 ft	40 ft				
Surface	Concrete	Asphalt				
Condition	Good	Good				
Established Strength	45,523 lbs/144 PSI					
Imposed Weight Limit						
Centerline Marked	No	No				
Lights	Yes	Yes				
Shoulders Stabilized	No	No				
Lighting Surface	No	No				
Paved Width	No	No				

Provided by host airport manager or officials

b. Description, location, and height of obstructions along taxiways. (Include lighting data)

5

3. Parking Area

a. Parking Data.

Designation						
**Dimensions	40x1000 ft					
Surface	Asphalt					
Condition	Good					
Published Strength	24,512 lbs/77 PSI					
*Imposed Wt Limit						
Taxi Stripes	No					
Tiedown Rings	No					
Grounding Points	No					
Shoulders Stabilized	No					
Stabilizing Surface						
Stabilized Width						
Flood Lighting	Yes					

*Imposed by host airport manager or officials.
**If irregular size, indicate dimensions on attached drawing.

b. Description, location, and height of obstructions adjacent to a parking area that will restrict aircraft movement while complying with taxi obstacle clearance requirements. (Include lighting data.)

c. Are remote (explosive) parking spaces available? No
Designate number and explosive limits for each. (Indicate location on attached drawing)

Are parking spots marked (C-5, C-141, C-130, etc)? No

d. How much of the total parking space available can be allotted? Is LCN waiver required? If so, will local officials grant waivers?

e. Does the slope of the parking apron aggravate the break-away and taxi power requirements? No

If yes, designate the parking area or spot and explain in detail:

f. Remark on any aspect of parking aircraft not covered: _____

C-141s limited to North Parking Area

Max 2 C-141 on ground at any time

g. Is space adequate for emergency vehicles to maneuver around aircraft?

Yes.

Engine blast.

a. Can engines be run-up to max power in parking position without damage to ground surfaces or structures? No.

b. Is an engine trim pad available for max power run-up? No

c. Is a blast fence installed or planned for the engine trim pads?

No.

d. Are other aircraft, structures, or surfaces likely to be damaged by engine blast from application of break-away power when moving from parking spot or from taxi power application as the aircraft follows designated taxi routes to and from the parking area? Yes

If yes, explain: Block wall 10' high located 100' from North Parking ramp on west and north sides

e. Is any damage to structures, surfaces or vehicular traffic likely to occur while the aircraft is in the take-off position when max engine power is applied? No- blowing sand only

If yes, explain: _____

f. Remark on any aspect of jet blast not covered:

_____

Aircraft movement on the ground.

Designate any area not accessible to the aircraft because of surface conditions, obstacles, or probable engine jet blast damage. _____

C-141s limited to operation on north apron and exit taxiway.

Designate any specified taxi route that aircraft would have to follow taxiing to the parking areas and from parking areas to the runway for take-off:

_____

NOTE: Routing should be displayed on an airfield diagram.

7

c. Can the aircraft taxi in and out of: (If no, for what reason)

(1) Refueling area Yes

(2) On/Offload area Yes

(3) Maintenance area Yes

d. Attach to the completed survey checklist an airfield drawing (8" X 10") showing designated taxiways and proposed parking plan that the aircraft will have to comply with while observing limitations imposed by obstacles, weight bearing capacity, probably blast damage, width, etc.

e. Remark on any aspect of ground movement difficulties not covered:

6. Aids to navigation:

Facility	Yes	No
VOR		X
TACAN		X
RBN	X (2)	
ILS		X
Radar (PAR) (ASR)	PAR (15 min notice)	
Instm Approach Procedure		
USAF		X
*Other (Type)	Peruvian AF	
Standard Instrument Departure		
USAF		X
*Other (Type)		X

*FLIP, Jeppesen, host nation only.

PART II

AIRFIELD SUPPORT

SECTION I

OPERATIONS FACILITIES

1. ALCE Operations Facilities

a. Room or building for operations functions-briefings, flight planning:

(1) Yes X No _____

(2) Bldg No 51 Group Bldg

(3) Limitations No flightline visibility

b. Methods for control of classified material available:

(1) Yes _____ No X

(2) Limitations Use American Embassy or bring safe.

2. Base Operations:

a. Building number: Group 51 Bldg Phone: 67-61-95

b. NOTAMS: Yes _____ No X

c. Flight Pubs: Yes _____ No X

d. Customs: Yes _____ No X

e. RCR Measuring Equipment: Yes _____ No X

Remarks _____

f. Control Tower:

(1) Does position and construction of control tower afford the operators unrestricted vision of all approaches, runways, and taxi strips?

Yes X No _____

(2) What are equipment limitations for guarding and transmitting on A/G frequencies? Both A/G and ground control freqs have B/U Transmitters. No UHF avail.

(3) Is emergency power available for the tower? Yes X No _____

(4) Are up-to-date charts and diagrams, including crash grid maps maintained in the tower? Yes _____ No X

(5) Who operates tower facility? Peruvian Air Force

3. Weather Facilities.

a. Observations.

(1) Agency responsible for observations Peruvian Air Force

Phone number 67-60-64 Ext 56

(2) Observing hours 0600-1800

(3) Location of observing site 51st Group Bldg ramp side

(4) Frequency of observations Hourly and specials

9

*(5) Dissemination code(s) Peruvian Air Force only

(6) Upper Air Observations:

Rawinsonde No Scheduled times _____

PIBAL No Scheduled times _____

b. Forecasts.

(1) Domestic Yes

(2) Overseas No

(3) Agency responsible for forecasts Peruvian Air Force

Phone number 67-60-64 Ext 56

(4) Forecasting hours N/A

*(5) Weather warning Yes _____ No Not required

(6) Aera weather advisories Yes _____ No N/R

c. Weather Communications.

(1) Pilot to Forecaster Radio No Frequency _____

*(2) By what means are observations and forecasts transmitted?

Teletype Peruvian Air Force only.

(3) Receipt of data/communications equipment (teletype, fax, circuits, etc.). Teletype Peruvian Air Force only.

Note: List circuit number and agency, HF frequency and time, commercial company to some city, etc)

d. Weather Equipment.

(1) Radar Yes _____ No X Type use Jorge Chavez

(2) Wind Equipment Yes X No _____ Type Electric

(3) Visibility equipment Yes _____ No X Type _____

(4) Other _____

(5) Equipment maintenance performed by Air Force

*Not required for AWS, US NWS, or US Navy stations.

e. Weather Briefings:

(1) English capability No

(2) Flight folders (HWD, en route winds/temps, destination forecast, etc.).

No

(3) Computer flight plan No

f. Other:

(1) Alternate sources of weather information Jorge Chavez

10

(autovon/commercial telephone to AWS, US Navy or other stations - list numbers).

(2) Contracts for service None

(3) Plans for increasing/improving service None

g. Remarks _____

4. Communications:

a. Telephones

(1) Base telephone exchange Yes X No _____

(2) Commercial Yes X No _____

(3) Direct circuit

(a) To _____, _____, _____

(b) Type termination

1. Switchboard (PBX) Yes X No _____

2. Console Yes _____ No X
Patching Capability Yes _____ No X

(4) AUTOVON

(a) Quantity (number of incoming, outgoing, 2-way lines)

1. PBX _____, _____, _____

2. 4-Wire (where is it located?) _____, _____, _____

(b) Precedence capability (Flash, Priority, etc)

1. PBX _____

2. 4-Wire _____

(c) Maximum call area (world-wide, CONUS, Pacific, etc)

1. PBX _____

2. 4-Wire _____

(d) Number (area code, operator assist)

(5) Local commercial number (area code, operator assist) 67-60-64

(6) Secure voice communications

a. Available Yes X No _____

b. Type Autosevocom at Embassy

c. Number/Listing N/A

b. Record Communications

(1) Teletype

(a) Speed (wpm) No

11

(b) Type (Point-to-Point, TELEX, TWX, etc)

_____

(c) Highest security classification circuit can process (TS, S, SPECAT, etc) _____.

(2) AUTODIN terminal Yes X No _____ at Embassy

(a) DSTE type (AE, AB, etc) N/A

(b) Other (Mode V, II, etc) SKYLINK (SATCOM)

(c) Highest security classification circuit can process TS

(3) Distance and travel time between operating location and communications center 10 miles/30 minutes

(4) Hours of operation

(a) 24 hr/day, 7 day/wk _____

(b) 8 hr/day, 5 day/wk Yes

(c) Other (specify) Night action required

(5) Routing indicator RUESLM

c. Radio

(1) UHF/VHF VHF only in tower

(a) Type (AN nomenclature) _____

(b) Quantity 2

(c) Frequencies available 4 (118.5, 119.3, 126.9, 126.2)

(2) Intra base radio (by net)

Frequency No

d. Nearest FAA center or FSS facility Jorge Chavez (above 3000')

(1) Location Jorge Chavez

(2) Type both FSS at ATC Center

(3) Phone number 52-95-70 ext 190

(4) Distance _____

e. Auxiliary power for communications equipment Volts Portable receivers only. _____

f. Type of communications support to be augmented and building and room number where service is required

_____

_____

g. Person to contact and telephone number for coordination of additional communications required USDAO, US Embassy, Lima, Peru

_____

h. General Remarks (reliability of communications equipment and long-haul

circuits and other pertinent comments) _____

_____

i. Major C-E facilities/capabilities program change N/A

_____

PART II

AIRFIELD SUPPORT

SECTION II

TRANSPORTATION

1. Aerial Port Facilities;

a. Cargo Terminal:

(1) Covered space available None

(2) Outside storage space available Yes

(3) Bldg No N/A Space _____

(4) Aircraft loaders (quantity) 40K _____ 25K _____ 10K F/L 2 4K F/L _____ other (explain type and rate capacity) _____

(5) Pallet/container trailers No

(6) Pallet/cargo scales (type/make weight capability) No

(7) Flat bed trucks (type rollerized length) No

(8) Truck off/on loading ramp(s) No

(9) MHE repair location _____ Space _____

b. Passenger Facilities:

(1) Location No maximum capacity _____

(2) Eating facilities available _____

(3) Passenger stairs (type, height capability) _____

c. Fleet Service:

(1) Location No Space _____

(2) In-Flight Kitchen _____

(3) Latrine servicing truck (type/capacity) _____

(4) Disposal facility (distance/availability) _____

d. Cargo Storage Area:

(1) Inside Storage None Sq Ft. Type flooring _____ (i.e., concrete, dirt, gravel, asphalt, PSP, etc.)

(2) Outside storage _____ Sq Ft. Type surface _____. Is area fenced Yes _____ No _____ Are outside lights available Yes _____ No _____

(3) What cargo storage vehicle parking capability other than the designated cargo storage area is available for:

(a) Vehicles (give dimensions) _____ Wheeled _____ Tracked _____

(b) Cargo _____

e. Hazardous Cargo Buildup Area:

(1) Distance to remote parking _____

(2) Size _____ Sq Ft.

