

**APROXIMACION AL ESTUDIO DEL RIESGO
DEL BLEVE Y SUS EFECTOS EN LOS
GENERADORES MARINOS DE VAPOR Y LOS
TANQUES DE CARGA DE LOS BUQUES LNG-
LPG. APLICACION COMPARATIVA DE LAS
NORMAS QUE LO REGULAN Y PREVIENEN.**

Autor: German de Melo Rodriguez
Director: Emilio Eguia López

Barcelona, mayo de 1994

ANEXO 1

SRD/HSE MAJOR HAZARDS INCIDENT DATA SERVICE
(C) SRD,1985

MHIDAS is an information retrieval system in which the data has been selected by professional engineers from published material. The causes attributed to the incidents in the database do not necessarily represent the views of the Health and Safety Executive.

For further information on MHIDAS or other services offered by SRD please contact:

**MHIDAS Database Manager
AEA TECHNOLOGY , SRD
Wigshaw Lane
Culcheth
Cheshire WA3 4NE**

**Telephone: 0925 254305
Fax : 0925 254537
Telex : 629301**

RECORD : 131
 DATE : /12/82
 PLACE :
 CONTRIBUTOR :SRD
 Town/Village/Rural: PORTUGAL
 MATERIAL TYPE :RLGAS
 HAZARDS :FI
 MATERIAL NAME :LPG
 MATERIAL CODE:1075
 INCIDENT TYPE :FIRE
 ORIGIN :TRANSPORT SHIP
 GENERAL CAUSES :
 SPECIFIC CAUSES :
 QUANTITY : Tonnes
 DAMAGE \$: X 10E6
 NUMBER KILLED : INJURED:
 EVACUATED: X 10E3
 IGNITION SOURCE: AT TIME : SECS FROM SPILL
 KEYWORDS :COMPANY DESIGN
 ABSTRACT :2481m3 LPG CARKIER "BANDIM" FULLY LOADED WITH SEMI-PRESSURISED/SEMI-REFRI
 GERATED CARGO IN 4 SPHERICAL TANKS.DELIBERATELY SUNK AFTER FIRE.FIRE WHICH WAS THOUGHT TO H
 AVE STARTED IN ENGINE ROOM DID NOT AFFECT CARGO.COMPANY = SACOR MARITIME.

NUMBER OF REFERENCES: 1
 TEXTFILE (Yes or No):N

CODER :KWB

SRD

MIDAS

Major Hazard
Incident Data Service

RECORD : 4121
 DATE : 27/10/90
 PLACE : PAJARITOS
 MATERIAL TYPE : PLGAS
 MATERIAL NAME : LPG
 INCIDENT TYPE : EXPLODE
 GENERAL CAUSES :
 SPECIFIC CAUSES :
 QUANTITY : 15000 Tonnes
 NUMBER KILLED : 1
 INJURED : 4
 IGNITION SOURCE :
 KEYWORDS :
 ABSTRACT : A HUGE EXPLOSION RIPPED THROUGH AN LPG CARRIER AFTER IT LOADED WITH 15000
 te OF LPG & PREPARED FOR A LOAD OF AMMONIA.EXTENSIVE DAMAGE TO THE AFT PART OF THE SHIP.CAU
 SE UNKNOWN.
 CONTRIBUTOR : SRD
 Town/Village/Rural : MEXICO
 HAZARDS : FI
 MATERIAL CODE:1075
 ORIGIN : TRANSFER
 DAMAGE \$: X 10E6
 EVACUATED: 0 X 10E3
 AT TIME : SECS FROM SPILL

