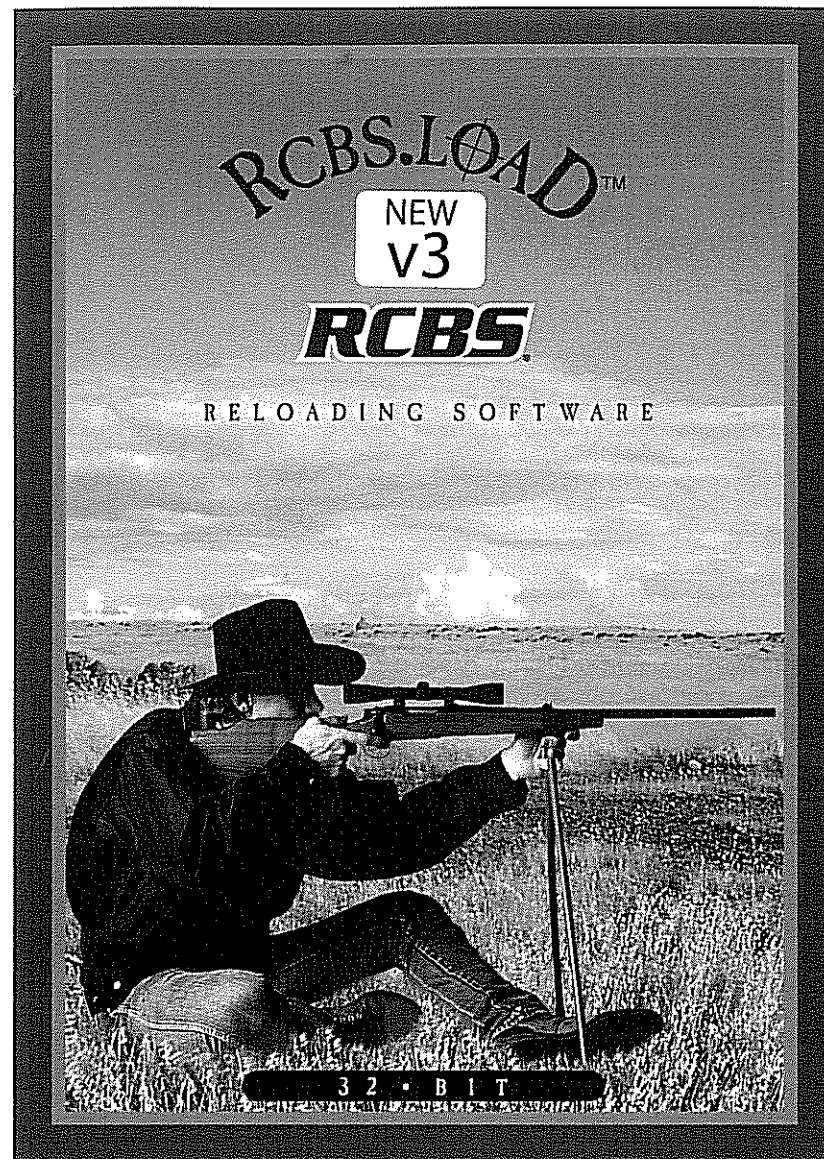# RCBS

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RELOADING SOFTWARE
INSTRUCTIONS
v.2.88D

Computerized Handloading and Performance Database Manager

By Gregory J. Mushial, PhD and MC Berisso, PhD

RCBS.LOAD INSTRUCTIONS
CONTENTS

RCBS.LOAD FEATURES
Main Screen
A list of 455 different cartridges for which load data and/or a source for load data is available in RCBS.LOAD.

Handloading Data
The handloading data includes all data from: *Accurate Smokeless Powder Loading Guide #2, Alliant Powder Reloader's Guide '98 and '00, Hodgdon Basic Reloader's Manual '98 and '00, LaserCast Reloading Manual #1, RCBS Cast Bullet Manual, SomChem Reloading Powders Manual '97, Speer Reloading Manual #13, Vectan Handloading Manual #4, Vihtavuori Oy Reloading Guide '00 and Winchester Reloading Data #15 and '00.*

Graph Utility
A database manager in which load data from one or several sources can be displayed, filtered and compared. Data for one or multiple cartridges can be displayed at the same time.

External Ballistics Calculator
A highly precise tool with a database of over 1,100 component bullets and several hundred factory cartridges that provides a graphic display of the effects of all the variables controlling the path of a bullet.

User Data Files
Allows the user to build a database of personal loads and merge it with the data from other sources.