(3) Type surface _____

(4) Revetment type _____

(5) Maximum NEW allowable in holding area _____

2. Transportation:

a. Staff cars All leasable from National, Avis, etc. contact USDAO-US Embassy.

b. Station wagon _____

c. Buses _____

d. Trucks _____

e. Wreckers _____

f. Car rental service _____

g. Taxi service _____

3. Airfield Throughput Capacity (This section will be accomplished by qualified transportation team member or base transportation personnel).

a. Throughput capacity is comprised of the personnel, equipment and facilities required to perform the functions necessary for receiving, parking, off-loading processing, and clearing of all types of cargo and passengers at an airport, and is constrained by airfield reception, aircraft parking and off-load, and clearance capabilities. In this regard, it is necessary to determine tonnage estimates for each airfield in terms of both the amount of work which could be accomplished each data over a sustained period of 30 days.

b. Considering the above factors, please specify below, the tonnages that could be moved completely through the airfield during each 24 hour period.

CURRENT AVERAGE DAILY THROUGHPUT	EST MAXIMUM DAILY THROUGHPUT CAPABILITY (with current manpower & equipment)	EST MAXIMUM THROUGHPUT CAPABILITY (Not constrained by current manpower equip
_____ S/T	_____ S/T	_____ S/T

c. Arriving personnel, vehicles, and cargo will be moved to their final destination by rail, road or a combination of both. The following information is required:

(1) Identify, and indicate the distance, to the nearest railhead(s) with capacity to load wheeled and tracked vehicles, to include capabilities of loading ramps and marshalling areas.

(2) Identify the number and type (dual lane, etc.) of major roads serving the airfield and any movement restrictions that exist in the vicinity of the airfield and/or between the airport and railhead(s) to prevent movement of large wheeled or tracked vehicles.

PART II

AIRLIFT SUPPORT

SECTION III

LOGISTICS

1. Aircraft support:

a. Deicing equipment, fluid and status No

b. Transient Alert:

(1) Follow-me vehicle available One

Operating hours: 24 hours

(2) Aircraft marshallers available Yes

(3) Fire guards available Yes

(NOTE: If aircraft jacking must be accomplished outdoors, designate an area where ramp has sufficient strength and where jet/prop blast of taxiing aircraft will not affect jacked aircraft.)

2. Equipment:

a. Power units by type available. MA-1A _____ MD-3 _____ MA-2 _____ M32A 60 _____ Other 2 MD-3 equiv. (1 self-propelled)

Additional needed N/A

b. Air carts available (include MA-2 and M32A-60) N/A

Additional needed N/A

c. Type of hydraulic test stands available Peruvian AF

d. Air compressors available. Hi press Peruvian AF Lo Press _____

e. Heaters available No Additional needed N/A

f. Light carts available 2 (Peruvian AF) Additional needed _____

g. Other powered AGE _____

_____ Additional needed _____

h. Jacks available (list by type and purpose; i.e., R-6n C-130 nose available 3 Additional needed 1)

TYPE	PURPOSE	AVAILABLE (NR)	ADDITIONAL NEEDED
UNK	C-130	2	N/A
UNK	C-141	0	N/A

i. Maintenance stands

TYPE	AVAILABLE (NR)	ADDITIONAL NEEDED
All types available from Peruvian Air Force		

j. Aircraft airconditioners available N/A.

3. Maintenance and supply facilities and capabilities:

a. What repair capability exists on station that is compatible with the type aircraft in this operation. (If complete field repair capability exists for an MDS state C-141 - complete - all)

MDS	FIELD LEVEL REPAIR CAPABILITY	SYSTEMS
C-130	None	
C-141	None	

b. What facilities are available for specialist dispatch pools? (List shop, type and ft^2.)

SHOP(s)	TYPE Perm or Temp	FT^2	ADDITIONAL NEEDED FT^2
See 3a			

c. Are LOX/Gaseous Oxygen, Oils, and Tires/Wheels (build up) available or procureable? What is your source of resupply? Is it provided in your OPLAN?

Gaseous oxygens and oils, Peruvian Air Force

4. POL: Capacities in gallons by grade of fuel (JP-4, JP-5, COM Jet A, A-1, Jet B, 115/145, 100/130).

a. Storage capability (by grade of product).

(1) Capacities 100/130 30,000 45,000 A-1 30,000 JP-4

(2) Receiving rates (simultaneously) By truck.

(3) Transfer rate to hydrant systems _____.

(4) How does the storage facility receive fuel (truck, pipeline,etc)? _____.

b. Hydrant refueling (by grade of product).

(1) Number of refueling positions None.

(2) Number of aircraft that can be serviced: _____.

(a) Simultaneously _____.

(b) In one hour _____.

(c) In 8 hours _____.

(d) In 24 hours _____.

(e) In 5 days _____.

(3) Hydrant dispensing rate per lateral (GPM) _____.

(4) Number of laterals _____.

c. Fuel servicing vehicles (by grade or product).

(1) Number of capacity and dispensing rate A-1(3) JP-4(1).

(2) Turn around time from flight line to fillstand, fill, and return to flightline _____.

d. Runway Clearance Vehicles (i.e., [redacted], runway sweepers, etc.) One (NW).

e. General Remarks.

If storage runs out or is contaminated, trucks must travel approximately 10 miles to refinery.

PART II

AIRLIFT SUPPORT

SECTION V

BASE SUPPORT

1. Base Facilities:

a. Billets: Considerable Bivwac area

(1) On base

(a) Yes _____ No X

(2) Off base In Lima

(a) Yes X No _____

(b) Type & NO Hotel in city

(c) Distance _____

b. Messing:

(1) On base Chow hall

Hours of Operation one meal/day

(2) Off base Numerous restaurants

Hours of Operation _____

c. General remarks: All billeting would be in Lima hotels. Hotels are numerous, but may be limited during peak periods.

2. Medical:

a. In-patient care available:

(1) On base: Yes X No _____

(2) Off base: Yes X No _____

b. Out-patient care available:

(1) On base: Yes _____ No X

(2) Off base: Yes X No _____

c. Number of ambulances:

(1) Crash ambulances w/radio Two at field _____

(2) Other ambulances (civilian/Military _____

d. Nearest hospital: Name/Location Las Palmas Air Field

Dist from airfield _____

e. General Remarks: Large hospitals in Lima with heliport.

3. Personnel

a. CBPO facilities available. Yes _____ No X

b. CBPO is Phase II. Yes _____ No X

c. CBPO's Major Command N/A

4. Security

a. Type Guards: (Military/Civilian, US/Indigenous) Military

b. Number on each shift _____.

c. Does flight line have restricted access? Yes, 1800-0600 no activity permitted.

d. Is flight line area fenced? If so, what type (e.g., chain link, wood, etc)? Concrete wall

e. Are roving patrols used? If so, how many? Guards Posts on wall

f. Are patrol dogs used? Yes

g. Does security force use an intrabase radio net? Yes

h. Are weapon storage facilities available? Yes

i. Are aircraft stanchion and ropes available for aircraft perimeter security? Not permitted; may position guard in aircraft only

j. Are local forces providing security check of passengers? Yes

5. Fire Protection

a. MANPOWER: Indicate the number of fighters on each shift. _____

1 Rescue

2 Nozzle Small

b. FACILITIES:

(1) Are rescue crews housed and messed on the flight line?

Yes

(2) Is a full suit of protective clothing available for each on-duty fire fighter; i.e., hood, coat, trousers, boots, gloves? Yes

(3) Is any aluminized protective clothing available?

Yes

(4) Is a water supply available on the airfield for refilling crash trucks? Yes

c. OPERATIONS:

(1) Is each fire fighting vehicle radio equipped? Rescue vehicles only

(2) Can vehicles communicate with the tower? Yes

(3) Is an ambulance normally located on the field? Yes - one

d. EQUIPMENT:

(1) List the type and quantity of USAF fire protection vehicles

Type	Quantity
None	

(2) Provide the following information for non-USAF fire protection vehicles:

Make	Mercedes 2632 6x6 Total	
Number	one	two
Water Capacity	1000 kilos (dry chemical)	1000 kilos (dry)
Foam Capacity	1	1
Number of Turrets	Unk	Unk
Water Rate (gpm) of Turrets		

PART II

AIRLIFT SUPPORT

SECTION VI

SUMMARY

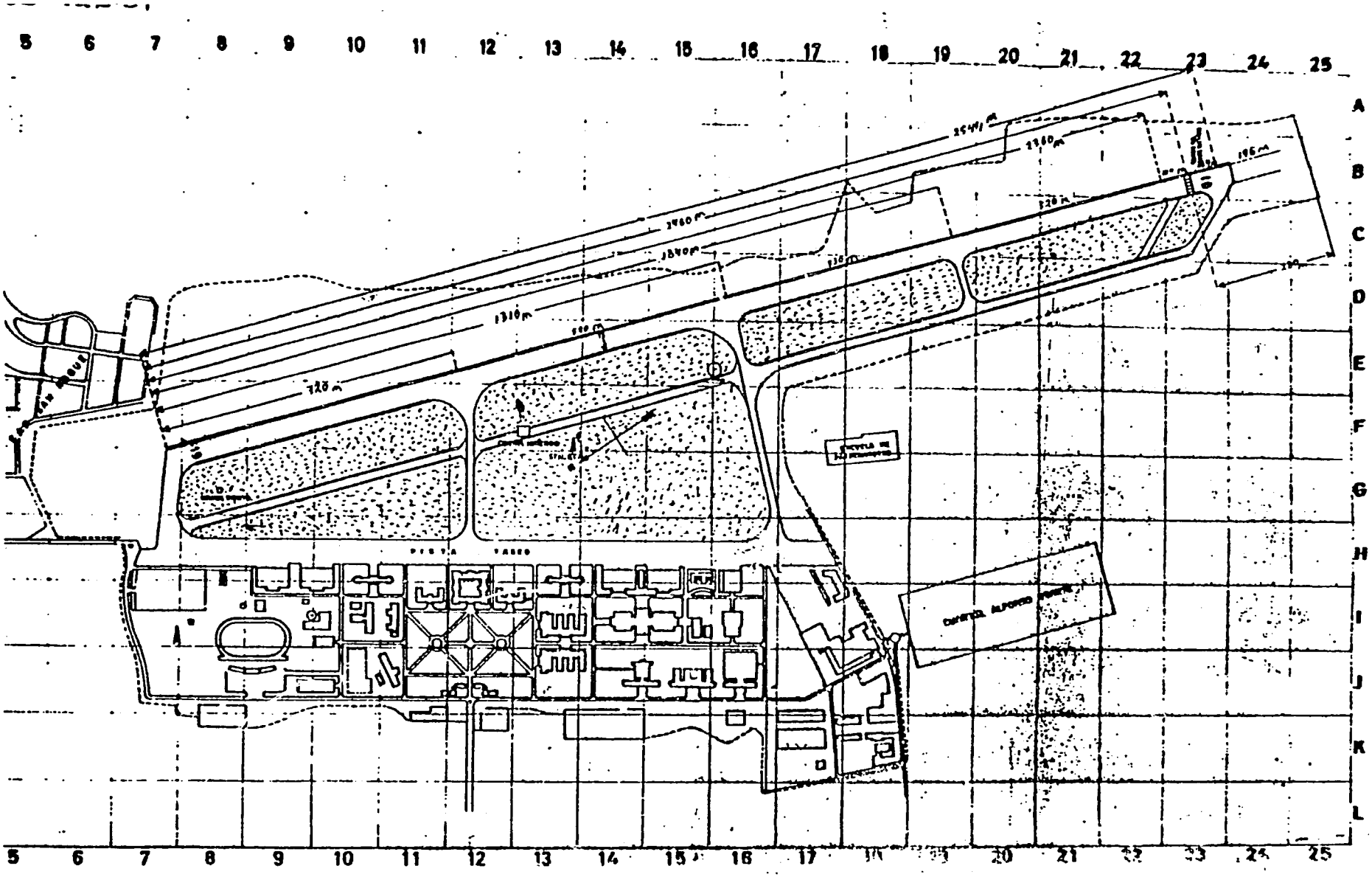
Summarize the airfield's capability to support C-130/C-141/C-5 aircraft. Include whether the airfield is capable to support an on/offload, en route stop or emergency/alternate capability. Include also any limiting factors not covered by this checklist and measures necessary to correct all limiting factors.