NUMBER OF REFERENCES: 3
 TEXTFILE (Yes or No):N

CODER : MZ

SRD

MIDAS

Major Hazard
Incident Data Service

RECORD : 2497B
 DATE : 01/10/79
 PLACE : SUDA BAY
 MATERIAL TYPE : PLGAS
 MATERIAL NAME : PROPANE
 INCIDENT TYPE : EXPLODE FIRE
 GENERAL CAUSES : EXTERNAL
 SPECIFIC CAUSES : EXTNLFIRE
 QUANTITY : Tonnes
 NUMBER KILLED : 6
 INJURED : 140
 IGNITION SOURCE :
 KEYWORDS : PROPERTY INJURIES MISSILES EXTENT TIMING
 ABSTRACT : FIRE IN ENGINE ROOM OF FREIGHTER SPREAD TO STORED CARGO WHICH INCLUDED DY
 NAMITE, LPG & PETROL..SERIES OF EXPLOSIONS THREW DEBRIS 800m DAMAGING SHOPS, HOUSES & ELECTRIC
 /TELEPHONE LINES.
 CONTRIBUTOR : SRD
 Town/Village/Rural: V
 CRETE GREECE
 HAZARDS : FI
 MATERIAL CODE: 1075
 ORIGIN : TRANSFER SHIP
 DAMAGE \$: X 10E6
 EVACUATED: X 10E3
 AT TIME : SECS FROM SPILL

NUMBER OF REFERENCES: 3
 TEXTFILE (Yes or No): N

CODER : AW

SRD

MIDAS

Major Hazard
Incident Data Service

RECORD : 2557 CONTRIBUTOR :SRD
 DATE : 31/03/75 Town/Village/Rural: JAPAN
 PLACE :SAKAI CITY OSAKA
 MATERIAL TYPE :PIGAS HAZARDS :FI
 MATERIAL NAME :LPG MATERIAL CODE:1075
 INCIDENT TYPE :RELEASE ORIGIN :TRANSFER PIPEWORK
 GENERAL CAUSES :IMPACT EXTERNAL
 SPECIFIC CAUSES:SHIP/LAND HIGHWINDS
 QUANTITY : Tonnes DAMAGE \$: X 10E6
 NUMBER KILLED : 0 INJURED: 0 EVACUATED: X 10E3
 IGNITION SOURCE:NONIGNITE AT TIME : SECS FROM SPILL
 KEYWORDS :COMPANY TIMING WEATHER
 ABSTRACT :STRONG WINDS CAUSED CARGO BOAT TO HIT PIER.COLLISION RESULTED IN 50m OF P
 IER COLLAPSING & DAMAGE TO AN LPG PIPE.DAMAGE PIPE RELEASED QUANTITY OF LPG INTO SEA.

NUMBER OF REFERENCES: 1 CODER :STP
 TEXTFILE (Yes or No):N

SRD

MIDAS

Major Hazard
Incident Data Service

RECORD : 3374
 DATE : 31/07/81
 PLACE : ROSARITO
 MATERIAL TYPE : PLGAS
 MATERIAL NAME : PROPANE
 INCIDENT TYPE : CONTREL
 GENERAL CAUSES : MECHANICAL
 SPECIFIC CAUSES :
 QUANTITY : Tonnes
 NUMBER KILLED : INJURED :
 IGNITION SOURCE : NONIGNITE
 KEYWORDS : COMPANY RESPONSE WEATHER
 ABSTRACT : THREE LEAKS FCUND IN BOTTOM OF A 10million gallon PROPANE TANK.WATER SPRA
 YED INTO THE AIR AND A STRONG BREEZE DISPERSED VAPOUR.PROPANE REMOVED TO ROADTANKERS AND TO
 SHIP STANDING OFFSHORE.