Cartridge Drawings
A database of dimensional drawings for over 330 cartridges that can be displayed individually for reference or in groups for comparison.

Cartridge Designer
Allows the user to create new cartridges by modifying the basic dimensions of existing cartridges and save them for future reference and use. The reference catalog of existing cartridges contains dimensional drawings for over 330 cartridges.

Ballistic Coefficient Calculator
A simple yet accurate tool for computing the terminal velocity, ballistic coefficient and drop of a bullet in flight.

Powder Burn Rate Chart
Shows relative burn rates of 78 recently and currently available smokeless powders.

Kinetic Energy Calculator
Provides a graphic presentation of kinetic energy based on bullet weight and velocity.

Minimum Twist Chart
Shows the minimum twist rate required to stabilize a bullet of given diameter and weight.

Primer Names by Brand
Gives the manufacturers' designation for each size and type of primer for major US brands.

ANSI Maximum Pressure List
Shows ANSI (American National Standards Institute) maximum pressure standards (SAAMI recommended) in CUPs and/ or PSI for all the cartridges in the main screen index for which industry standards have been established.

European Equivalent Cartridges
Shows applicable European designations for certain US cartridges.

WHAT IS RCBS.LOAD?
RCBS.LOAD is Microsoft® Windows® software for the handloader and shooter. First, it is a database manager with an assortment of included and optional databases. RCBS.LOAD offers you the broadest array of reloading data from the leading publishers of reloading manuals. The database manager gives you the ability to quickly compare data on the same cartridge or compare the performance of different cartridges. You can graph the data to "see" the differences, filter the data using a long list of variables and compare multiple cartridges.

Secondly, RCBS.LOAD is an extremely accurate exterior ballistics analysis tool using the latest mathematical models to calculate and display the path of a specific bullet/load combination, including many popular factory loads. In short, RCBS.LOAD is the most comprehensive, powerful and useful reloading software available to the handloader.

MINIMUM HARDWARE AND SYSTEM REQUIREMENTS
- Operating System: Windows 95, 98,

Windows NT (v.3.51 or greater)
- RAM: Minimum 16 MB
- Processor: Pentium 75 MHz or better
- Free disk space: 5MB (15 MB if all available reloading manuals are installed)
- Monitor and video card capable of displaying 256 colors at a minimum of 800x600 pixel screen resolution–1024x768 is highly recommended.

CONVENTIONS USED IN THESE INSTRUCTIONS

The use of the computer mouse is mentioned throughout these instructions. A standard mouse for a computer running the Windows operating system has two buttons. Both are used to access RCBS.LOAD's many features. If your mouse has more than two buttons, consult the documentation that came with the mouse to see which click patterns correspond to the right and left mouse buttons of a standard, two-button mouse. Unless otherwise noted, clicking is done with the left mouse button.

Certain operations require clicking the **right mouse button.** To make these operations easier for you to spot, the phrase **right mouse button** is shown in boldface type. Please note these other highlighted operations:
- Screen buttons are shown in bold face type (ie: **LoadData, Tools, Exit**).
- Menu selections, are shown in quotation marks (ie: "Graph Selected Loads").
- Keys are underlined (ie: Ctrl).
- Screens are shown in italicized type (ie: *Lateral View*).
- Boxes are shown in outlined type (ie: Zero Dist).

The pictures representing the computer screen image shown in this instruction booklet were obtained with 800 x 600 pixel resolution in order to fit the size of the paper. They are not representative of the actual resolution obtained when running the program at its design point (1024x768 pixels).

INSTALLING RCBS.LOAD
On Windows 95, 98 & NT 4.0 Systems:
    START | RUN | (Letter of CD Drive*): Install.EXE
On Windows NT 3.51 Systems:

START | RUN | (Letter of CD Drive*): Install.EXE
*Usually "D" or "E"
After the installation, an icon will be left on the desktop in the RCBS.LOAD folder. If such a folder does not already exist, the installation utility will create one which, after installation, will be accessible by the path: START | PROGRAMS | RCBS.LOAD. *See figure 1.*
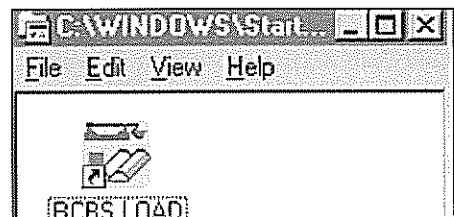

Figure 1. Desktop RCBS.LOAD Program Group and icon

RELOADING SAFETY
Reloading is a safe and enjoyable hobby that is practiced by millions of shooters world-wide. However, like any technical field, there are certain safety rules and practices that must be followed.
The simplest of these is the requirement to be able to read, understand and follow instructions. General safety practices for reloading are presented in every major reloading manual. Get a copy of one of these and read the safety section carefully. We highly recommend the Speer #13 Reloading Manual. A list of general safety practices is also available on the menu under "Tools" in the main screen.