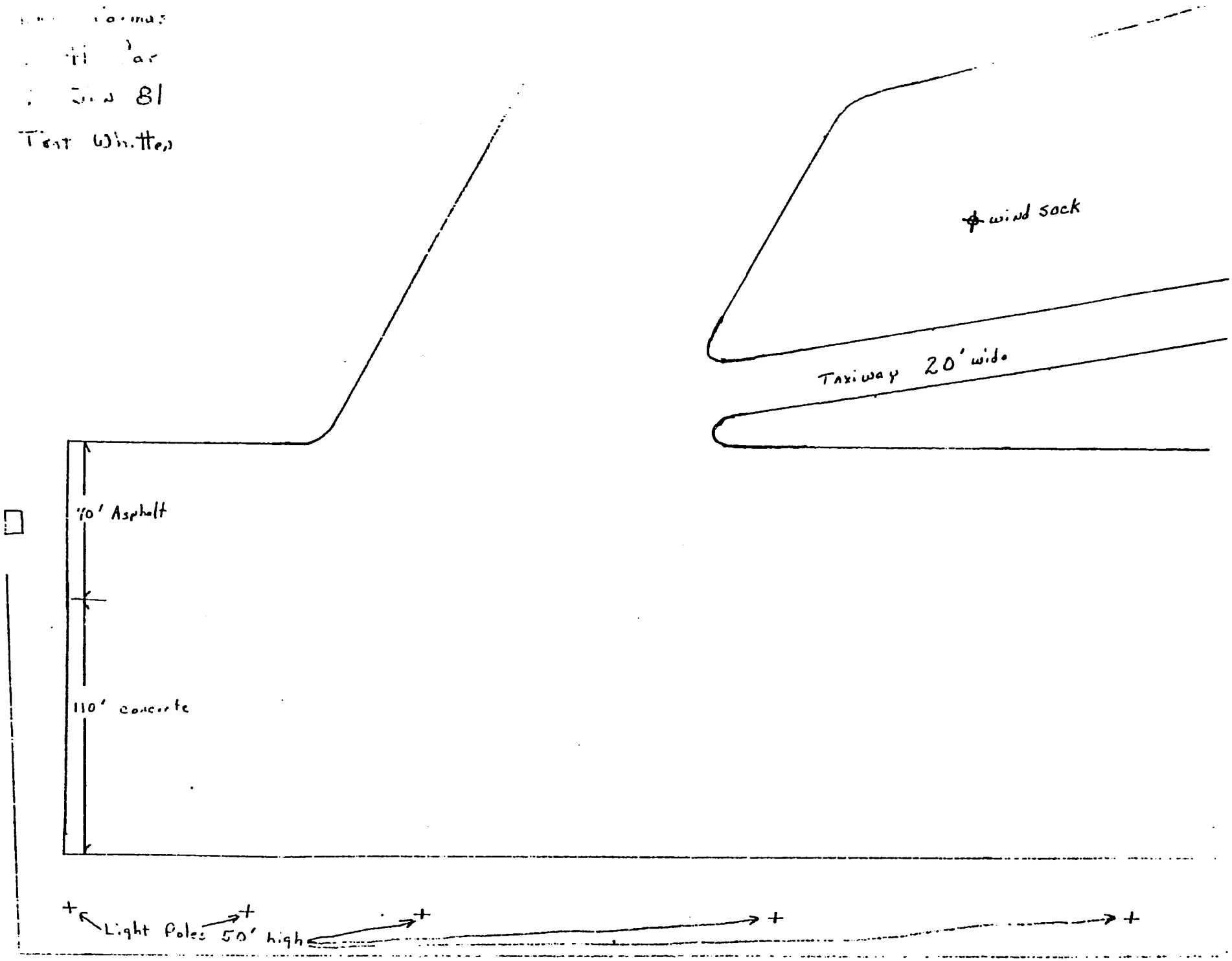
1. Airfield could support C-141 and C-130 operations with deployed ALCE. C-141 should be limited to a MOG of two due to limited ramp area. Ramp area available may vary depending on number of PAF aircraft on the field. C-130s should be limited to a MOG of six.

2. The runway is in good condition with the exception of the first 2000 ft. of RWY 01 which shows signs of deterioration. Numerous cracks are visible with grass growing through the cracks. Taxiways are good with the exception of the first and third link on south end which have several holes one foot in diameter and 3-4 inches deep.

3. Runway lighting is temporary. One step intensity

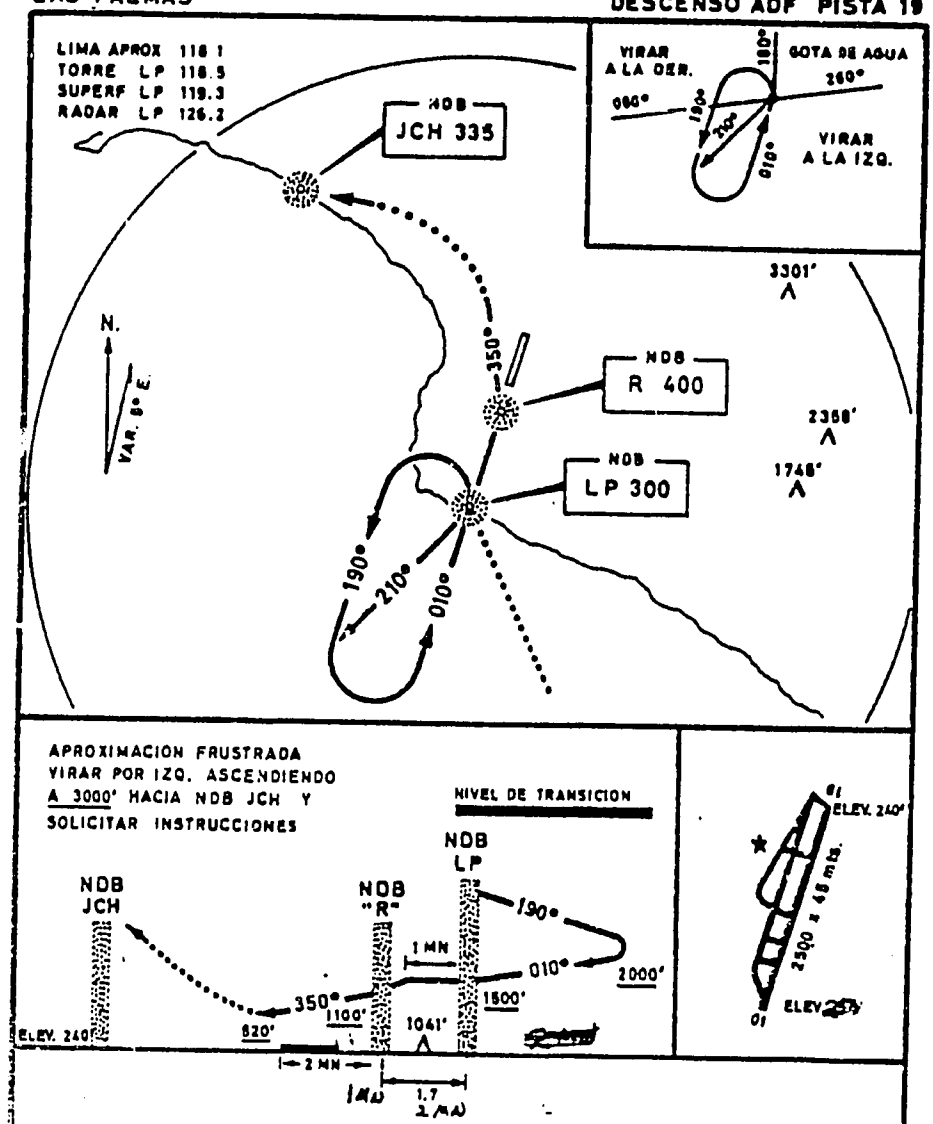
4. Drawings of the airfield, parking ramp, and PAF approach plates are attached.


5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
A B C D E F G H I J K L
2440 m
2360 m
2340 m
1310 m
720 m
195 m


81
Test Whitten
wind sock
Taxiway 20' wide
70' Asphalt
110' concrete
Light Poles 50' high

LAS PALMAS

DESCENSO ADF PISTA 19



TIEMPO ENTRE "R" Y P. DE FRUST. 2 MN				
90 KT	120 KT	150 KT	180 KT	210 KT
1:30	1:00	0:48	0:40	0:33

TIEMPO ENTRE LP Y "R" 1.7 MN				
90 K	120 K	150 K	180 K	210 K
1:06	0:48	0:38	0:32	0:28

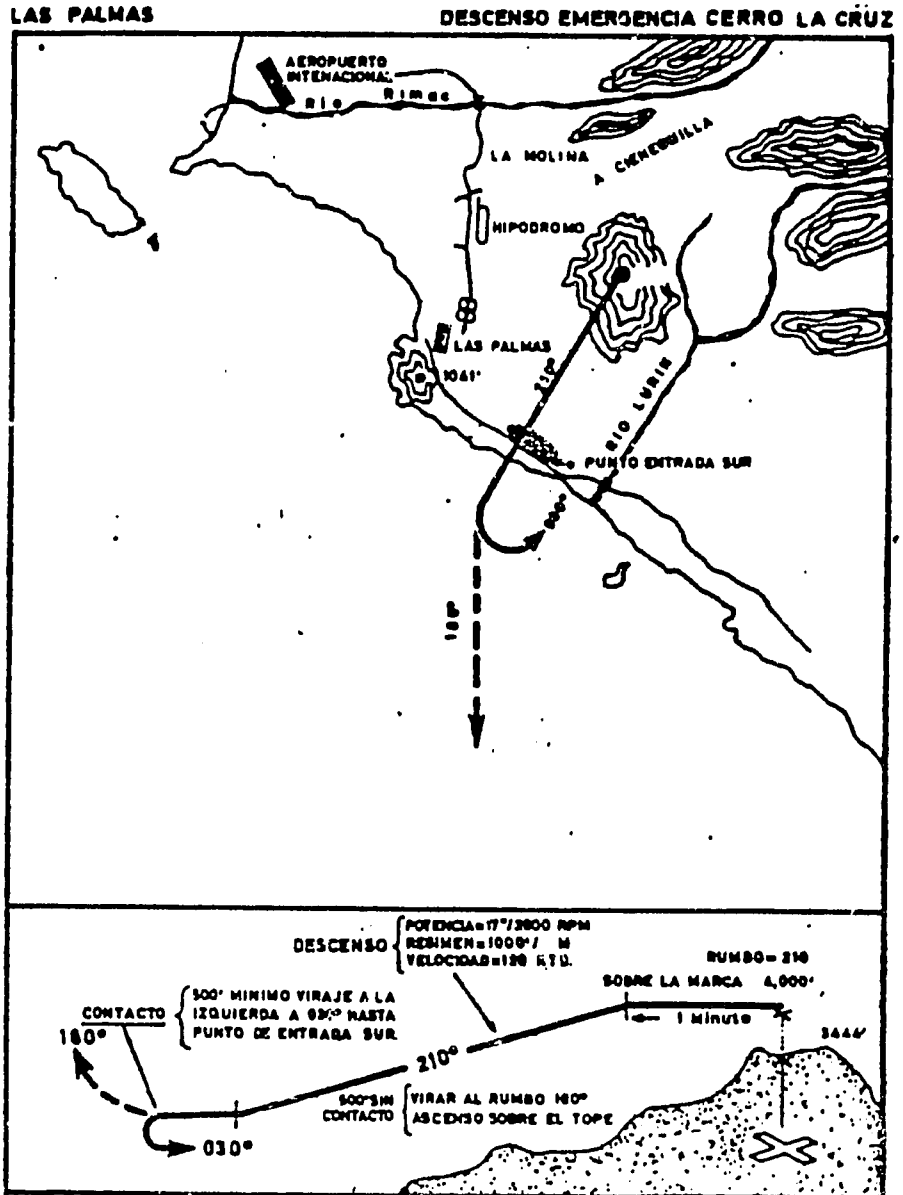
CATEGORIA	A	B	C	D	E
CIRC. NDB 19	820'		(580' – 1 1/2)		
DIR. PAR 01	240'		(100' – 1/2)	G.S. 2.5°	
DIR ACR 01	340'		(200 – 1/2)		

