

**National Defense Industrial Association
International Explosives Safety Symposium & Exposition
San Diego, California
August 6-9, 2018**



DDESB Software & Tools – Planning for the Future

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Policy Development Division

Department of Defense Explosives Safety Board

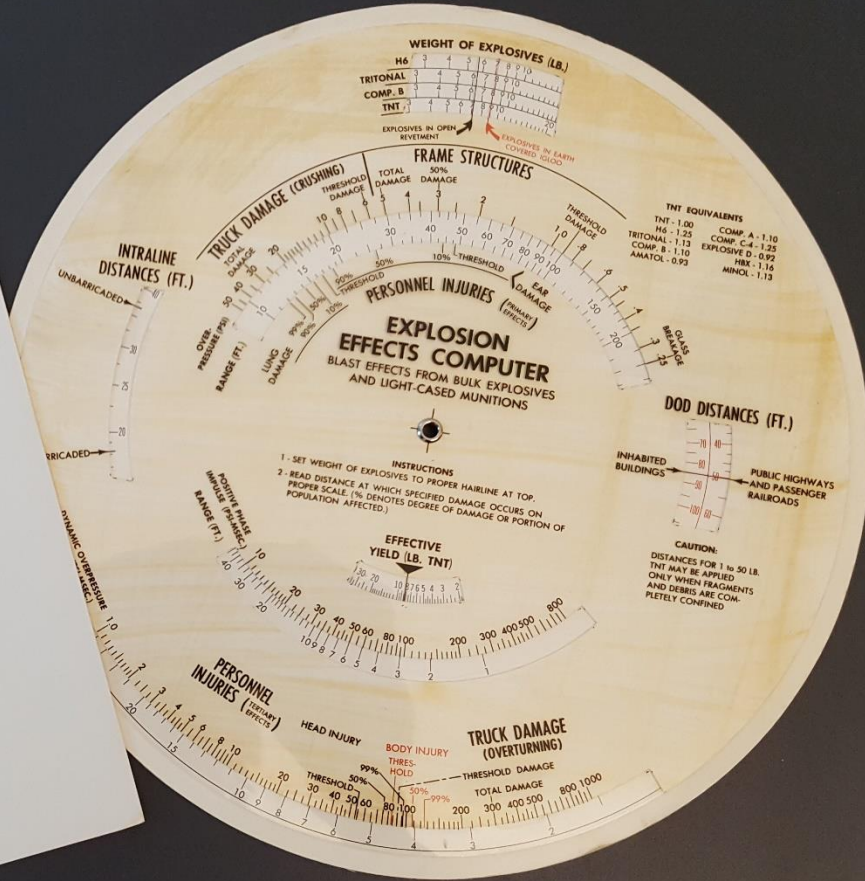


The First DDESB “Computer”

BLAST EFFECTS COMPUTER

Instruction Manual

DEPARTMENT OF DEFENSE
EXPLOSIVES SAFETY BOARD





The Future of DDESB Software

- DDESB manages a “portfolio” of explosives safety-related software and tools
- As with other niche technical areas, our tools evolved from “home grown solutions” well before the days of “Information Technology (IT) Management”
- We have been working since 2008 to improve and modernize our various software and tools
 - Consolidating software to reduce our IT certification burden
 - Revising programming for efficiency and clarity
 - Developing comprehensive documentation
 - Performing testing and validation



DDESB Software Portfolio

- Purpose of this paper and presentation is to share where we are with this effort, and what is planned for the next several years, to include development of a strategic plan for management of our portfolio
- Portfolio can be divided into two groups
 - Site Planning Support Software
 - Specialized Technical Tools



Site Planning Support Software *Explosives Safety Siting – Current*



- Quantity-Distance (QD) site planning tool based on DoDM 6055.09
- DDESB standalone desktop software
- GIS interface for mapping
- Displays QD results on a map and form

About ESS Site Planner

Explosives Safety Siting Application

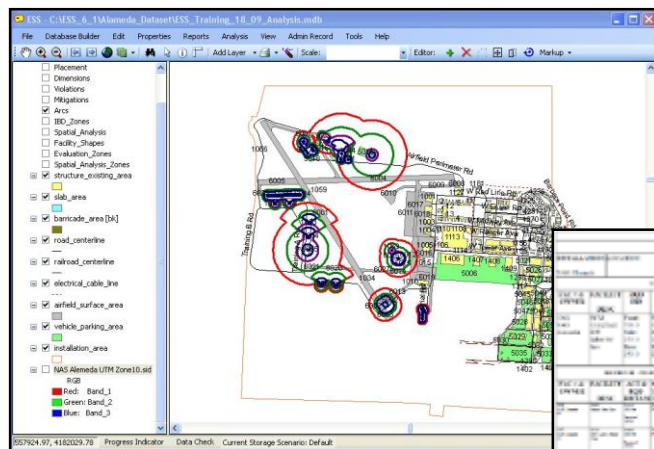


Automated
Site Planner

Version 6.1.3.19.3

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Designed by: NAVFAC EXWC
Sponsored by: Department of Defense Explosives Safety Board (DDESB)



SITE SAFETY DISTANCES									
ITEM	CLASS	TYPE	CLASS	TYPE	CLASS	TYPE	CLASS	TYPE	CLASS
101	1	1	1	1	1	1	1	1	1
102	1	1	1	1	1	1	1	1	1




Site Planning Support Software ASAP-X – Current



- Low-fidelity explosion effects consequence assessment tool based on DoDM 6055.09, V1.E8
- DDESB Excel spreadsheet
- Capability to ingest GPS coordinates
- Displays results in a table format with a plot of consequence zones