Note: Optional, add-on libraries available for RCBS.LOAD contain older data that has been superseded by more recent testing. These are provided for their historical interest only. Pressure assignments, powder characteristics, cartridge cases and primers can and do change over time. **Use only current data for reloading.**

Do's & Don'ts
- DO begin with the listed starting load and work up in small steps toward the maximum, testing each along the way.
- DO watch for pressure signs at each

step. Some firearms may not tolerate a load that is at the upper end of the cartridge's industry-established safe pressure range.
- DO reduce loads whenever you change components.
- DO wear approved safety glasses when reloading and shooting.
- DO keep detailed records of the ammunition you assemble.
- DO read and understand the operating instructions that are provided with your reloading equipment.
- DON'T start with a maximum load. Use only light to moderate loads until your skill level increases.
- DON'T mix or blend propellants.
- DON'T reload ammunition when ill, fatigued, or under the influence of alcohol or medications.
- DON'T smoke while reloading.
- DON'T rely on any powder burning rate chart, including the one furnished with this program, to substitute propellants. Such charts are based on tests performed in special laboratory equipment, not sporting firearms. They are for reference only. In a "real" gun, the ballistic characteristics of propellants can change as pressure limits and case capacities change.
Use only current published load data. Detailed safety information is available in every major reloading manual. Read and follow all safety instructions, and you will enjoy a lifetime of safe and productive reloading.

RUNNING RCBS.LOAD
RCBS.LOAD can be started several ways. The simplest way is to double click on the RCBS.LOAD icon created during installation. Another way is by the path: START | PROGRAMS | RCBS.LOAD. A third alternative is from the File Manager by double clicking on "RCBSLD32.Exe" (in C:\RCBS288).
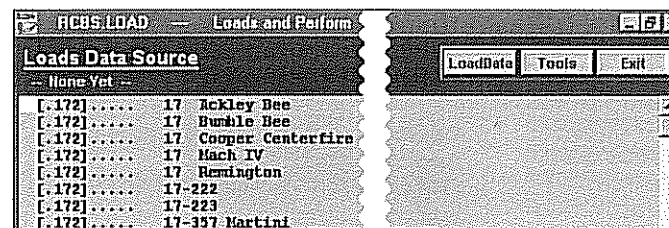

Figure 2. RCBS.LOAD Main Screen

The Main Screen
When you start RCBS.LOAD the first screen that appears is the *Main Screen. See figure 2.* It is a list of 455 cartridges that can be scrolled vertically in the norm. Windows® fashion. You can use the scroll bar on the right side of the screen, or the page up, page down keys if your keyboar is so equipped. There are also three buttons in the upper right corner of the screen. They are: **LoadData, Tools** and **Exit.** Clicking on the **LoadData** button brings up a new screen used for loading database into the working memory of RCBS.LOAD. Clicking on **Tools** or **right button** clicking anywhere on the screen displays a list of options. Clicking on **Exit** is the way to exit RCBS.LOAD.

LoadData Screen
To view or graph load data in RCBS.LOAD, a copy of the appropriate database (reloading manual) must be moved into the working memory of RCBS.LOAD. By clicking on the **LoadDat** button on the *Main Screen* a window is displayed that allows you to select which database(s) you want to work with. The first time you click on **LoadData** after installing RCBS.LOAD the screen will con tain a list of 9 databases and one index.

The databases are labeled *Accurate2, Allint'00, Allint'98, Hodgdn'00, Hodgdn'98, LsrCst1, RCBS1, SomChem'97, Speer13, Vectan4, VihtaVu2000, Win2000, and Win15.* The reloading data from these manuals and guides are included as a complimentary feature of RCBS.LOAD. The INDEX lists many more reloading manuals and other sources of reloading data. *This index is a reference resource only; it does not contain the actual reload ing data.* The Index is intended to provide you a source of direction when you are looking for data on the more obscure cartridges. Some, but not al of the listed reloading manuals are available as optional data disks for use with RCBS.LOAD. See the section on optional data on page 16
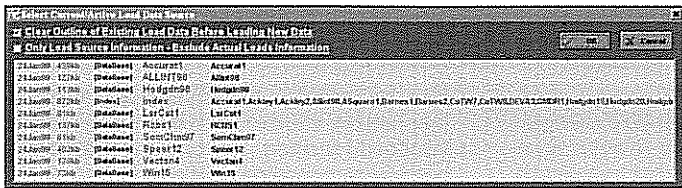
Figure 3. Data Load Selection Window.

for more details. In the upper left corner of the *LoadData* screen there are two check boxes. One is titled Clear Outline of Existing Load Data Before Loading New Data and the other is titled Only Load Source Information-Exclude Actual Loads Information. *See figure 3*. The default setting of the first box is "checked". In this position, databases in the working memory will be removed before new data is placed in the working memory. As you use the program the positive logic of this default will become obvious.