CONTRIBUTOR : SRD
 Town/Village/Rural : MEXICO
 HAZARDS : FI
 MATERIAL CODE : 1075
 ORIGIN : STORAGE PSVESSEL

DAMAGE \$: X 10E6
 EVACUATED : X 10E3
 AT TIME : SECS FROM SPILL

NUMBER OF REFERENCES : 1
 TEXTFILE (Yes or No) : N

CODER : APF

SRD

MIDAS

Major Hazard
Incident Data Service

RECORD : 1215 CONTRIBUTOR : SRD
 DATE : 15/06/86 Town/Village/Rural: MEXICO
 PLACE : COATZACOALCOS PAJARITOS LAGOON
 MATERIAL TYPE : PLGAS HAZARDS : FI
 MATERIAL NAME : LPG MATERIAL CODE:1075
 INCIDENT TYPE : RELEASE EXPLODE ORIGIN : TRANSFER SHIP
 GENERAL CAUSES :
 SPECIFIC CAUSES :
 QUANTITY : Tonnes DAMAGE \$: X 10E6
 NUMBER KILLED : 2 INJURED: 15 EVACUATED: 0 X 10E3
 IGNITION SOURCE: ELECTRIC MOTORGENER AT TIME : SECS FROM SPILL
 KEYWORDS : COMPANY KNOCK-ON PROGRESN
 ABSTRACT : LP GAS CLOUD ALLEGEDLY FROM SPILLAGE FROM BERTH WHERE MLPG TANK AHKATUN W
 AS LOADING. BUOY MOORING VESSEL EXPLODED APPARENTLY WHEN COVERED BY CLOUD, AND FIRE IMMEDIATE
 LY SPREAD TO AHKATUN AND OTHER BERTHS. DETAILED DAMAGE REPORTS INCLUDED.

NUMBER OF REFERENCES: 4
 TEXTFILE (Yes or No): N

CODER : KOD

SRD



Major Hazard
Incident Data Service

RECORD : 643
 DATE : 23/01/85
 PLACE : WILHELMSHAVEN
 MATERIAL TYPE : PLGAS
 MATERIAL NAME : BUTANE
 INCIDENT TYPE : CONTROL GASCLD
 GENERAL CAUSES : MECHANICAL
 SPECIFIC CAUSES : METALLURG
 QUANTITY : Tonnes
 NUMBER KILLED : 0 INJURED: 0
 IGNITION SOURCE : NONIGNITE
 KEYWORDS : STORCOND RESPONSE DETECT
 ABSTRACT : DURING FILLING OPERATION OF 3500m3 LPG TANK LIQUIFIED GAS WAS EMITTED AT
 TOP OF SUPPORT BRACE. VISIBLE CLOUD DRIFTED PAST SEVERAL OTHER STORAGE TANKS TOWARDS NEARBY
 RIVER. CLOSURE OF REFINERY AREA & SHIPPING MOVEMENTS PREVENTED IGNITION.

CONTRIBUTOR : SRD
 Town/Village/Rural : T WEST GERMANY
 HAZARDS : FI
 MATERIAL CODE : 1075
 ORIGIN : TRANSFER PSVESSEL
 DAMAGE \$: X 10E6
 EVACUATED : X 10E3
 AT TIME : SECS FROM SPILL

NUMBER OF REFERENCES: 1
 TEXTFILE (Yes or No): N

CODER : AW

SRD

MIDAS

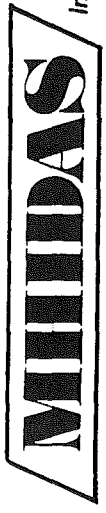
Major Hazard
Incident Data Service

RECORD : 2013 CONTRIBUTOR : SRD
 DATE : 04/09/79 Town/Village/Rural: USA
 PLACE : PIERRE PART LOUISIANA
 MATERIAL TYPE : PLGAS HAZARDS : FI
 MATERIAL NAME : NATURAL GAS LIQUIDS MATERIAL CODE:1075
 INCIDENT TYPE : RELEASE UNCONEXP ORIGIN :TRANSPORT PIPELINE
 GENERAL CAUSES : IMPACT
 SPECIFIC CAUSES:SHIP/LAND
 QUANTITY : Tonnes DAMAGE \$:>5.0 X 10E6
 NUMBER KILLED : 2 INJURED: 1 EVACUATED: X 10E3
 IGNITION SOURCE: AT TIME : SECS FROM SPILL
 KEYWORDS : COMPANY CODES EXTENT
 ABSTRACT : A TUG TOWING A BARGE BACKED INTO AND RUPTURED A 10 inch PIPE CARRYING NAT
 URAL GAS LIQUIDS. THE RESULTING EXPLOSION AND FIRE KILLED TWO PEOPLE, INJURED ONE AND EXTENS
 IVELY DAMAGED THE TUG, BARGE AND PIPELINE. THE PIPELINE WAS TOO CLOSE TO THE SURFACE.