DDESB
AUTOMATED SAFETY ASSESMENT
PROTOCOL - EXPLOSIVES
VERSION 3.0e - Excel 2007

Based on
DDESB Technical Paper 23
And DoD Mammal 6055.09-M



Sponsored by:
DDESB, Program Evaluation Division

REQUIRED EXCEL SETTINGS

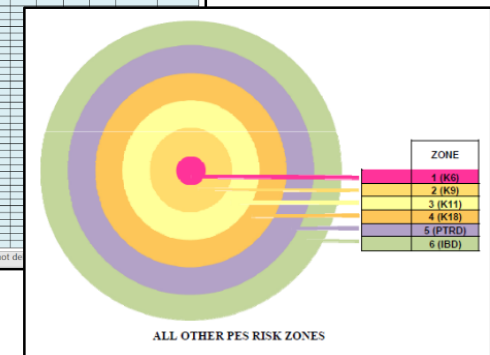
(1) Under "Print" menu, select "Active Sheets".

(2) This Spreadsheet will only work on Microsoft Office 2007 or later versions.

Approved for public release. Distribution is unlimited.

27 February 2018

The screenshot shows an Excel spreadsheet with two main tables. The first table, titled 'EARTH COVERED MAGAZINE ZONE OUTPUT FOR Building 1', has columns for FRONT DISTANCE, REAR DISTANCE, ZONE, FATAL, BLINDING DAMAGE LOSS, INJURED, FATAL, BLIND, and BLIND. It lists various distances (e.g., 200, 300, 400, 500, 600, 700, 800, 900, 1000) and corresponding zone and damage data. The second table, 'ES OUTPUT DATA', has columns for ES Name, Storage Qty, Zone, Protection, Spikes, Height, and Building Storage Loss. It lists 'Building 1' with a storage quantity of 200,000 and a storage loss of 91,000.





Site Planning Support Software

C&RI – Current



- Low-fidelity explosion effects consequence assessment tool based on ASAP-X
- DDESB Excel spreadsheet
- Partially automated input based on GPS data
- Displays results in a table format and figure showing consequence zones



Exposure Site	Exposed Area (SQ. FT.)	Personnel or Exposed Units	Fatality ¹	Building Damage Cost	Building Damage Loss
On-Base	100	100	0	\$100,000	\$100,000
Off-Base	100	100	0	\$100,000	\$100,000
TOTAL	200	200	0	\$200,000	\$200,000
GRAND TOTAL - ALL ZONES	1776	1776	0	\$1,776,000	\$1,776,000

Site	Exposure Location	Exposures		Potential Consequences	
		Personnel Within IBD	Infrastructure Cost	Fatalties ¹	Infrastructure Damage Loss ²
	On-Base				
	Off-Base				
	TOTAL				

¹ The potential fatalities and building damage loss were determined using the C&RI Assessment Tool that analyzes an exposed site's estimated population and property (i.e., assets, facilities, and infrastructure within the EXOD (IBD arc) based on the functional use, size, and cost per square foot. This tool provides the estimated number of fatalities and property replacement value based on potential damages resulting from the exposed site's physical distance to the PES.

² Construction Cost reference:



Site Planning Support Software

FAST-Site – Current



- High-fidelity explosion effects consequence assessment tool based on SAFER/DDESB TP-14
- DDESB Excel spreadsheet
- No mapping capability
- Displays results in a table format with a plot of consequence zones

DDESB
Field Assessment Spreadsheet Tool for Operational Munitions Risk Management in Explosives Safety Site Planning
FAST-Site
VERSION 1.0

Based on:
 DDESB Technical Paper 14,
 DDESB Technical Paper 23,
 And DoD Manual 6055.09-M

Sponsored by:
Department of Defense Explosives Safety Board (DDESB)

REQUIRED LEVEL SETTINGS

This spreadsheet has only been tested on Microsoft Office 2007 and later.

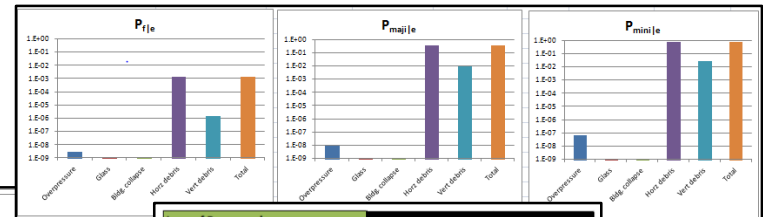
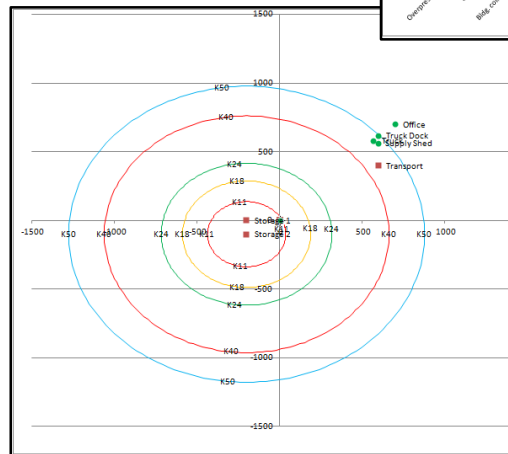
CONTACT INFORMATION

esrmy.post@gsa.hqts.dod-ccb.mbr.web-team@mail.mil

REVISIONS

Version	Date	Changes
1.0	8/5/2014	

DISTRIBUTION STATEMENT C: DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTORS; ADMINISTRATIVE/OPERATIONAL USE ONLY. OTHER REQUESTS SHALL BE REFERRED TO THE DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD.