GRUPO AEREO Nº 51 (Enmienda Nº 12) FEB. 1979 ESC. VUELO INSTRUM. 515

– 60 –

ATTCH-2

LAS PALMAS — DESCENSO EMERGENCIA CERRO LA CRUZ



PROCEDIMIENTO – SOBREVOLAR A 4.000' MARCA EN EL CERRO PONER RUMBO 210° MANTENER LA ALTURA POR UN MINUTO EN RUMBO 210° DESCENDER A 1000' / MINUTO

MINIMOS – 500' SI SE HACE CONTACTO VIRAR POR LA IZQUIERDA EN RUMBO 030°

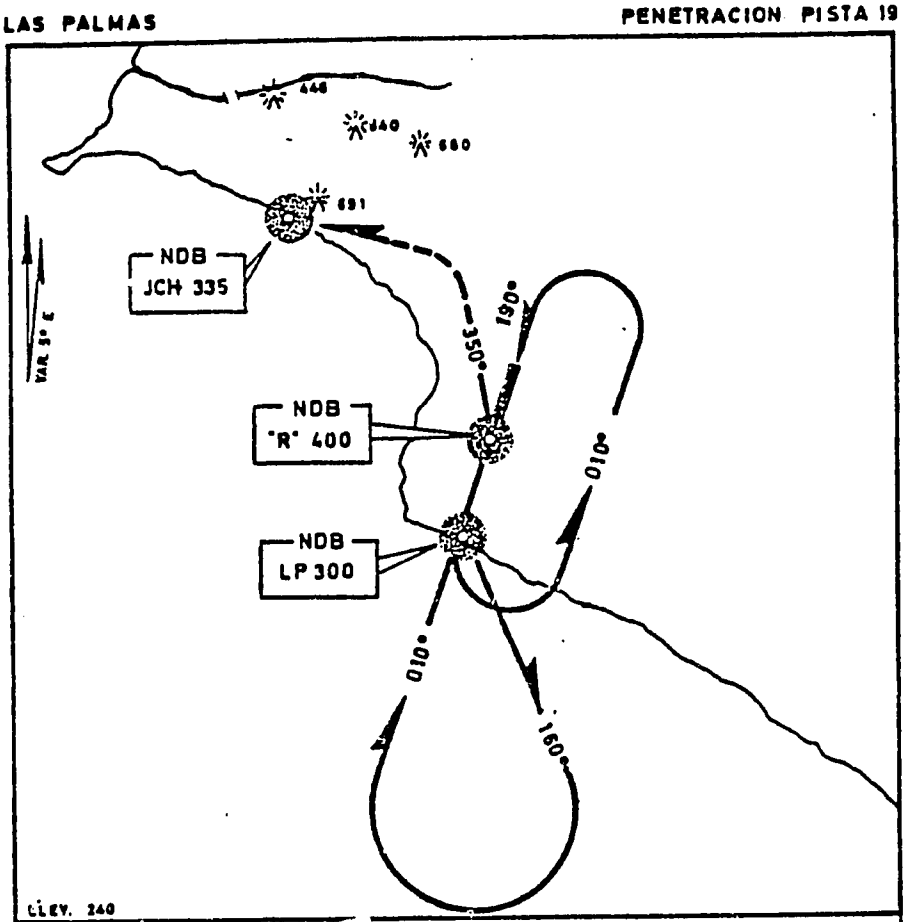
SI NO HACE CONTACTO A 500 VIRAR AL RUMBO 180° ASCENDIENDO SOBRE EL TOPE SOLICITE INSTRUCCIONES A LA TORRE DE CONTROL

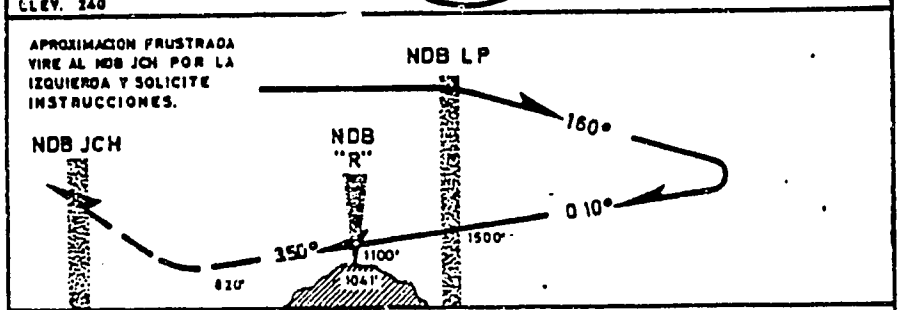
GRUPO AEREO Nº 51 — Octubre 1975 — ESC VUELO INSTRUM 519

- 61 -

ATTCH -3

LAS PALMAS — PENETRACION PISTA 19





MINIMOS			TIEMPO DISTANCIA ENTRE "LP" Y "R"												
DIRECTA	DIA	NOCHE	MUDO	100	110	120	130	140	150	160	170	180	190	200	210
CIRCULAR	DIA 820-11/2	NOCHE 820-2	SEG.	58	52	48	44	41	38	36	34	32	30	28	25

GRUPO AEREO Nº 51 (9-5-75) Octubre 1975 ESC VUELO INSTRUM 515

- 59 -

APPENDIX III

Airfield Survey: COLLIQUE Airport

AIRFIELD SURVEY

INSTRUCTIONS AND CHECKLIST

FOR

AIRLIFT OPERATIONS

Collique, Lima, Peru

NOTE: The MAJCOM having the primary responsibility for the airlift operation will conduct the airfield survey.

MAC FORM MAR 77 174 PREVIOUS EDITION WILL BE USED

AIRFIELD SURVEY

TABLE OF CONTENTS

	PARA	PAGE
INSTRUCTIONS		
General	1	1
Runway, taxiway, and parking area data	2	1
Material Support	3	2
Navigational Aids	4	2
AIRFIELD SURVEY CHECKLIST		
PART I - Airfield Suitability		
Runways	1	4
Taxiways	2	5
Parking Areas	3	6
Engine Blast	4	7
Aircraft Movement on the Ground	5	7
Aids to Navigation	6	8
PART II - Airfield Support		
Section I - Operations Facilities		
ALCE Operations Facilities	1	9
Base Operations	2	9
Weather	3	9
Communications	4	11
Section II - Transportation		
Aerial Port	1	14
Vehicle Transportation	2	15
Section III - Logistics		
Aircraft Support	1	16
Equipment	2	16
Maintenance and Supply Facilities and Capabilities	3	17
POL	4	18
Section IV - Base Support		
Base Facilities	1	19
Medical	2	19
Personnel	3	20
Security	4	20
Fire Protection		20/21
Section VI - Summary		22

AIRFIELD SURVEY INSTRUCTIONS

1. General:

a. The Airfield Survey Checklist is in two parts; Part I Airfield Suitability and Part II Airfield Support. Part I is designed to provide information which will be used to determine if the airfield can physically accept an airlift aircraft, e.g., C-5, C-141, C-130, etc. Part II is designed to provide information which will be used to determine if the airfield has the facilities to support an airlift operation.

b. Personnel accomplishing the airfield survey should contact appropriate host airfield officials to obtain required information.

c. The Airfield Survey Checklist should be completed in as much detail as possible. Attach additional sheets to the survey checklist, as necessary, to furnish required information.

2. Runway, taxiway, and parking area data:

a. Identify and complete data blocks on <u>all</u> runways, taxiways and parking areas whether they are active or inactive.

b. Include an airfield diagram or sketch labeling <u>each</u> of the above.

c. Identify specific taxi routes and parking areas on the airfield diagram/sketch.

d. List the published runway, taxiway or apron strength by at least one of the following designations:

T - Twin gear rating

ST - Single tandem gear rating

TT - Twin tandem gear rating

TDT - Twin delta tandem gear rating

ESWL - Equivalent single wheel loading (include associated tire pressure if available)

LCN - Load classification number

listing either T, ST, TT or TDT include the other ratings if available (e.g., if is given attempt to obtain the ST, TT, and TDT rating). If data source is current FLIP, confirm with appropriate airport officials/civil engineers. If other ings are not available, do not convert.

e. Identify and locate all obstructions adjacent to all runways, taxiways, parking aprons. For example, runway distance markers 4 feet high every 1000 along runway 04/22, 8 feet from runway edge. If obstacle data is listed in current FLIP, confirm its accuracy.

f. Identify and include all obstructions in the approach and departure which violate standards of AFM 86-8. Identify all obstructions and iated heights and locate them from a known reference point adjacent or near the obstruction.

g. Record distances between adjacent runways, taxiways, and parking areas, 1000 feet between runway 20 and parallel taxiway.

h. Record condition of area surfaces in regard to possible repair, and engine blast damage.

i. List and locate AGE equipment, building, barriers, etc which are to possible blast damage.

j. Designate tiedown rings which qualify as aircraft grounding points.

k. Include any gross weight or other limitation imposed by airfield operator/manager.

3. Materiel Support:

a. Determine AGE equipment available from base and procurement resources.

b. Determine whether warehouse or open storage is available.

4. Navigational Aids:

a. Determine if replacements or additions to existing facilities are expected.

b. Determine if published SID can be used in lieu of radar vectors. Attach a copy of current SIDs to survey.