Loading Databases Into the Working Memory
To move a copy of a database into the working memory, click on the database you wish to use; it will become highlighted. Then click on **OK** in the upper right corner of the screen. The chosen database will be quickly copied into the working memory and the *Main Screen* will reappear. In the upper left corner of the screen, under "Loads Data Source" the name of the database will appear. A "+" will also appear next to some of the cartridges in the cartridge list index. The "+" indicates there is load or source data for that cartridge in the database you have in the working memory.

Merging Databases
There will probably be occasions when you will want to display more than one database at a time. You may want to combine data of a similar nature such as all current reloading manuals, all cast bullet data, or all data manuals from a single publisher. Combining or merging databases is simple and can be done for a one-time use or saved as a new database for future work. As is often the case with Windows*, there is more than one way to accomplish the merging of databases. One way is to copy the first database into the working memory as described above. Next, click on **LoadData** and click on Clear Outline of Existing Load Data

Before Loading New Data to remove the default "check mark". Click on the second database you want to add to the database in the working memory and finally click on **OK.** The *Main Screen* will reappear and a box will show the progress of the merging, cartridge by cartridge, until the merge is complete. The length of time required to merge the databases depends on the speed of your computer. However it will probably tell you that you want to save the most often used merged databases as new, complete databases that can be loaded into the working memory quickly. You can save the new merged database before quitting RCBS.LOAD by selecting "Save Load Data to Disk" from the **Tools** menu. To save the last merged databases, answer **yes** when, as you exit RCBS.LOAD, you are asked if you want to save the new load data to disk. Then just follow the directions on the screen and give the database an appropriate file name when the opportunity presents itself. If you do not enter a name, a less creative one will be assigned by the program. To add more databases to the new database, simply repeat the steps you followed to merge the second database to the first. The most efficient way to merge multiple databases is to click on **LoadData**, hold down the Ctrl key on your keyboard while you click on each of the databases you wish to merge, release the Ctrl key and click on **OK.** The databases will be merged sequentially while you wait patiently.

Installing Data from Optional Reloading Manuals into RCBS.LOAD
If you purchase additional reloading manual databases for use in RCBS.LOAD, they are easily installed by following the same steps you used to install RCBS.LOAD. The installation utility will route the data correctly and it will appear as a database on the *LoadData* screen. *See figure 3*.

Combining the Use of Load Data and the Main Screen
One of the principal features of RCBS.LOAD is the ability to quickly view selected data for a specific cartridge, or a group of cartridges,

from one or more sources. This avoids the hassle of having to move about within and/or between an assortment of printed manuals. To view data from a specific source for a specific cartridge, start RCBS.LOAD by clicking on the icon on your desktop. Next, click on **LoadData**, click on the database you want to use and click on **OK.** The *Main Screen* will appear with the "+" beside some of the cartridges *See figure 4* . Click on the cartridge of interest and an outline box will appear around the "+" adjacent to that cartridge. Double click on the cartridge and a list of the sources currently in the working
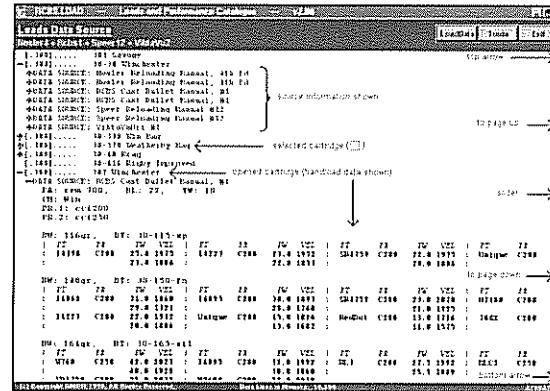

Figure 4. Main window with text visualization of Handload Data.

memory with loads for the cartridge will appear below the cartridge line. Double click on any, or all of the source lines and the data contained in that source, for that cartridge will appear below the source line.