Loss of Personnel		
consequence	number	percentage
Killed	6.3	11.0%
Major injury	2.8	4.9%
Minor injury	5.3	9.4%
Unharmed	42.6	74.8%

Loss of Assets
 This sums up the total damage to structures, giving a dollar estimate for the scenario. In this example the tool predicts \$35.00 worth of damage if the "Transport" PES detonated.

Loss of Assets		
consequence	number	percentage
Collapsed	0	0%
Damaged	0	0%
Superficial damage	1	25%
Not damaged	3	75%
Total damage cost	\$ 35	<.01%

Detailed Output
 This breaks down the consequence for every ES from the "Transport" PES and will be as follows:

ES Name	ES ID	ES Type	ES Status	ES Location	ES Size	ES Weight	ES Volume	ES Density	ES Value	ES Risk	ES Impact	ES Damage	ES Cost
Truck Dock	1001	Structure	Active	1000, 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Supply Shed	1002	Structure	Active	1000, 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Office	1003	Structure	Active	1000, 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Transport	1004	Vehicle	Active	1000, 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

PES-ES Combination Consequence
 Select "Truck Dock" from the blue dropdown menu.

ES Name	ES ID	ES Type	ES Status	ES Location	ES Size	ES Weight	ES Volume	ES Density	ES Value	ES Risk	ES Impact	ES Damage	ES Cost
Truck Dock	1001	Structure	Active	1000, 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Supply Shed	1002	Structure	Active	1000, 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Office	1003	Structure	Active	1000, 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Transport	1004	Vehicle	Active	1000, 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000




Site Planning Support Software SAFER – Current



- High-fidelity quantitative risk assessment tool based on DDESB TP-14
- DDESB standalone desktop software
- No mapping capability
- Displays results in a table format
- DDESB-approved tool for risk-based siting

About SAFER for Siting



SAFER
Safety Assessment for Explosives Risk

© 2008 APT Research, Inc.
Version 3.1
September 2008

Sponsored by:
DoD Explosives Safety Board
U.S. Army
U.S. Air Force
U.S. Marine Corps
U.S. Navy
U.S. Coast Guard

Developed by:
APT Research, Inc.
4950 Research Drive
Huntsville, Alabama 35805

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Disclaimer: The principles and techniques given in this software are in the opinion of the DDESB, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosives operations. It does not ensure or guarantee a risk-free situation, neither can the principles apply to every possible situation which may be encountered. Because of the inherent danger associated with explosives, the DDESB, four Services, or APT Research, Inc. cannot be held responsible for any mishap or accident resulting from decisions supported by this software. The use of the risk analysis software, SAFER (Safety Assessment for Explosives Risk) Version 3.1, is approved for use by the Department of Defense (DoD) Services. The SAFER model is based on accident experiences, munitions response, and structural response, and is for DoD application only.

Close

SAFER for Siting - User's Manual 3.1 Data 17.xls

User Settings for PIS 8950

BD entered by user: 1250 ft
SAFER calculated distance: individual risk = 6490 ft; 6780 ft
Risk-based evaluation distance from PIS: 1700 ft

System Information

Building Type:	Hardened aircraft shelter (HAS)
Soil Type:	Concrete
Activity Type:	Construction
Operating Hours:	1500

Environmental Factors - selected:

No env environmental factors will be applied.

Explosives Information

Hazard Reference:	M42
Weapon Type:	Round or stick-stemmed bomb
Weight (MWD):	10000
Equivalent MWD (G):	2000
Compatibility Group:	D

Exposed Personnel - Worker

No PIS exposed personnel information was entered

Output Results for PIS 8950

Hazard Division: 1.1

Individual Risk Results		Expected NEWSD	
Subst NEWSD		Subst NEWSD	
Maximum PIS Worker:	0.0e+000	Maximum PIS Worker:	0.0e+000
Maximum PIS (E) Worker:	0.0e+000	Maximum PIS (E) Worker:	0.0e+000
Maximum PIS (M) Worker:	0.0e+000	Maximum PIS (M) Worker:	0.0e+000
Maximum PIS (I) Worker:	0.0e+000	Maximum PIS (I) Worker:	0.0e+000
Maximum PIS (U) Worker:	0.0e+000	Maximum PIS (U) Worker:	0.0e+000
Maximum PIS Unrestricted Public:	0.2e-005 (ES 883)	Maximum PIS Unrestricted Public:	0.7e-005 (ES 883)
Maximum PIS (E) Unrestricted Public:	0.0e+000 (ES 886)	Maximum PIS (E) Unrestricted Public:	0.0e+000 (ES 886)
Maximum PIS (M) Unrestricted Public:	0.0e+000 (ES 886)	Maximum PIS (M) Unrestricted Public:	0.0e+000 (ES 886)

Group Risk Results

Subst NEWSD		Expected NEWSD	
Subst NEWSD		Subst NEWSD	
Subst NEWSD:	0.0e+000	Subst NEWSD:	0.0e+000