NUMBER OF REFERENCES: 1
 TEXTFILE (Yes or No): N

CODER : MAC

SRD



Major Hazard
Incident Data Service



RECORD : 3518
 DATE : 06/09/88
 PLACE : MARACAIBO
 MATERIAL TYPE : PLGAS
 MATERIAL NAME : LPG
 INCIDENT TYPE : CONTREL
 GENERAL CAUSES : IMPACT
 SPECIFIC CAUSES:HVYOBJECT
 QUANTITY : Tonnes
 NUMBER KILLED : INJURED:
 IGNITION SOURCE:NON-IGNITE
 KEYWORDS :
 ABSTRACT :TANKER WITH 35000te OIL ABOARD TRIED TO OVERTAKE & WAS IN CONTACT WITH OT
 HER SHIP INCURRING MINOR DAMAGE.TANKER THEN DROPPED ANCHOR RUPTURING LPG PIPELINE.

CONTRIBUTOR :SRD
 Town/Village/Rural:

VENEZUELA

HAZARDS :FI

MATERIAL CODE:1075

ORIGIN :TRANSPORT PIPELINE

DAMAGE \$: X 10E6

EVACUATED: X 10E3

AT TIME : SECS FROM SPILL

NUMBER OF REFERENCES: 1
 TEXTFILE (Yes or No):N

CODER :ANL

SRD

MIDAS

Major Hazard
Incident Data Service

RECORD : 4120 CONTRIBUTOR : SRD
 DATE : 20/10/90 Town/Village/Rural: SOLOMON ISLANDS
 PLACE : BARUKA ISLAND
 MATERIAL TYPE : PLGAS HAZARDS : FI
 MATERIAL NAME : LPG MATERIAL CODE: 1075
 INCIDENT TYPE : EXPLODE FIRE ORIGIN : TRANSPORT SHIP
 GENERAL CAUSES :
 SPECIFIC CAUSES :
 QUANTITY : Tonnes DAMAGE \$: X 10E6
 NUMBER KILLED : INJURED: X 10E3
 IGNITION SOURCE: AT TIME : SECS FROM SPILL
 KEYWORDS :

ABSTRACT : A GAS CYLINDER EXPLODED ON BOARD A CARGO SHIP. ENSUING FIRE SPREAD TO DRUM
 MED FUEL CARGO. 23 CREW ABANDONED SHIP. VESSEL LATER BURNED OUT AND SANK. A 3 mile OIL SLICK W
 AS PRODUCED.