To hide the data lists, double click again on the source line. If you want to hide all of the data lists, it may be faster to click on **Tools** (adjacent to **LoadData**) then click on "Implode Data for All". To hide the source lines, double click on the cartridge. You can open and view as many sources for as many cartridges as you like. You may find, however, that the scrolling required becomes unwieldy when you get too much information open at one time.

GRAPHING LOAD DATA
Viewing load data in the tabular form just discussed is useful and often the best choice. Another and perhaps more revealing way to view load data is graphing. To graph data for a specific cartridge, load the

database of choice into the working memory of RCBS.LOAD by the method that should now be familiar to you. To view a graph presentation of data for a specific cartridge, select the cartridge by clicking on it. Click on **Tools** (or **right button** click anywhere on the screen) and the Tools menu will appear. Click on "Graph Selected Loads". A graph will appear with lines and/or dots representing all the loads for that cartridge in the database you installed in the working memory of RCBS.LOAD. *See figure 5.*

The default values for the horizontal axis is Powder Weight and for the vertical axis is Velocity. Other choices for each axis are available by clicking on the **down arrow** for the axis in the right margin of the screen. Please note that the value must be present in the original database for that value to be plotted. If you want to plot pressure, for instance, you must be working with a source that shows pressures, such as the Accurate #1 database. If you select a value for an axis that isn't in the database, you will get an empty plot. The only exceptions are energy (E), power factor (PF) and Taylor Knockdown Factor (TKF). These are calculated automatically by RCBS.LOAD and are always available.

There are other boxes on the right side of the screen that give you considerable latitude in modifying the graph for your purpose and preferences. Below the Vertical Axis and Horizontal Axis boxes are two boxes for Different Panes. By clicking on the **down arrow** for each box and selecting from the drop-down list, you can divide the screen into multiple panes showing only loads that represent the common factor. However, like the axis selections, that common factor must be in the original data source. If you break into panes based on firearm type and the type is not called out in the source, no separate panes will be displayed. Once displayed, each of the panes can be brought to full screen size by clicking within the pane. To return to the multiple pane display, click on the full screen once again. If the abbreviations are a puzzle, the puzzle can be solved by clicking on the **Abbrevs** button in the

upper right corner of the screen. Below the Different Panes boxes are two Labels boxes. Clicking on the **down arrow** for these boxes presents an assortment of labeling choices for the lines of the graph. You can select one from each of the boxes and therefore put two labels on each of the lines in the graph. The labels will be shown any time the resolution is great enough to allow their presentation. If the screen is divided into small panes or the resolution is diminished for some other reason, the labels will not appear.

Below the Labels boxes are three boxes that represent filters that can be applied to the loads shown on the graph. PT is a powder type filter. If you click on the **down arrow**, all the powders used in the loads selected for graphing will appear in the list. You have the option to choose a single powder of interest by clicking on that powder. Only loads using that powder will then be shown on the graph. The other two boxes are BW (Bullet Weight) and BL barrel length. They function the same way as the powder type filter. Whenever you have a single, full-pane view selected, you can see the specifics of a particular load by clicking on a line or data point with the **right mouse** button. A Load Specifics window appears over the graph showing the values plotted. *See figure 6.*

RCBS.LOAD automatically calculates the bullet energy (E), the IPSC/ USPSA power factor (PF), which is bullet weight
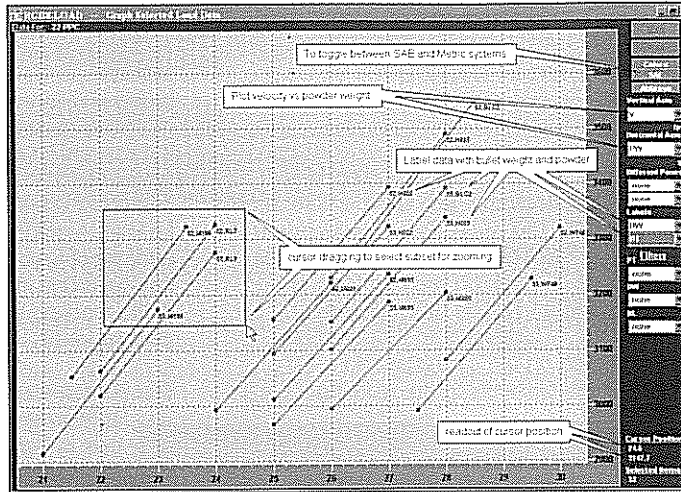

Figure 5. RCBS.LOAD Graphics Window.

times velocity divided by 1000 and the Taylor Knockdown Factor (TKF) for every load. By effectively using the options offered by the different panes boxes and filters, a very large number of loads that nearly cover the screen can be reduced to allow effective comparisons of related data.