SAFER for Siting Version 3.1

Date: Friday September 05, 2008 10:00 AM

User: Has not been set

Filename: User's Manual 3.1 Beta 17.xls

PES/ES Pair Report for 555506 Pair

Individual Risk Results for Hazard Division 1.1		Expected NEWSD	
Subst NEWSD		Subst NEWSD	
Maximum PIS Worker:	0.0e+000	Maximum PIS Worker:	0.0e+000
Maximum PIS (E) Worker:	0.0e+000	Maximum PIS (E) Worker:	0.0e+000
Maximum PIS (M) Worker:	NA	Maximum PIS (M) Worker:	NA
Maximum PIS (I) Worker:	NA	Maximum PIS (I) Worker:	NA
Maximum PIS (U) Worker:	NA	Maximum PIS (U) Worker:	NA
Maximum PIS Public:	2.0e-005	Maximum PIS Public:	1.4e-005
Maximum PIS (E) Public:	0.0e+000	Maximum PIS (E) Public:	0.0e+000
Maximum PIS (M) Public:	4.1e-007	Maximum PIS (M) Public:	5.0e-007
Maximum PIS (I) Public:	0.0e+000	Maximum PIS (I) Public:	0.0e+000

Group Risk Results for Hazard Division 1.1		Expected NEWSD	
Subst NEWSD		Subst NEWSD	
Subst NEWSD:	0.0e+000	Subst NEWSD:	0.0e+000
(E) Risked:	NA	(E) Risked:	NA
(M) Risked:	NA	(M) Risked:	NA
(I) Risked:	NA	(I) Risked:	NA
(U) Risked:	NA	(U) Risked:	NA
(E) Public:	0.0e+000	(E) Public:	0.0e+000
(M) Public:	0.0e+000	(M) Public:	0.0e+000
(I) Public:	0.0e+000	(I) Public:	0.0e+000
(U) Public:	1.7e-005	(U) Public:	1.4e-005
(E) (M) Public:	0.0e+000	(E) (M) Public:	0.0e+000

Maximum Consequence Results for Hazard Division 1.1		Expected NEWSD	
Workers		Workers	
Workers:	0.0	Workers:	0.0
Number of Fatalities:	0.0	Number of Fatalities:	0.0
Number of Major Injuries:	NA	Number of Major Injuries:	NA
Number of Minor Injuries:	NA	Number of Minor Injuries:	NA

Page 1 of 4

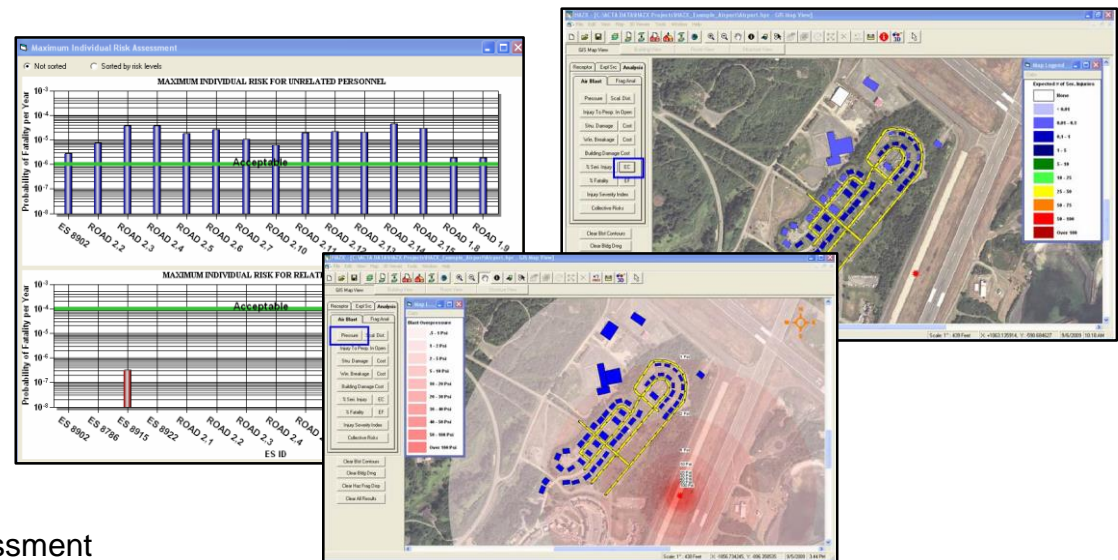
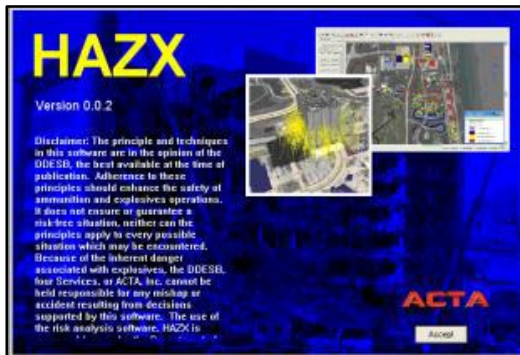


Site Planning Support Software

HAZ-X – Current



- High-fidelity explosion effects consequence assessment tool based on DDESB TP-14
- Qualitative risk assessment tool based on Army guidance
- Army standalone desktop software
- GIS interface for mapping
- Displays results in a table and map format



“HAZX – Part 1 & 2, An Explosives Hazard Assessment Tool,” Chrostowski, John, et al., 2010 DDESB Seminar