AIRFIELD SURVEY CHECKLIST

Airfield Name Collique

Airfield Location Lima, Peru

Date Survey Completed 24 June 1981

Personnel Conducting Survey:

Name/Rank	Position	Organization	Phone
B. Parks, Capt	OIC, Airlift Control	1300 MAS/DOC	84-5714
L. Whitten, TSgt	CCT	1300 MAS/DOXX	84-3752
J. Placencia, Sgt	CCT	1300 MAS/DOXX	84-3752

Host Airfield Representatives:

Name/Rank	Position	Organization	Phone
Norman H. Runge, Col	Air Attache	USDAO Lima APO Miami 34031	286000 x 363
Alberto Noriega,	Comandante Director	School of Civil Aviation	81-6307

Distribution:

1 cy - Each MAC AF/DOX
2 cy - MAC/INO
1 cy - DMAAC/ADPA, South Annex, St. Louis AFS MO 63125
3 cy - USDAO/USAIRA, US Embassy Lima, APO Miami 34031
1 cy - 437 MAW/LGX
1 cy - 437 MAW/DOXL
1 cy - 1300 MAS/DO (file)

PART I

AIRFIELD SUITABILITY

1. Runways

a. Runway data

Designation	02/20			
Length	3346'	2300' extension planned to North 1982		
Width	164'			
Surface	Asphalt			
**Condition	Good			
Slope	0			
Published Strength	24512 lbs/	77 PSI		
*Imposed Weight Limits				
Centerline Marked	Yes			
Distance Markers	No			
Edge Lights	No Flare pots for night handling			
Approach Lights	No			
Threshold Lights	No			
VASI Lights	No			
Shoulders (Surface)	Hard dirt			
(Width)	20'			
(Condition)	Good			
Overrun (Length)	No			
(Surface)				
(Condition)				

*Imposed by host airport manager or officials.
**Excellent, good, fair, poor. If fair or poor, give details.

b. Description, location, and height of obstructions along runways. Example: Radar reflector 72 inches high, 300 feet left of centerline R/W 04, 550 feet from the approach end. (Include lighting data.)

c. Description, location, and height of obstructions in the approach and departure zones. Example: Trees, 322 ft MSL, 1000 ft prior to threshold R/W 22, 70 ft left of R/W centerline. (Include lighting data.)

Commercial radio antenna 2NM North on runway center line 700 ft tall FREQ 590.

d. Describe approach illusions.

2. Taxiways:

a. Taxiway data

Designation	Paralle	end (02)	end (20)	center		
Width	60'	45'	60'	60'		
Surface	ASP	ASP	ASP	ASP		
Condition	Good	Fair	Good	Good		
Published Strength	24,512	lbs/77 PS	I			
Imposed Weight Limit						
Centerline Marked	Yes	No	No	No		
Lights	No	No	No	No		
Shoulders Stabilized	No	No	No	No		
Stabilizing Surface						
Stabilized Width						

Verified by host airport manager or officials

b. Description, location, and height of obstructions along taxiways. (Include lighting data)

3. Parking Area

a. Parking Data.

Designation						
**Dimensions	40x1000 ft					
Surface	Asphalt					
Condition	Good					
Published Strength	24,512 lbs/77 PSI					
*Imposed Wt Limit						
Taxi Stripes	No					
Tiedown Rings	No					
Grounding Points	No					
Shoulders Stabilized	No					
Stabilizing Surface						
Stabilized Width						
Flood Lighting	Yes					

*Imposed by host airport manager or officials.
**If irregular size, indicate dimensions on attached drawing.

b. Description, location, and height of obstructions adjacent to a parking area that will restrict aircraft movement while complying with taxi obstacle clearance requirements. (Include lighting data.)

c. Are remote (explosive) parking spaces available? No
Designate number and explosive limits for each. (Indicate location on attached drawing)

Are parking spots marked (C-5, C-141, C-130, etc)? No

d. How much of the total parking space available can be allotted? Is LCN waiver required? If so, will local officials grant waivers?

e. Does the slope of the parking apron aggravate the break-away and taxi power requirements? No

If yes, designate the parking area or spot and explain in detail:

Remark on any aspect of parking aircraft not covered: _____

Parking apron width precludes one C-130 passing another.

g. Is space adequate for emergency vehicles to maneuver around aircraft?

Yes.

Engine blast.

a. Can engines be run-up to max power in parking position without damage to ground surfaces or structures? No.

b. Is an engine trim pad available for max power run-up? No.

c. Is a blast fence installed or planned for the engine trim pads?

No.

d. Are other aircraft, structures, or surfaces likely to be damaged by engine blast from application of break-away power when moving from parking spot or from taxi power application as the aircraft follows designated taxi routes to and from the parking area? Yes

If yes, explain: Numerous Cessna aircraft on ramp, hangars along west edge of parking area are open and equipment is exposed.

e. Is any damage to structures, surfaces or vehicular traffic likely to occur while the aircraft is in the take-off position when max engine power is applied? No, blowing sand only

If yes, explain: _____

f. Remark on any aspect of jet blast not covered:

_____

Aircraft movement on the ground.

a. Designate any area not accessible to the aircraft because of surface obstacles, or probable engine jet blast damage. _____

None (C-130 only)

b. Designate any specified taxi route that aircraft would have to follow including to the parking areas and from parking areas to the runway for take-off:

_____

Routing should be displayed on an airfield diagram.

7

c. Can the aircraft taxi in and out of: (If no, for what reason)

(1) Refueling area Yes

(2) On/Offload area Yes

(3) Maintenance area Yes

d. Attach to the completed survey checklist an airfield drawing (8" X 10") showing designated taxiways and proposed parking plan that the aircraft will have to comply with while observing limitations imposed by obstacles, weight bearing capacity, probably blast damage, width, etc.

e. Remark on any aspect of ground movement difficulties not covered:

6. Aids to navigation:

Facility	Yes	No
VOR		X
TACAN		X
RBN		X
ILS		X
Radar (PAR) (ASR)		X
Instm Approach Procedure		
USAF		X
*Other (Type)		X
Standard Instrument Departure		
USAF		X
*Other (Type)		X

*FLIP, Jeppesen, host nation only.

PART II

AIRFIELD SUPPORT

SECTION I

OPERATIONS FACILITIES

1. ALCE Operations Facilities

a. Room or building for operations functions-briefings, flight planning:

(1) Yes X No _____

(2) Bldg No _____

(3) Limitations No flightline visibility

b. Methods for control of classified material available:

(1) Yes _____ No X

(2) Limitations Use Embassy or bring safe

2. Base Operations:

a. Building number: None Phone: _____

b. NOTAMS: Yes _____ No X

c. Flight Pubs: Yes _____ No X

d. Customs: Yes _____ No X

e. RCR Measuring Equipment: Yes _____ No X

Remarks Flight plans are passed to Jorge Chavez

f. Control Tower:

(1) Does position and construction of control tower afford the operators unrestricted vision of all approaches, runways, and taxi strips?

Yes X No _____

(2) What are equipment limitations for guarding and transmitting on A/G frequencies? NO UHF available

(3) Is emergency power available for the tower? Yes X No _____ Batteries (10 hours)

(4) Are up-to-date charts and diagrams, including crash grid maps maintained in the tower? Yes _____ No X

(5) Who operates tower facility? Peruvian Air Force/Civilian

3. Weather Facilities. Wind equipment in tower

a. Observations.

(1) Agency responsible for observations None

Phone number _____

(2) Observing hours _____

(3) Location of observing site _____

(4) Frequency of observations _____

*(5) Dissemination code(s) N/A

(6) Upper Air Observations:

Rawinsonde No Scheduled times _____

PIBAL No Scheduled times _____

b. Forecasts.

(1) Domestic No

(2) Overseas No

(3) Agency responsible for forecasts _____

Phone number _____

(4) Forecasting hours _____

*(5) Weather warning Yes _____ No _____

(6) Aera weather advisories Yes _____ No _____

c. Weather Communications.

(1) Pilot to Forecaster Radio No Frequency _____

*(2) By what means are observations and forecasts transmitted?

N/A

(3) Receipt of data/communications equipment (teletype, fax, circuits, :.). _____

te: List circuit number and agency, HF frequency and time, commercial "pany to some city, etc)

d. Weather Equipment.

(1) Radar Yes _____ No X Type _____

(2) Wind Equipment Yes X No _____ Type Located in tower

(3) Visibility equipment Yes _____ No X Type _____

(4) Other _____

(5) Equipment maintenance performed by Unk

*Not required for AWS, US NWS, or US Navy stations.

Weather Briefings:

(1) English capability No

(2) Flight folders (HWD, en route winds/temps, destination forecast, etc.).

No

(3) Computer flight plan No

Other:

(1) Alternate sources of weather information Jorge Chavez

10

(autovon/commercial telephone to AWS, US Navy or other stations - list numbers).

(2) Contracts for service None

(3) Plans for increasing/improving service None

g. Remarks

4. Communications:

a. Telephones

(1) Base telephone exchange Yes X No 32-5540 (Ask for coordination net. then ask for Collique)

(2) Commercial Yes X No

(3) Direct circuit

(a) To Lima only, ____, ____

(b) Type termination

1. Switchboard (PBX) Yes ____ No X

2. Console Yes ____ No X
Patching Capability Yes ____ No X

(4) AUTOVON

(a) Quantity (number of incoming, outgoing, 2-way lines)

1. PBX ____, ____, ____

2. 4-Wire (where is it located?) ____, ____, ____

(b) Precedence capability (Flash, Priority, etc)

1. PBX ____

2. 4-Wire ____

(c) Maximum call area (world-wide, CONUS, Pacific, etc)

1. PBX ____

2. 4-Wire ____

(d) Number (area code, operator assist)

(5) Local commercial number (area code, operator assist)

(6) Secure voice communications

a. Available Yes X No

b. Type Autosevocom at Embassy

c. Number/Listing N/A

b. Record Communications American Embassy

(1) Teletype

(a) Speed (wpm) 2400 wpm (Fastcast System)

11

(b) Type (Point-to-Point, TELEX, TWX, etc)

_____

(c) Highest security classification circuit can process (TS, S, SPECAT, etc) N/A.

(2) AUTODIN terminal Yes X No _____ (at Embassy)

(a) DSTE type (AE, AB, etc) N/A

(b) Other (Mode V, II, etc) Skylink (SATCOM)

(c) Highest security classification circuit can process TS

(3) Distance and travel time between operating location and communications center

_____

(4) Hours of operation

(a) 24 hr/day, 7 day/wk _____

(b) 8 hr/day, 5 day/wk Yes

(c) Other (specify) Night action required

(5) Routing indicator RUESLM

c. Radio

(1) UHF/VHF VHF only in tower

(a) Type (AN nomenclature) N/A

(b) Quantity 1

(c) Frequencies available 126.0

(2) Intra base radio (by net)

Frequency No

d. Nearest FAA center or FSS facility Jorge Chavez

(1) Location _____

(2) Type _____

(3) Phone number 52-95-70 ext. 190

(4) Distance _____

. Auxiliary power for communications equipment Volts batteries (10 hours)

. Type of communications support to be augmented and building and room where service is required

_____

_____

.. Person to contact and telephone number for coordination of additional ..cations required

USDAO, US Embassy, Lima, Peru

h. General Remarks (reliability of communications equipment and long-haul

12

circuits and other pertinent comments) _____

_____

i. Major C-E facilities/capabilities program change N/A

_____

PART II

AIRFIELD SUPPORT

SECTION II

TRANSPORTATION

1. Aerial Port Facilities;

a. Cargo Terminal:

(1) Covered space available None

(2) Outside storage space available Yes

(3) Bldg No _____ Space _____

(4) Aircraft loaders (quantity) 40K _____ 25K _____ 10K F/L _____ 4K F/L _____ other (explain type and rate capacity) _____

(5) Pallet/container trailers _____

(6) Pallet/cargo scales (type/make weight capability) _____

(7) Flat bed trucks (type rollerized length) _____

(8) Truck off/on loading ramp(s) _____

(9) MHE repair location _____ Space _____

b. Passenger Facilities:

(1) Location No maximum capacity _____

(2) Eating facilities available Aero Club Cafeteria

(3) Passenger stairs (type, height capability) _____

c. Fleet Service:

(1) Location None Space _____

(2) In-Flight Kitchen _____

(3) Latrine servicing truck (type/capacity) _____

(4) Disposal facility (distance/availability) _____

d. Cargo Storage Area:

(1) Inside Storage None Sq Ft. Type flooring _____ (i.e., concrete, dirt, gravel, asphalt, PSP, etc.)