NUMBER OF REFERENCES: 3
 TEXTFILE (Yes or No): N

CODER : MZ

SRD

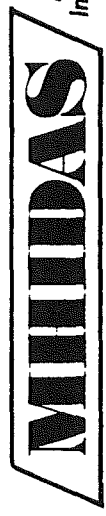
MIDAS

Major Hazard
Incident Data Service

RECORD : 893 CONTRIBUTOR :SRD
 DATE : 30/08/79 Town/Village/Rural:T
 PLACE :GOOD HOPE LOUISIANA USA
 MATERIAL TYPE :PLGAS HAZARDS :FI
 MATERIAL NAME :BUTANE MATERIAL CODE:1075
 INCIDENT TYPE :INSTREL FIREBALL ORIGIN :TRANSPORT BARGE
 GENERAL CAUSES :IMPACT INSTRUMENT HUMAN
 SPECIFIC CAUSES:SHIP/SHIP CONTROL PROCEDURES
 QUANTITY : Tonnes DAMAGE \$: 10.5 X 10E6
 NUMBER KILLED : 12 INJURED: 0.3 X 10E3
 IGNITION SOURCE: AT TIME : SECS FROM SPILL
 KEYWORDS :MAP PROGRESN ENQUIRY ADVICE COMBUST
 ABSTRACT :NTSB INVESTIGATION.COLLISION OF CARGO VESSEL WITH LOADING BUTANE BARGE ON
 MISSISSIPPI RIVER.FIREBALL HUNDREDS OF FEET HIGH FOR 1 MINUTE.12 HOURS TO EXTINGUISH SECON
 DARY FIRES.

NUMBER OF REFERENCES: 2 CODER :RJP
 TEXTFILE (Yes or No):Y

SRD



Major Hazard
Incident Data Service



RECORD : 148
 DATE : 26/04/83
 PLACE :
 CONTRIBUTOR : SRD
 Town/Village/Rural:
 MATERIAL TYPE : PLGAS
 MATERIAL NAME : LPG
 INCIDENT TYPE :
 HAZARDS : JAPAN
 : FI
 GENERAL CAUSES : IMPACT
 MATERIAL CODE:1075
 ORIGIN :TRANSPORT SHIP
 SPECIFIC CAUSES:SHIP/SHIP
 QUANTITY : Tonnes
 NUMBER KILLED : INJURED:
 : X 10E6
 IGNITION SOURCE: : X 10E3
 KEYWORDS : COMPANY EXTENT
 : SECS FROM SPILL
 ABSTRACT :GAS CARRIER COLLISION,NO CARGO RELEASED.565 M3"IZUMI MARU NO.15"HIT MV"TE
 NJIN MARU NO.11"

NUMBER OF REFERENCES: 1
 TEXTFILE (Yes or No):N
 CODER : KWB

SRD

MIDAS

Major Hazard
Incident Data Service

RECORD : 1141 CONTRIBUTOR : SRD
DATE : 12/10/85 Town/Village/Rural:R
PLACE : 145 MILES NW DUBAI STRAIT OF HORMUZ ARABIAN GULF
MATERIAL TYPE : RLGAS HAZARDS : FI
MATERIAL NAME : LPG MATERIAL CODE:1075
INCIDENT TYPE : FIRE ORIGIN : TRANSPORT SHIP
GENERAL CAUSES : HUMAN EXTERNAL
SPECIFIC CAUSES : EXTNLEXP SABOTAGE CONEXP
QUANTITY : Tonnes
NUMBER KILLED : 0 INJURED: 0 DAMAGE \$: X 10E6
IGNITION SOURCE: EVACUATED: X 10E3
KEYWORDS : AFTER DESIGN DURATION EXTENT PROGRESN SECS FROM SPILL
ABSTRACT : 40,200m3 LPG CARRIER "GAZ FOUNTAIN" ATTACKED & HIT BY 2 ROCKETS.ONE EXPLO
DED IN VOID SPACE ABOVE CARGO TANK, RUPTURING IT.GAS BURNT FOR 3 DAYS.OTHER TANKS NOT AFFECT
ED & REMAINDER OF CARGO EVENTUALLY TRANSFERRED.ALL 33 CREW SAVED.