Site Planning Support Software *Today*

ESS

HAZ-X

SAFER

ASAP-X

G&RI

FAST-SITE

6 Software Tools with Overlapping Capabilities



Site Planning Support Software

Tomorrow – ESS V6.1.4

ESS

- QD Site Planning Tool

- QD Siting Planning Tool

- RBESS Tier 1 - Low Fidelity Consequence Assessment Tool

ASAP-X

- Low fidelity consequence assessment tool



RBESS Tier 1



Site Planning Support Software

Tomorrow – ESS V6.1.4

ESS

- QD Siting Planning Tool
- RBESS Tier 1 - Low Fidelity Consequence Assessment Tool
- RBESS Tier 2a - High Fidelity Consequence Assessment Tool & Qualitative Risk Assessment Tool

HAZ-X

- High fidelity consequence assessment tool



RBESS Tier 2a





Site Planning Support Software

Tomorrow – ESS V6.1.4

ESS

- QD Siting Planning Tool
- RBESS Tier 1 - Low Fidelity Consequence Assessment Tool
- RBESS Tier 2a - High Fidelity Consequence Assessment Tool & Qualitative Risk Assessment Tool

FAST-SITE

- High fidelity consequence assessment tool

**Functionality
replaced by
RBESS Tier 2a**





Site Planning Support Software

Tomorrow – ESS V6.1.4

ESS

- QD Siting Planning Tool
- RBESS Tier 1 - Low Fidelity Consequence Assessment Tool
- RBESS Tier 2a - High Fidelity Consequence Assessment Tool & Qualitative Risk Assessment Tool
- MRAS Tool

C&RI Tool

- Low fidelity consequence assessment tool

**Incorporated
into ESS as
MRAS Tool**





Site Planning Support Software

Future – Web ESS V2.0

ESS

- QD Siting Planning Tool
- RBESS Tier 1 - Low Fidelity Consequence Assessment Tool
- RBESS Tier 2a - High Fidelity Consequence Assessment Tool & Qualitative Risk Assessment Tool
- MRAS Tool
- Web-based capability

**Transition ESS to
web-based
capability**





Site Planning Support Software

Future – Web ESS V2.0

ESS

- QD Siting Planning Tool
- RBESS Tier 1 - Low Fidelity Consequence Assessment Tool
- RBESS Tier 2a - High Fidelity Consequence Assessment Tool & Qualitative Risk Assessment Tool
- MRAS Tool
- Web-based capability
- RBESS Tier 2b - High Fidelity Quantitative Risk Assessment Tool

SAFER

- High fidelity quantitative risk assessment tool
- DDESB-approved tool for risk-based siting

RBESS Tier 2b





Site Planning Support Software

Future – Web ESS V2.0

ESS

- QD Siting Planning Tool
- RBESS Tier 1 - Low Fidelity Consequence Assessment Tool
- RBESS Tier 2a - High Fidelity Consequence Assessment Tool & Qualitative Risk Assessment Tool
- MRAS Tool
- Web-based capability
- RBESS Tier 2b - High Fidelity Quantitative Risk Assessment Tool





Site Planning Support Software *Future – ESS V6.1.5 and Web ESS*

- ESS V6.1.5: Merged QD Engine
- Web ESS
 - Web-based software hosted on DISDI Portal
 - Centralized location for hosting a suite of other explosives safety-related software and tools

ESS Web

Search:

Facility Number: 1036
Facility Name: OPR LOC
Facility Description:
Typecode: AGM
Last Modified: 6 / 14 / 18

ID	Name	Installation
1019	New Dataset	Alameda
1020	With 2 services	Alameda
1023	New Dataset	Alameda
1024	Renamed Dataset	Alameda
1027	New Dataset	Indian Head
1028	China Lake Dataset	NAVYCL
1029	Copy of Renamed Dataset	Alameda
1030	New Dataset	Indian Head
1033	Don't use	Alameda
1035	Spiral 3 - Alameda	Alameda
1037	Test 12	Alameda
1039	Copy of Test 12	Alameda
1043		Alameda
1044		Alameda
1046	New Dataset	NAVYCL
1047	New Dataset	Indian Head

Welcome Back!
Pick an installation above to work on, or navigate the map to locate one.

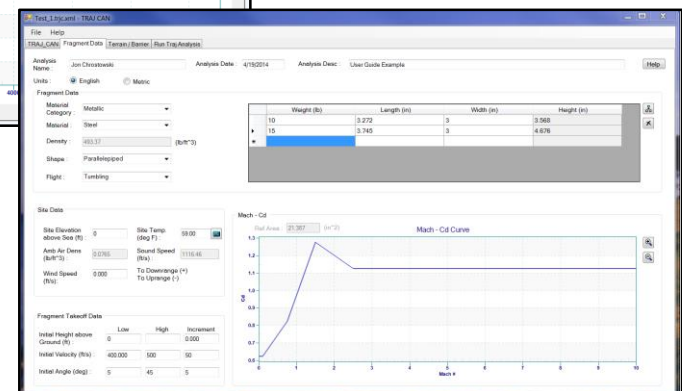
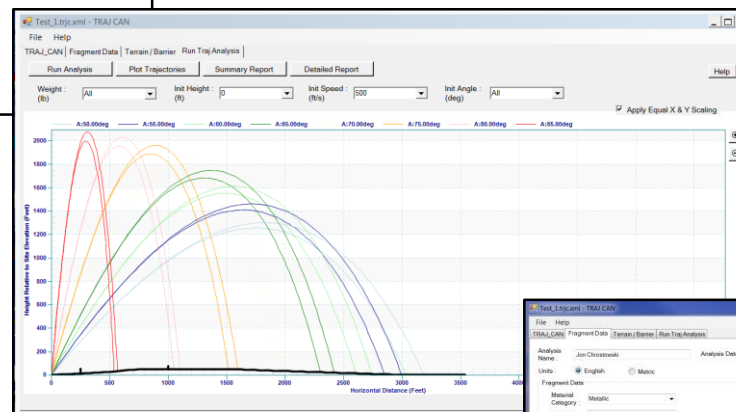
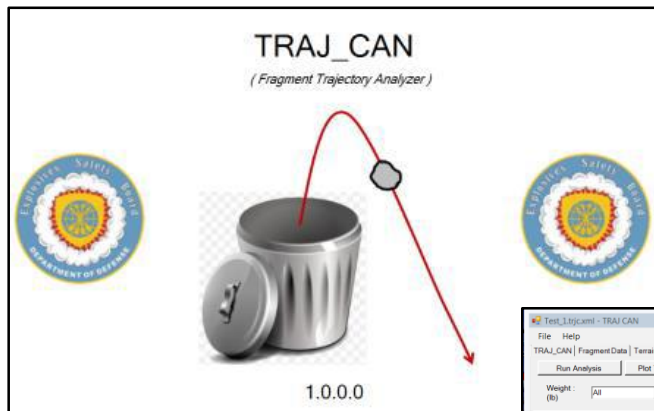
Map labels: CNRNW, CNRSW, CNRMA, CNRH, CNREURAFSWA