(2) Outside storage _____ Sq Ft. Type surface _____. Is area fenced Yes _____ No _____ Are outside lights available Yes _____ No _____

(3) What cargo storage vehicle parking capability other than the designated cargo storage area is available for:

(a) Vehicles (give dimensions) _____ Wheeled _____ Tracked _____

(b) Cargo _____

e. Hazardous Cargo Buildup Area:

(1) Distance to remote parking None

(2) Size _____ Sq Ft.

(3) Type surface _____

(4) Revetment type _____

(5) Maximum NEW allowable in holding area _____ _____

Transportation:

a. Staff cars All leasable from National, Avis, etc, contact USDAO-US Embassy.

b. Station wagon _____

c. Buses _____

d. Trucks _____

e. Wreckers _____

f. Car rental service _____

g. Taxi service _____

3. Airfield Throughput Capacity (This section will be accomplished by qualified transportation team member or base transportation personnel).

a. Throughput capacity is comprised of the personnel, equipment and facilities required to perform the functions necessary for receiving, parking, off-loading processing, and clearing of all types of cargo and passengers at an airport, and is constrained by airfield reception, aircraft parking and off-load, and clearance capabilities. In this regard, it is necessary to determine tonnage estimates for each airfield in terms of both the amount of work which could be accomplished each data over a sustained period of 30 days.

b. Considering the above factors, please specify below, the tonnages that could be moved completely through the airfield during each 24 hour period.

CURRENT AVERAGE DAILY THROUGHPUT	EST MAXIMUM DAILY THROUGHPUT CAPABILITY (with current manpower & equipment)	EST MAXIMUM THROUGHPUT CAPABILITY (Not constrained by current manpower equip
_____ S/T	_____ S/T	_____ S/T

c. Arriving personnel, vehicles, and cargo will be moved to their final destination by rail, road or a combination of both. The following information is required:

(1) Identify, and indicate the distance, to the nearest railhead(s) with capacity to load wheeled and tracked vehicles, to include capabilities of load-ramps and marshalling areas.

(2) Identify the number and type (dual lane, etc.) of major roads serving the airfield and any movement restrictions that exist in the vicinity of the airfield and/or between the airport and railhead(s) to prevent movement of large wheeled or tracked vehicles.

PART II

AIRLIFT SUPPORT

SECTION III

LOGISTICS

1. Aircraft support:

a. Deicing equipment, fluid and status N/R

b. Transient Alert:

(1) Follow-me vehicle available No

Operating hours: _____

(2) Aircraft marshallers available Yes

(3) Fire guards available _____

(NOTE: If aircraft jacking must be accomplished outdoors, designate an area where ramp has sufficient strength and where jet/prop blast of taxiing aircraft will not affect jacked aircraft.)

2. Equipment: None

a. Power units by type available. MA-1A _____ MD-3 _____ MA-2 _____ M32A 60 _____ Other _____

Additional needed _____

b. Air carts available (include MA-2 and M32A-60) _____ Additional needed _____

c. Type of hydraulic test stands available _____

d. Air compressors available. Hi press _____ Lo Press _____

e. Heaters available _____ Additional needed _____

f. Light carts available _____ Additional needed _____

g. Other powered AGE _____

_____ Additional needed _____

h. Jacks available (list by type and purpose; i.e., R-6n C-130 nose available 3 Additional needed 1)

TYPE	PURPOSE	AVAILABLE (NR)	ADDITIONAL NEEDED
None			

i. Maintenance stands

TYPE	AVAILABLE (NR)	ADDITIONAL NEEDED
None		

j. Aircraft airconditioners available _____

3. Maintenance and supply facilities and capabilities:

a. What repair capability exists on station that is compatible with the type aircraft in this operation. (If complete field repair capability exists for an MDS state C-141 - complete - all)

MDS	FIELD LEVEL REPAIR CAPABILITY	SYSTEMS
None		

b. What facilities are available for specialist dispatch pools? (List shop, type and ft^2.)

SHOP(s)	TYPE Perm or Temp	FT^2	ADDITIONAL NEEDED FT^2
None			

17

c. Are LOX/Gaseous Oxygen, Oils, and Tires/Wheels (build up) available or procureable? What is your source of resupply? Is it provided in your OPLAN?

Oil, Peruvian Air Force

4. POL: Capacities in gallons by grade of fuel (JP-4, JP-5, COM Jet A, A-1, Jet B, 115/145, 100/130. 80/87

a. Storage capability (by grade of product).

(1) Capacities 10,000 gal 100/130; 8000 gal 80/87

(2) Receiving rates (simultaneously) _____.

(3) Transfer rate to hydrant systems _____.

(4) How does the storage facility receive fuel (truck, pipeline,etc)? _____.

b. Hydrant refueling (by grade of product).

(1) Number of refueling positions _____.

(2) Number of aircraft that can be serviced: _____.

(a) Simultaneously _____.

(b) In one hour _____.

(c) In 8 hours _____.

(d) In 24 hours _____.

(e) In 5 days _____.

(3) Hydrant dispensing rate per lateral (GPM) _____.

(4) Number of laterals _____.

c. Fuel servicing vehicles (by grade or product).

(1) Number of capacity and dispensing rate _____.

(2) Turn around time from flight line to fillstand, fill, and return to flightline _____.

d. Runway Clearance Vehicles (i.e., snow removal, runway sweepers, etc.) _____.

e. General Remarks.

PART II

AIRLIFT SUPPORT

SECTION V

BASE SUPPORT

Base Facilities:

a. Billets:

(1) On base

(a) Yes _____ No X

(2) Off base in Lima

(a) Yes X No _____

(b) Type & No hotels in city

(c) Distance _____

b. Messing:

(1) On base One cafeteria

Hours of Operation Unk

(2) Off base Numerous restaurants

Hours of Operation Vary

c. General remarks: All billeting would be in Lima hotels. Hotels are numerous, but rooms may be limited during peak periods.

2. Medical:

a. In-patient care available:

(1) On base: Yes _____ No X

(2) Off base: Yes X No _____

b. Out-patient care available:

(1) On base: Dispensary Yes X No _____

(2) Off base: Yes X No _____

c. Number of ambulances:

(1) Crash ambulances w/radio No

(2) Other ambulances (civilian/Military One military

d. Nearest hospital: Name/Location _____

nce from airfield _____

e. General Remarks: Peruvian AF has small clinic on field with one r, 2 dentists, 3 nurses. Large hospital in Lima with heliport.

3. Personnel

a. CBPO facilities available. Yes _____ No X

b. CBPO is Phase II. Yes _____ No X

c. CBPO's Major Command _____

4. Security

a. Type Guards: (Military/Civilian, US/Indigenous) Military

b. Number on each shift _____.

c. Does flight line have restricted access? Yes

d. Is flight line area fenced? If so, what type (e.g., chain link, wood, etc)? No

e. Are roving patrols used? If so, how many? No

f. Are patrol dogs used? No

g. Does security force use an intrabase radio net? Yes

h. Are weapon storage facilities available? Yes, with Peruvian Air Force

i. Are aircraft stanchion and ropes available for aircraft perimeter security? No

j. Are local forces providing security check of passengers? No

5. Fire Protection

a. MANPOWER: Indicate the number of fighters on each shift. _____

b. FACILITIES:

(1) Are rescue crews housed and messed on the flight line?
No

(2) Is a full suit of protective clothing available for each on-duty fire fighter; i.e., hood, coat, trousers, boots, gloves? No

(3) Is any aluminized protective clothing available?
No

(4) Is a water supply available on the airfield for refilling crash trucks? Yes

c. OPERATIONS:

(1) Is each fire fighting vehicle radio equipped? No

(2) Can vehicles communicate with the tower? No

(3) Is an ambulance normally located on the field? Yes

d. EQUIPMENT:

(1) List the type and quantity of USAF fire protection vehicles

Type	Quantity
None	

(2) Provide the following information for non-USAF fire protection vehicles:

Make	German
Number	One
Water Capacity	Dry chemical approx 30 gal
Foam Capacity	N/A
Number of Turrets	2 hoses
Water rate (gpm) of turrets	Unk