NUMBER OF REFERENCES: 1
TEXTFILE (Yes or No): N

CODER : KOD

SRD



Major Hazard
Incident Data Service



RECORD : 1381
 DATE : 05/03/82
 PLACE : MELBOURNE
 MATERIAL TYPE : PLGAS
 MATERIAL NAME : PROPANE
 INCIDENT TYPE : RELEASE
 GENERAL CAUSES : HUMAN
 CONTRIBUTOR : SRD
 Town/Village/Rural: AUSTRALIA
 NEW SOUTH WALES
 HAZARDS : FI
 MATERIAL CODE:1075
 ORIGIN :TRANSPORT SHIP
 DENS GSCL
 SPECIFIC CAUSES:GENERALOP
 QUANTITY : 6 Tonnes
 NUMBER KILLED : 0
 INJURED:
 IGNITION SOURCE:NONIGNITE
 KEYWORDS : INJURIES LEGALITY PUBLIC
 ABSTRACT :SHIP DISCHARGED SEVERAL CLOUDS OF PROPANE CONTAMINATED WITH BUTADIENE DUR
 ING PURGING OPERATIONS INSIDE BAY.YELLOW CLOUD OF GAS SPREAD ACROSS AREA CAUSING EVACUATION
 S/MINOR INJURIES.SHIP'S MASTER PROSECUTED UNDER MARINE ACT FOR GAS EMISSION.
 DAMAGE \$: X 10E6
 EVACUATED: 0.2 X 10E3
 AT TIME : SECS FROM SPILL

NUMBER OF REFERENCES: 4
 TEXTFILE (Yes or No):N

CODER :KOD

SRD



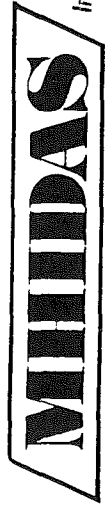
Major Hazard
Incident Data Service

RECORD : 306 CONTRIBUTOR : SRD
 DATE : 21/01/80 Town/Village/Rural:R
 PLACE : LARNE NORTHERN IRELAND UK
 MATERIAL TYPE : PLGAS HAZARDS : FI
 MATERIAL NAME : BUTANE MATERIAL CODE:1075
 INCIDENT TYPE : ORIGIN :TRANSPORT SHIP
 GENERAL CAUSES :EXTERNAL IMPACT
 SPECIFIC CAUSES:HIGHWINDS SHIP/LAND
 QUANTITY : Tonnes
 NUMBER KILLED : INJURED:
 IGNITION SOURCE: :
 KEYWORDS :
 DAMAGE \$:>0:001 X 10E6
 EVACUATED:>0.001 X 10E3
 AT TIME : SECS FROM SPILL

ABSTRACT :SMALL DANISH LPG SHIP "REGITZE THOLSTRUP" CARRYING 240te OF BUTANE FROM M
 ILFORD HAVEN TO LARNE DRIVEN ONTO ROCKS OUTSIDE LARNE HABOUR.NO DAMAGE TO CARGO TANKS,BUTAN
 E TRANSFERRED TO ROAD TANKERS AT 10te/hr.FEW NEARBY COTTAGES EVACUATED.

NUMBER OF REFERENCES: 1 CODER :JJC
 TEXTFILE (Yes or No):N

SRD



Major Hazard
Incident Data Service

RECORD : 1155
DATE : 28/12/79
PLACE :
MATERIAL TYPE : PLGAS
MATERIAL NAME : BUTANE
INCIDENT TYPE :
GENERAL CAUSES : EXTERNAL
SPECIFIC CAUSES : EXTNLFIRE
QUANTITY : 740 Tonnes
NUMBER KILLED :
IGNITION SOURCE : NONIGNITE
KEYWORDS : RESPONSE TIMING DURATION
ABSTRACT : FIRE BROKE OUT IN THE LIVING QUARTERS ON THE SPANISH LPG CARRIER "BUTASEIS
BY RAF TO CONTROL IT. THE CARGO WAS DAMAGED.

CONTRIBUTOR : SRD
Town/Village/Rural :
DEVON UK

HAZARDS : FI
MATERIAL CODE : 1075
ORIGIN : TRANSPORT SHIP

DAMAGE \$: X 10E6
EVACUATED : X 10E3
AT TIME : SECS FROM SPILL

NUMBER OF REFERENCES : 1
TEXTFILE (Yes or No) : N

CODER : BLP

SRD

MIDAS

Major Hazard
Incident Data Service