Specialized Technical Tools

TRAJ_CAN

- DDESB-sponsored update of legacy TRAJ software



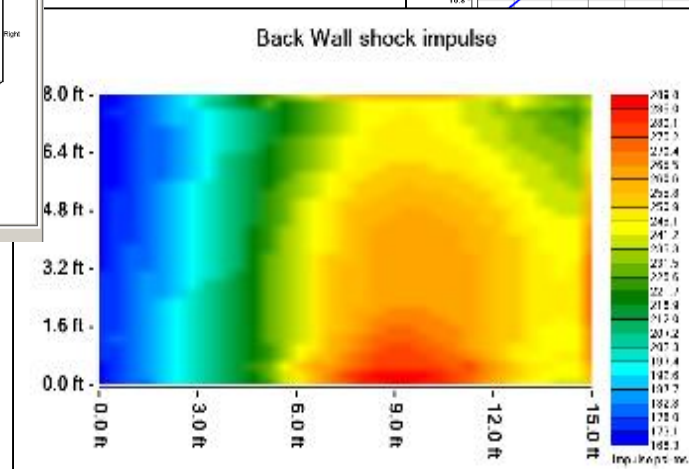
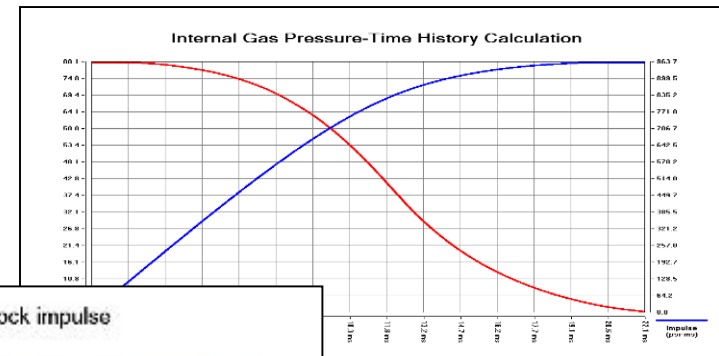
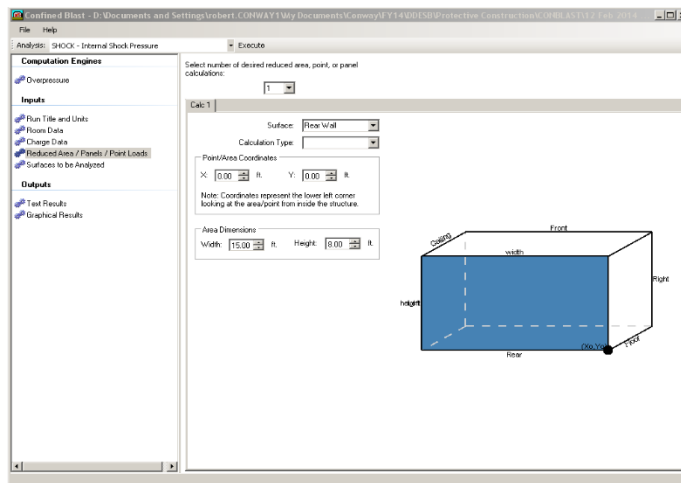
“TRAJ_CAN White Paper,” Chrostowski, John, et al.,
September 2014



Specialized Technical Tools

CONBLAST

- Update of three legacy DDESB software programs
 - SHOCK and FRANG: UFC 3-340-02, *Structures to Resist the Effects of Accidental Explosions*
 - MUDEMIMP: DDESB TP-13, *Prediction of Building Debris for Quantity-Distance Siting*



“DoD Research in Support of Future UFC 3-340-02 Updates,” Conway, Bob, et al.