PART II

AIRLIFT SUPPORT

SECTION VI

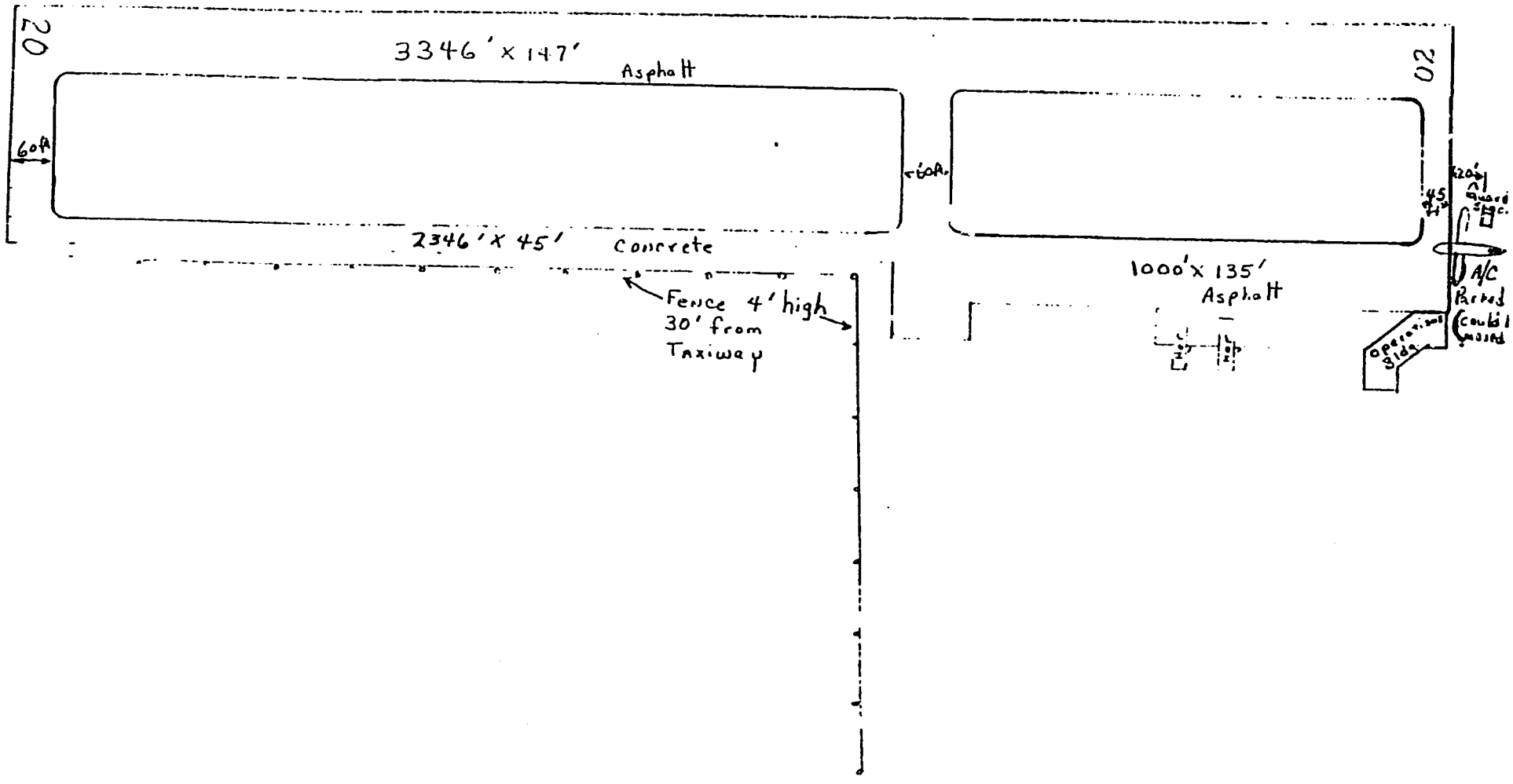
SUMMARY

Summarize the airfield's capability to support C-130/C-141/C-5 aircraft. Include whether the airfield is capable to support an on/offload, en route stop or emergency/alternate capability. Include also any limiting factors not covered by this checklist and measures necessary to correct all limiting factors.

1. Runway does not meet the minimum requirement in MACR 3-3. There is only 3,463 ft of runway with no overruns. (MACR 3-3 requires 3,500 ft of runway with 300 ft of overrun on each end). This does not present a significant hazard to safe operation of C-130 aircraft for contingency operations.

2. The parking ramp is limited and would require aircraft to be backed to the extreme edge of the ramp with tail over the dirt to allow another C-130 to pass.

Collins
25 June 61
Test Facility



APPENDIX IV

"Meeting the Triple R Challenge"

Magazine Article

engineering & services

Air Force
Engineering and Services
Quarterly

AFRP 80-1 VOL 22 NO 2

FEATURES

4 • Proud Phantom — TAC Tackles the Sahara
9 • New Challenges in Southwest Asia
13 • Readiness: A Bird's Eye View
15 • North Field: Meeting the RRR Challenge
19 • COBs in Europe
23 • On the Move
24 • PACAF is Ready!
27 • On the AFRES Menu: PRIME RIBS
32 • 50th Midnight Express
33 • Staging Your Own War at Home ... for just pennies a day
39 • Fire Fighter Readiness
40 • Annual Awards
42 • Salty MACE '80
44 • The Gavel: Gen Gilbert steps down at SAME
47 • PRIME BEEF and PRIME RIBS on the Move
BC • Innkeeper

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2 • From the Director
11 • Current Emphasis
34 • Worth Noting
37 • CESMETips

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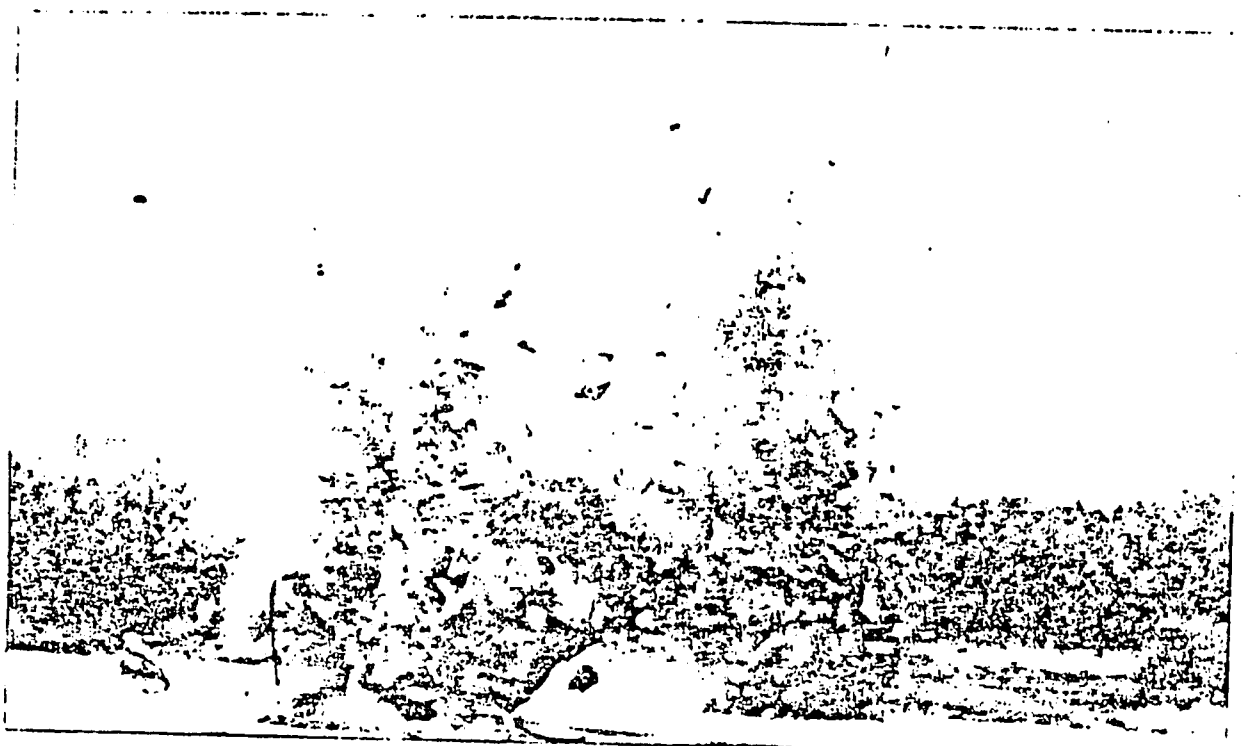
EXPLOSION...CONCRETE AND EARTH SPEWING...

North Field

meeting the Triple R challenge

By Lt Col Robert E. Boyer and Philip T. Nash



The hot August sun starts to appear and life emerges around a desolate, small airfield as a routine day begins. Suddenly, a tremendous explosion sends concrete and earth spewing in all directions. When the smoke and dust clear, a gaping crater is found in the runway surface surrounded by piles of rubble blocking the pathway to launch aircraft. In addition, simulated damage to the runway is extensive, including potholes from rocket and cannon fire, numerous craters, and a variety of unexploded bombs and other ordnance strewn about the airfield. Quickly, an Air Force damage assessment team, dressed in chemical warfare gear, arrives on scene to start an exceptionally realistic test of rapid runway repair (RRR) techniques by the Air Force Engineering and Ser-

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Philip T. Nash, *the director of the North Field test, is technology base program manager, engineering research division, AFESC at Tyndall AFB. He earned his bachelor's and master's degrees in civil engineering at Texas Tech University in 1971 and 1972, respectively. In March he earned the Civilian Meritorious Service award. He is the author of numerous articles relating to hardened facilities and the effects of blast and explosion on structures.*

vices Center (AFESC)

Potential enemies have devoted much effort to design weapon systems and tactics to prevent U.S. aircraft from operating in the event of war. In the past, fighter aircraft were stored in the open and were extremely vulnerable to strafing attack. Following valuable lessons learned from the 1967 Mideast conflict, an evolutionary aircraft shelter hardening program began. Protecting aircraft with shelters was effective and caused the threat to shift towards attacking the mission essential runway launch and recovery surfaces. Sophisticated U.S. aircraft and weapon systems are useless in any conflict if they are unable to get off the ground. During the sixties, the U.S. Air Force recognized the need to be able to rapidly repair damaged runways and launch aircraft soon after an attack. Using post-World War II technology, procedures were developed that were capable of repairing a limited number of craters to meet the perceived threat at that time. However, the threat grew tremendously, and soon RRR procedures were faced with a variety of challenges: 1) increased number of craters, 2) less time for repairs; 3) difficulties in determining which craters to repair first, 4) possible chemical warfare environment; 5) possible aircraft damage while operating over repairs, and 6) unexploded ordnance.

Again, the Air Force recognized the challenge and outlined a nine-year research program to provide the capability to launch tactical aircraft within five minutes after an attack and to prepare a suitable expedient runway that can sustain limited operations within one hour. AFESC is currently in the fourth year of the RRR research program and has made significant headway toward meeting planned goals. However, operational commands are faced with an enormous threat at the present time, and cannot depend on past capabilities until future systems begin entering the field in 1986. Periodic improvements must be transferred to the using commands as they become available. Testing at North Field provided an appropriate means of demonstrating the current status of RRR, transferring recently developed technology to the users, and previewing future concepts under development.

The RRR program is designed to meet this challenge through a systematic approach which includes four technical areas: post-attack environment, alternate launch and recovery, bomb damage repair and surface roughness.

Post-Attack Environment

Extensive damage to the airfield can be expected following an enemy attack. In most cases, only a portion of the airfield is required to launch and recover aircraft. Assessing airfield damage determines which portion of the airfield can be quickly repaired, and identifies any hazardous ordnance or chemical environment endangering repair crews. Current damage assessment methods involve personnel in chemical gear visually inspecting the airfield and reporting their findings to the survival recovery center (SRC). The RRR program is developing automated systems which will electronically record and relay damage information to a ground-based minicomputer programmed to help optimize recovery operation plans. At North Field a candidate airborne system was demonstrated using a modified Cessna 180 aircraft.

Alternate Launch and Recovery Surfaces

An attractive method to increase chances of launching aircraft immediately after an attack is to construct inexpensive contingency surfaces capable of supporting limited aircraft operations. Providing a much larger area with launch possibilities requires the enemy to dilute his attack and increases the odds of locating an undamaged portion of the airfield large enough for aircraft to takeoff and land. At North Field a concept for future contingency launch surfaces was installed and loaded with simulated aircraft traffic.

Bomb Damage Repair

Methods developed during the Sixties for repairing craters larger than 40 feet in diameter are still applicable for large craters today. Present and future threats now include many smaller craters 20 feet or less in diameter. The RRR program is developing techniques to accomplish the necessary repairs to the original runway

Inert bombs were used to simulate unexploded ordnance in post attack environment.

surface and support sustained aircraft operations. One interim method is the crushed stone repair, replacing debris thrown from the crater to within a specified depth below the original runway surface. Selected crushed stone is compacted to fill the upper portion of the repair. A thin membrane covers the repair to prevent damage to the aircraft from dislodged repair stones. A major objective of North Field test was to demonstrate and validate the crushed stone method which would meet the interim requirements for small crater repairs and could be used as a substitute for large crater repairs. Methods for quickly repairing potholes from rocket impacts were also demonstrated.