Graphing Loads of Multiple Cartridges
Loads for different cartridges can be displayed in graph form simultaneously by establishing the loads for the first cartridge on the graph then clicking on the **Exit** button. The *Main Screen* will reappear. Select the next cartridge by clicking on it, then
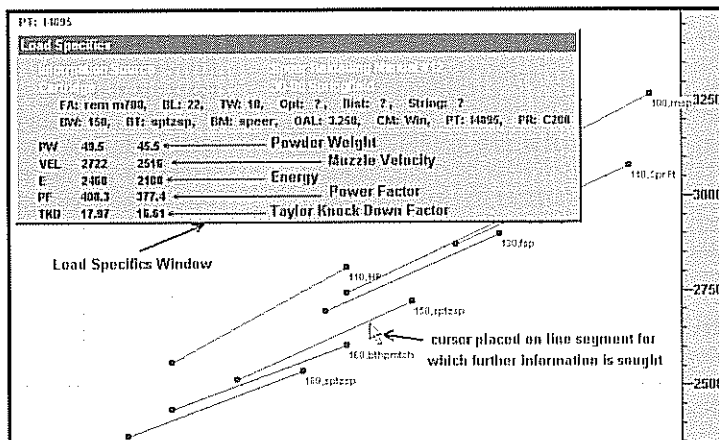

Figure 6. Load Specifics Window in the Graph Utility.

click on **Tools** and select "Graph Additional Loads". The loads for the second cartridge will be added to the graph. Additional cartridges can be included by following the same procedure. Once the loads are on the graph, they can be separated by selecting "Cart" in one of the Different Panes boxes. If preferred, the loads can be sorted by use of the filters and identified by using Labels.

ENTERING YOUR OWN LOAD DATA
RCBS.LOAD gives you access to more current and historical reloading data than any other software available. Most reloaders also have some, or many loads they have developed for their firearms. They want to record, save and compare their loads with loads from other sources. RCBS.LOAD gives you that tool. The first step to entering your load data is to click on **Tools** on the *Main Screen*. Then click on "Construct User Load-Data File" from the Tools menu. The screen that appears has the look of a spread sheet, but it is not.

The Construct User Load Data File Screen (CUD)
(From here forward, it will be referred to as "CUD") The *CUD screen* is generally divided into two sections *See figure 7.* The top half of the screen deals with those things common to all of the data being recorded in the file. Examples are the chronograph distance, temperature, relative humidity,

Figure 7. Construct User Data (CUD) Screen

firearm information, etc. The bottom half of the screen is called *Performance Data* and consists of those things that may vary from shot string to shot string. Examples are bullet weight (BW), bullet type (BT), bullet manufacturer (BM), primer (PR), powder weight (PW), etc. Not all of these factors will vary with each shot string, but any of them can.

You will find some of the same variables in the boxes located on the right side of the upper screen. If the particular item, for instance primer type (PR) does not vary from one shot string to the next, it can be entered either in the box at the top right of the screen, or in the *Performance Data* section at the bottom. Under no circumstance can it be entered in both locations. If you try it, you will get an error message when you try to save the data. *CUD* is constructed so you can enter the results of a string (average velocity, extreme spread, standard deviation, variance, etc.). Clicking on the **Load Raw Data** button will bring up a new screen that allows you to enter the velocity for each shot in the string. When you click on the values you select, they will be calculated and automatically entered in the proper place on the *CUD screen*. On the *Raw Data screen* you also have the opportunity to set the maximum extreme spread of your choice. The default level is 15% to eliminate bad data caused by failure of a chronograph screen to "see" a bullet.