Specialized Technical Tools

DDESB TP-16

- DDESB TP-16, *Methods for Calculating Primary Fragment Characteristics*
 - Generic Equation Calculator (GEQ)
 - Buried Explosion Module (BEM)
 - Barricade Angle Calculator (BAC)
 - Modified Pseudo Trajectory Normal Calculator (MPTNC)
 - Jacobs-Roslund Calculator (JRC)
 - Stacked Munition Article Calculator (SMAC)

PRIMARY FRAGMENT RANGE GENERIC EQUATIONS CALCULATOR
VERSION 3.1

INPUTS

Maximize/Restore/Close | CHECK KNOWN INFORMATION | ENTER KNOWN INFORMATION

SELECT BRBTS: [OTHER] | NEW [H] | [OK] | [CANCEL]

ENGLISH UNITS

	Actual	ERC	Max Actual
Maximum Fragment Distance - Horizontal [MFD-H]	1111	1111	1111
Bound No. NEW Entered [Eq. 4-1, 4-2, and 4-3]	Out of limits! Out of limits! Out of limits!		
Bound No. BARRIER Entered [Eq. 4-2, 4-3, and 4-31]	2,949.9	2,949.4	6,156.4
Maximum Calculated Distance	6,156.4	6,156.4	6,156.4
Maximum Fragment Distance [MFD]	Out of limits! Out of limits! Out of limits!		
Bound No. NEW Entered [Eq. 4-15, 4-16, and 4-17]	Out of limits! Out of limits! Out of limits!		
Bound No. BARRIER Entered [Eq. 4-15, 4-16, and 4-23]	446.7	272.2	382.9
Maximum Calculated Distance	446.7	272.2	382.9
Maximum Fragment Distance - Vertical [MFD-V]	Out of limits! Out of limits! Out of limits!		
Bound no. Maximum Calculated MFD-H [Eq. 4-25]	6,156.4	6,156.4	6,156.4
Maximum Calculated Distance	6,156.4	6,156.4	6,156.4

SLIMITS

NEW [H] [8.88] | BARRIER [H] [127.81]

	Actual	ERC	Max Actual
Maximum Fragment Distance - Horizontal [MFD-H]	1111	1111	1111
Bound No. NEW Entered [Eq. 4-1, 4-2, and 4-3]	Out of limits! Out of limits! Out of limits!		
Bound No. BARRIER Entered [Eq. 4-2, 4-3, and 4-31]	748.8	748.8	478.8
Maximum Calculated Distance	748.8	748.8	478.8
Maximum Fragment Distance [MFD]	Out of limits! Out of limits! Out of limits!		
Bound No. NEW Entered [Eq. 4-15, 4-16, and 4-17]	Out of limits! Out of limits! Out of limits!		
Bound No. BARRIER Entered [Eq. 4-15, 4-16, and 4-23]	327.8	83.8	32.9
Maximum Calculated Distance	327.8	83.8	32.9
Maximum Fragment Distance - Vertical [MFD-V]	Out of limits! Out of limits! Out of limits!		
Bound no. Maximum Calculated MFD-H [Eq. 4-25]	6,156.4	6,156.4	6,156.4
Maximum Calculated Distance	6,156.4	6,156.4	6,156.4

WARNING

MFD value is outside the valid range for Actual flow
 BARRIER value is outside the valid range for ERC flow
 MFD value is outside the valid range for the maximum flow
 END OF THIS TOOL IS NOT PERMITTED BEYOND THESE BARRIERS.

Modified Pseudo Trajectory Normal (MPTNC) Analysis

Input: Target: English Unit | Calc By: | Date: | Check By: | Date:

Target Description: []

Target Data: []

Fragment Characteristics Table:

Item No.	Distance (ft)	Angle (Degrees)	Fragment Weight (lb)	Fragment Velocity (ft/s)	Fragment Diameter (in)	Fragment Shape
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Plot of Test Data

ENGLISH UNITS

Note: White cells are user input cells. Yellow cells are calculated.

SELECT ITEM DESCRIPTION: [OTHER] | ENTER FRAGMENT DISTAN (ft): [949] | NUMBER OF ROUNDS: [1]

SELECT INITIATION MODE: []

USER DEFINED FRAGMENT CHARACTERISTICS

ENTER FRAGMENT WEIGHT (lb): [] | SINGLE ITEM MAXIMUM FRAGMENT VELOC (ft/s): [] | FRAGMENT VELOCITY (ft/s): [] | UNBARRICADED MAX FRAGMENT DIST. HORIZONTAL (MFD-H) (ft): []

SINGLE ITEM MAXIMUM FRAGMENT WEIGH (lb): [] | SINGLE ITEM MAXIMUM FRAGMENT VELOC (ft/s): [] | SINGLE ITEM MAX FRAGMENT DIST. HORIZ (ft): []

FRAGMENT WEIGHT USED IN CALCULATIO (lb): [] | FRAGMENT VELOCITY USED IN CALCULAT (ft/s): [] | MAX FRAGMENT DIST. FOR CALCULATION (ft): []

BARRICADE ANGLE

MEASURED FROM HORIZONTAL (°): [] | MEASURED FROM VERTICAL (°): []

BARRICADE LOCATION

SELECT KNOWN DISTANCE: [Horizontal Distance, ft] | Distance to top of barricade from center of round: []

No Barricade Required - MFD-H is less than Fragment Distance



Specialized Technical Tools


DDESB TP-17 & TP-20

- DDESB TP-17, *DDESB Blast Effects Computer (BEC) Version 7 User's Manual and Documentation*
- DDESB TP-20, *DDESB Blast Effects Computer – Open (BEC-O) Version 1 User's Manual and Documentation*