Surface Roughness

RRR program contingency or repaired surfaces must not pose a hazard to operating aircraft. Excessive surface roughness may damage aircraft tires, structures, personnel or pylon-suspended weapons. RRR "HAVE BOUNCE" research is analyzing and testing a number of aircraft to determine surface roughness tolerance levels. Based upon aircraft response predictions by the

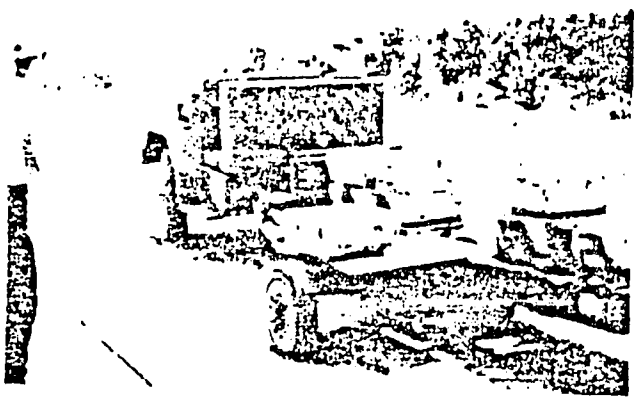
Air Force Wright Aeronautical Laboratory and results from extensive testing at the flight test center, both F-4E and C-130 aircraft demonstrated landings and takeoffs, rolling over repaired and unrepaired bomb craters, cannon and rocket potholes.

Base Recovery After Attack

Recovering an airbase after attack is an extremely complex operation. Detailed procedures have been established to integrate the activities of teams removing unexploded ordnance, repairing the airfield and coordinating the recovery efforts. When Tactical Air Warfare Center (TAWC) recognized the North Field test as an excellent opportunity to evaluate RRR-developed procedures, the scope of the North Field test was expanded to a full spectrum exercise involving a realistic scenario with fully trained teams and actual recovery equipment.

Supporting the Test

North Field was chosen as the test site because of its isolated location and high quality 500 x 10,000 foot runway surface, adequate for all aircraft operations,



One alternate launch and recovery surface test section sustained more than 400 passes of the F-4 load cart.

with some sections closely matching many asphalt-overlayed runways in Europe. Nestled in the South Carolina countryside, North Field was excellent for the required explosive operations. Extra precautions were taken to insure there would be no adverse effects to the nearby farming community.

Planning and preparing for the North Field test was an enormous undertaking. The test site belongs to the 437th Military Air Wing (MAW) at Charleston AFB. Directors at the 437th MAW recognized the positive value and importance of the North Field test and, worked diligently to provide essential support throughout preparation and testing. The first planning meeting for the North Field test was at Charleston AFB in November 1979. The 437th MAW set the mood by stating, "tell us what you need and we will do what we can to help." That vital help included support from logistics, operations, civil engineering, safety, audio-visual services and other organizations which provided expertise and equipment. That spirit of cooperation permeated the entire planning group. Nearby Shaw AFB worked equally as hard providing equipment, support, and repair team personnel who worked at an unbelievable pace setting the stage, performing repairs, and cleaning up during the exercises. Support for the North Field test was literally nationwide from a number of organizations.

In two separate exercises, realistic post-attack damage was simulated around the airfield. Each exercise began with an ammonium nitrate-fuel oil (ANFO) explosive charge detonation forming the craters. Producing charges on site prevented danger in transporting the explosive materials to the test site. The precisely mixed charges were used to produce two craters with open diameters of 25 and 37 feet. Upheaved concrete surrounded each crater and pieces of broken concrete were thrown hundreds of feet.

Sirens sounded to alert repair teams! The attack was over and work could begin. According to procedure, damage assessment teams approached the runway dressed in chemical gear not knowing if chemical weapons had been used in the attack, or not. A part of the team tested the environment to see if chemicals were present.

A variety of simulated damages and dangers were identified, including craters, hundreds of potholes, unexploded 500 and 250 kilogram bombs and a number of smaller munitions. Teams included an explosive ordnance disposal technician trained to recognize types and evaluate conditions of threatening weapons, a civil engineer trained to evaluate the airfield condition, and two augmentees to assist in recording damages and relaying information to the SRC for plotting on airfield maps. Maps were studied by the base commander and his staff in the SRC. They selected the portion of the damaged airfield which is to be repaired and used to launch and recover aircraft based on personnel safety, aircraft safety (based on "HAVE BOUNCE" information) and expediency of repair.

As soon as the launch surface was selected, explosive ordnance disposal teams cleared the pathway of unexploded bombs and submunitions. Bombs were defused or rendered safe and moved from the runway surface. Submunitions were carried from the runway surface in soil-filled boxes and pushed to the side using a front end loader. Normally ditches are dug beside the runway for burying the submunitions. Because the North Field runway is wider than normal, submunitions were carried only to the edge of the asphalt covered portion of the runway and placed as if they were being buried. Otherwise, the teams would have been carrying the submunitions distances unrealistic to the European scenario.

Runway repair operations began when the hazardous ordnance was removed from the minimum operating strip and access pathways. Although future improvements will harden repair equipment to survive detonations of nearby weapons, current equipment is extremely vulnerable to explosions. After repair equipment moved to the crater site to begin operations, graders, front end loaders and dozers cleared debris from around the craters and provided an area for stockpiling crushed stone at the crater site. Debris was placed into the crater and the upper portion of the repair

was filled with two feet of the crushed limestone material.

Simultaneously, dump trucks began transporting the crushed stone from the aggregate storage, stockpiling at the repair site until required in the repair process. Excessively upheaved concrete at the crater edge was removed using a front end loader or dozer blade, dozer ripper tooth and jackhammer. A reference string was stretched across the repair to insure the 2-foot depth required for the crushed stone backfill.

Stockpiled crushed stone was pushed into the crater by front end loaders or dumped directly from the trucks. The crater was overfilled approximately six inches to allow for compaction. Once the crater had been filled with crushed stone, compaction using the vibratory roller began. Four coverages of the vibratory roller were used as initial compaction. The stone was then releveled by the grader to approximately 1-1/2 inches above the surface. After releveling an additional 28 coverages by the vibratory roller were applied to the repair bringing the total number of coverage to 32.

The reference string was then used to measure the quality of repair for surface roughness. At North Field, aircraft safety required repairs to be of very high quality. Areas of the repair outside a 1/2 inch tolerance in either sag or upheaval were marked and releveled as necessary.

As an expedient safety precaution, a 1-1/2 nylon reinforced neoprene membrane was used at North Field to cover the repair and to protect against foreign object damage (FOD) to aircraft tires or engines. As the crater was prepared for the backfill operations, the 1-1/2 membrane was brought to the repair site, unfolded and positioned for placement. Steel plates were used to secure the membrane to the runway surface at the leading and trailing edge of the crater with respect to aircraft traffic. Holes drilled into the runway were filled with a quick-setting molten lead-sulfur compound to anchor bolts which passed through the plates. Other FOD cover concepts are being studied and developed.

Based upon "HAVE BOUNCE" test data, potholes in the runway surface deeper than 1-1/2 inches required repair. Compressed air was used to remove louse material, dust and moisture from the potholes. A quick setting patented polymer concrete, Silikal, was used to fill in potholes. Liquid hardener is mixed with the powder catalyst and poured in a polyethelene mixing bag. Contents were mixed thoroughly and then placed directly into the damaged area. The mixture set in 20 minutes after troweling flush with the runway surface. Mixture hardening times vary according to temperature and surface conditions.

An F-4E load simulator cart was used to strength test the crushed stone repairs. The load cart was equipped with an F-4 tire inflated to 265 psi pressure, loaded to [illegible] pounds, simulating 100 passes of a combat loaded F-4E aircraft before the first actual aircraft operations.

Actual aircraft operations came after exhaustive analysis and loadcart testing proved the crushed limestone technique would support simulated aircraft traffic. Extensive "HAVE BOUNCE" testing had built confidence in predicting aircraft responses to simulated craters. North Field was the first operational aircraft encounter with real craters repaired with RRR techniques.

The mood was tense as the F-4E positioned itself at the start of the first taxi run. Research was on the line as the aircraft thrust forward! First, aircraft pylons dipped slightly as the aircraft encountered repaired and unrepaired potholes. Next, the aircraft traversed the two repaired craters with almost negligible response. After the pilot reported encountering the bump created by the steel plates holding the FOD cover bomb damage repair, experts rushed to inspect the repairs. The repair suffered no noticeable effects! Aircraft test engineers quickly inspected aircraft response recordings and found actual responses matched predictions. After two more successful taxi runs, the F-4E prepared to takeoff over the taxi test-proven repairs. Takeoffs tested the FOD cover's resistance to the engine afterburner blast. Test planners, participants and visitors watched anxiously as the 53,000-pound aircraft encountered the first crater at 45 knots and the second at nearly 90 knots. Dust blown from the simulated craters obscured the aircraft from view as the engine noise increased. Finally, the aircraft lifted from the runway surface. At the same moment, test engineers and planners leaped with the joy of success. Both the aircraft and the repair were completely undamaged. Subsequently, more than 50 actual instrumented F-4E and C-130 aircraft operations over repaired craters were completed. In addition, load cart testing simulated more than 1,400 aircraft passes across the craters with only minor maintenance required. The large crater repair was instrumented to correlate the dynamic aircraft traffic loads to the static loads from the load cart.

Concepts for future capabilities in RRR were also demonstrated at North Field. While the damage assessment team manually surveyed the airfield, the small Cessna aircraft flew over the airfield collecting damage imagery with a camera sensor. Imagery was printed on hard copy fiberoptic recordings and analyzed to reveal damage to the runway and unexploded ordnance scattered around the airfield, comparing favorably with black and white and infrared photography taken by an F-4 reconnaissance aircraft.

Three stabilized soil test sections were installed at North Field by personnel from RED HORSE. These future concepts for an alternate launch and recovery surfaces were trafficked with the F-4 load cart. One test section sustained more than 400 passes of the F-4 load cart with negligible effects, thus demonstrating the feasibility of constructing contingency surfaces.

In conclusion, the objectives of the North Field test were achieved. The procedures validated during the test provide our teams in the field with interim techniques for a "now" post-attack launch and recovery capability. These procedures are presently being incorporated as an annex to AFR 93-2, "Base Recovery Planning," which is scheduled for distribution to the field in 1981.

The Lima Disaster Preparedness Report has 15 sections:

Volume I:	Methodology Employed
Volume II:	Port of Callao Infrastructure Security and Emergency Evacuation Needs
Volume III:	Electricity
Volume IV:	Water and Sewerage
Volume V:	Heavy Equipment Rehabilitation and Maintenance
Volume VI:	Airport and Aircraft Resources
Volume VII:	Education
Volume VIII:	Food
Volume IX:	Housing
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Volume XII:	Critical Abstracts from the Literature: A field perspective on major earthquakes: Peru, 5-31-70 Nicaragua, 12-23-72 Guatemala, 2-4-76
Volume XIII:	Review of Earthquake Prediction by Brian Brady
Volume XIV:	Other Issues
Volume XV:	Summary