To enter your own data, start at the *CUD screen*. Click on the **down arrow** in the Cartridge Name box. Scroll to the cartridge you want and click on it. You must have a valid cartridge name. Fill in the appropriate boxes in the upper part of the screen (you do not have to fill in every box). Remember not to put any values in the upper right portion that you want to enter in the Performance Data section. Go to the Performance Data table and fill in the appropriate boxes on the first horizontal line. When you get to the V (velocity) box, either enter
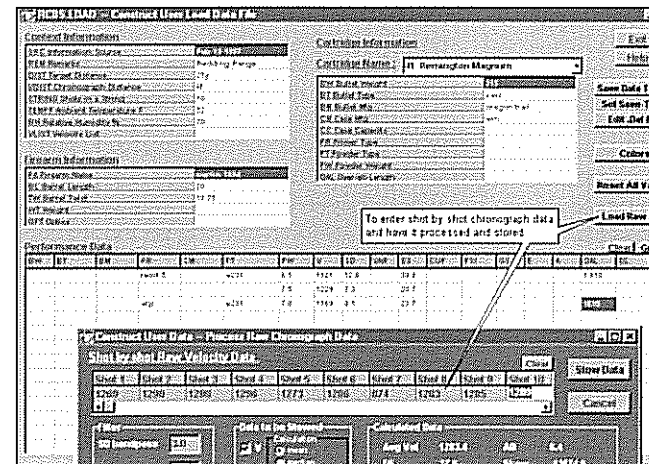
the average velocity from your chronograph, or click on **Load Raw Data** (shortcut: ctrl-R). Enter the velocity of each shot in the string in the appropriate boxes. Check the Filters and "Data to be Stowed" options to be sure they match your preferences. Click on **Stow Data** in the upper right corner of the screen (shortcut: ctrl-S). The *CUD screen* will reappear with the V, SD, VAR and ES boxes filled. If you chose to enter the average velocity in the V box, then you will also need to enter the values for SD, VAR and ES if you wish to have them be part of the data. They are not mandatory for saving the data. When you have entered the desired data on the first line, move to the second line. Continue entering your data line by line until it is all in place. It is highly recommended that you click on the **Graph** button at the top right corner of the Performance Data table. A window will appear with a preview graph of the data you just entered. If you made a mistake in entering the data and the graph looks strange, this is the easiest and best time to correct the error. You can make the preview screen go away by clicking within the graph.

Once you are satisfied that the data is correct, it is time to save it. If you click on the **Save Data To File** button on the *CUD screen*, the data will automatically be saved under the file name "UserLoad.Dat". If you prefer to name the file more descriptively or add the data to an existing file with a different name, then click on the **Set Save-To FN** button and follow the directions. Then click on the **Save Data to File** button to save the data under the new file name.

When you save your data as described above, the data will be saved as a ".DAT" file. The good news is that ".DAT" files can be edited by using the **Edit .Dat File** button on the *CUD screen* or a Windows text editor such as WordPad. The bad news is that ".DAT" files take much longer to load into the working memory of RCBS.LOAD than the ".SLD" type that is used for the reloading manual data in the RCBS.LOAD databases. It is highly recommended that you save your data in ".DAT" files to allow editing and then convert them to ".SLD" files when you are certain that no additional changes will be made to the data. SLD files cannot be edited. To convert the ".DAT" file to a ".SLD" file,

enter the ".DAT" file into the working memory of RCBS.LOAD, click on **Tools**, click on **Save Load Data to Disk** and the file will be converted to the ".SLD" type and appear as a "Database" on the *LoadData* screen. The ".DAT" file for the data will be retained and appear as a "Data" file on the same screen. ".DAT" files can also be merged into existing ".SLD" type databases by using the same procedure described earlier under Merging Databases.

LOOKING AT TRAJECTORY: THE FLIGHT OF THE BULLET

The External Ballistics Calculator
This tool performs real trajectory calculations based on the actual equations of motion. There are no ballistic tables built into the program. The G1 drag model is used for all computations. It provides the bullet trajectory information relative to the line of sight along the range, plus an axial view at the impact point with graduated scale.

The External Ballistics Calculator (XBC) is a great "what if?" playground. It all starts with accessing the XBC. There are two ways this can be done. The obvious and straightforward method is to click on **Tools** on the *Main* Screen, then "External Ballistics Calculator" in the Tools menu. The *XBC* screen appears with default values in most of the boxes. *See figure 8.*

The Standard Bullets box is empty as is the Stepwise BC box below. The first step in using the XBC is choosing one of the listed standard bullets, one of the listed factory loads or, adding a bullet that is not listed. Clicking on the **down arrow** with "Standard bullets" showing will give you a list of more than 1,100 commercially available bullets from all the major manufacturers. You can scroll, choose and click on the one of interest. Clicking on the words "Standard bullets" will switch the box to "Factory Loads". With "Factory Loads" showing, clicking on the **down arrow** will reveal a list of more than 900 different factory loaded cartridges. Once again, you can scroll, choose and click on the one of interest.
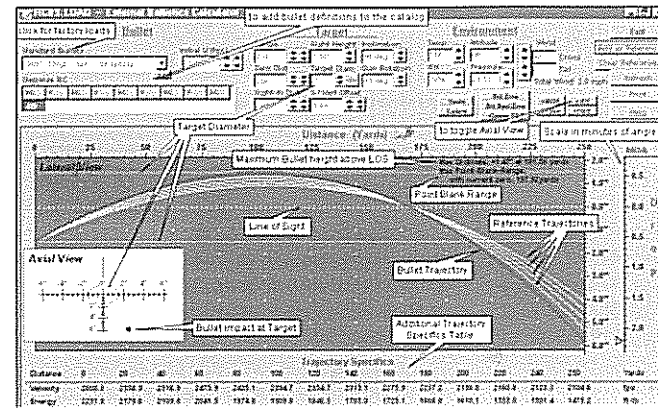