Standard Edition

DDESB
BLAST EFFECTS COMPUTER - OPEN
VERSION 1.0

Based on
DDESB Technical Paper 20

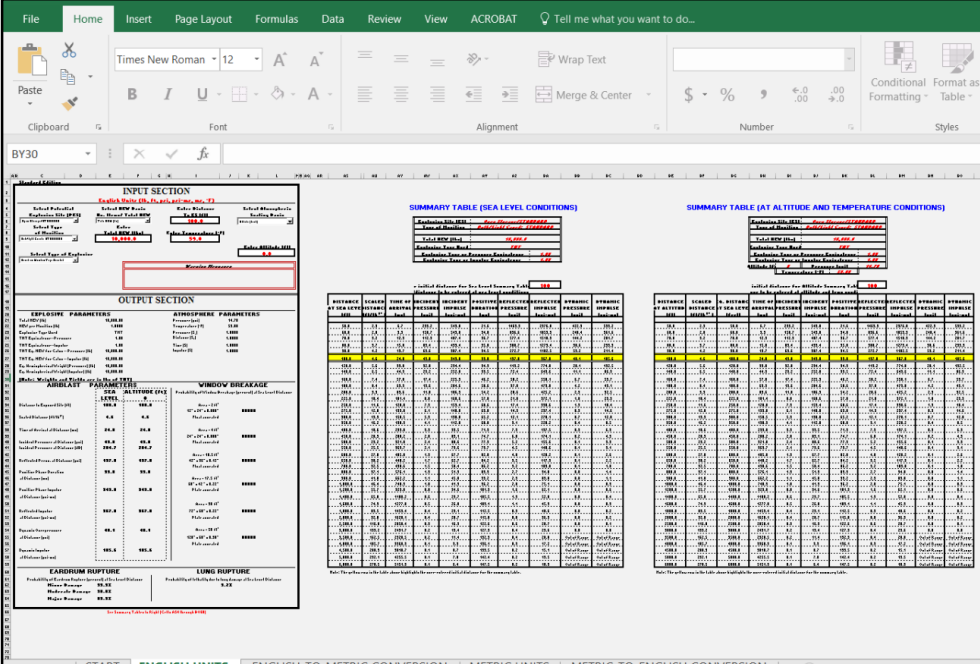


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The screenshot displays the Microsoft Excel interface for the DDESB software. The ribbon includes File, Home, Insert, Page Layout, Formulas, Data, Review, View, and ACROBAT. The main content area is divided into several sections:

- INPUT SECTION:** Contains fields for input parameters such as Explosive Weight, Charge Weight, and Standoff Distance.
- OUTPUT SECTION:** Displays calculated results for various parameters, including Blast Pressure, Blast Velocity, and Blast Impulse.
- SUMMARY TABLE (SEA LEVEL CONDITIONS):** A table with columns for distance, scaled, and various blast parameters at sea level.
- SUMMARY TABLE (AT ALTITUDE AND TEMPERATURE CONDITIONS):** A table with columns for distance, scaled, and various blast parameters at altitude and temperature.
- WINDOW BREAKAGE:** A table showing results for window breakage at different distances and conditions.
- LARGE STRUCTURE RUPTURE:** A table showing results for large structure rupture.
- LONG RUPTURE:** A table showing results for long rupture.

The interface also includes a status bar at the bottom with options for START, ENGLISH UNITS, ENGLISH-TO-METRIC CONVERSION, METRIC UNITS, and METRIC-TO-ENGLISH CONVERSION.



Specialized Technical Tools *In Development*

- Pipe Bomb Tool
- Hazard Division Mixing Rules Tool
- Intentional Burn/Detonation Criteria Management Tool
- “New” DDESB QD Calculator

- Potential Mobile Apps
 - Buried Explosion Module
 - ESS QD Calculator
 - DDESB QD Calculator



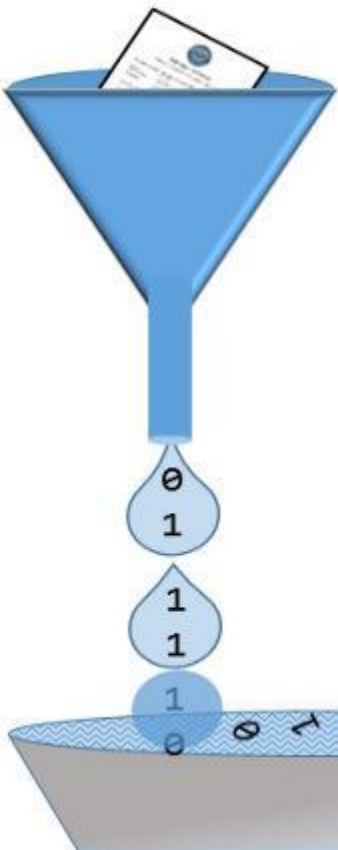
The Future of DDESB Software

Strategic Planning

- Strategic Plan Development
 - Blast design tools
 - Explosives safety-related tools for the expeditionary environment or “lite” versions of existing tools
 - “Interface” tools which would help bridge the gaps between explosives safety and other disciplines that are affected by or affect explosives safety (i.e., acquisition, master planning, real property processes, explosives logistics processes, and radio-frequency analysis)
 - Explosives safety-related databases
- Working towards comprehensive Explosives Safety Information Management



The Future of DDESB Software *Explosives Safety Information Management*



DDESB
Linked Explosives Applications And Networked Navigator
VERSION 3.4

ESS

RBESS Tier 3

TRA CAN

REC-D

BEO

CON BLAST

STI

HD

IB/

CNT

RBESS Tier 2

RBESS Tier 2D

GEN

TP-16

BAC

Pipe

some

Tool

MIRAS

QD Calc

GEN

TP-16

BAC

Pipe

some

Tool

Options

DESKES

Exit