Figure 8. External Ballistics Calculator (XBC)

Adding Your Own Bullet
To add your own bullet to the standard bullet list, click on the **add** button located at the lower right corner of the Standard Bullet box and fill in the boxes on the window that appears. When the data is complete, click on the **Add New Def** button in the window. The new bullet will reside on the list in the order of its caliber and weight.

Choosing a Factory Load
If you choose a factory load from the list, the correct ballistic coefficient and velocity will appear in the appropriate boxes. If you choose a standard bullet, the BC will appear but the default velocity of 2,600 fps will remain until you change it by clicking on the **up/down arrows** by the box. You will notice that the use of **up/down arrows** in the XBC is universal. The one on the left is for larger incremental movements, the one on the right is for fine tuning.

Note: If you wonder why the XBC only asks for a bullet rather than the cartridge you are working with, it is because the cartridge involved is of no consequence once the bullet leaves the barrel. Only the characteristics of the bullet, velocity, direction and external environmental factors affect the flight of the bullet.

XBC Buttons & Controls
A tour of the *XBC* screen, with an explanation of the buttons and controls, will not only qualify you to explore on your own,

but also show you how much this tool has to off in evaluating ballistics. The majority of the scree is occupied by the Latera View that charts the path of the bullet in flight. The horizontal scale at the to is the "Distance" or "Range". The default set ting is 300 yards. You ca change the units to "Meters" or "Feet" by clic ing on the **Yards** button above the Lateral View and to the right. The sca can be changed from 30 to your preference by us of the arrows of the Range box, with the other Target information. The vertical sca at the right end of the Lateral View repre sents the vertical path of the bullet relative to the line of sight (shown as a dotted line and labeled "0.0"). It is always shown in inches.

At the bottom of the Lateral View are two scales, "Remaining Velocity" in feet per sec ond and "Time of Flight" in milliseconds. Placing the cursor anywhere along the hori zontal travel of the bullet (on the distance scale or the trajectory line) and clicking with either the left or right mouse button will pop up a window with the specifics of the traject ry at that point and additional points on eith side of the selected point. Very handy. In th same window the specifics for reference tra jectories will appear. Reference trajectories will be covered in more detail later. Clicking within the window makes it disappear.

Trajectory Specifics
Another way to obtain trajectory specifics with complete details over the entire rang is to click on the **+/- Table** button. Clickin on the same button a second time makes the table disappear. This table will print with the rest of the screen, if you wish. In the lower left of the Lateral View is an Ax View window. Its purpose is to provide n only the same vertical path information a the Lateral View, but also the "left/right" movement of the bullet caused by wind drift and/or rotation of the firearm. The Axial View can be turned on or off with th "+/-AV" button. The vertical point

of impact shown by the Axial View is the point of impact at the distance set in the Range box. It is also the maximum range shown in the Lateral View. Most boxes under the area of Environment are self-explanatory and are controlled by the arrows on their right. The Wind boxes use positive and negative values to show direction. For crosswinds (the box labeled Cross), a positive (+) value indicates a left-to-right wind, and a negative (-) value indicates a right-to-left wind. The box labeled Tail uses positive values to indicate a tailwind and negative values to indicate a headwind.

In the area under "Target", the Range box has already been explained. The Sight Height box represents the height of the sight over the bore. The default setting is "1.5", which is typical for scopes, but can be changed with the arrows to match your needs. The Inclination box is used if the target is uphill or downhill from the shooter and the number of degrees relative to horizontal is set with the arrows for the box. The Gun Rotation box also is in degrees, but in this case it is the number of degrees clockwise or counterclockwise that the firearm is rotated (canted) from the vertical. For a new insight into the need for good scope mounting and attention to detail when shooting, work with this tool to see the effect of only a few degrees of rotation on bullet impact.

The remaining four boxes under "Target" are somewhat interrelated. Zero Dist is the distance down range where the bullet will pass through the line of sight for the second time. **Target Diam** is the "effective" diameter of the target. This factor is very important to the hunter and is determined by the size of game being hunted. Another button alongside the arrows for the **Target Diam** button, is **+/-AV**. This button allows you to choose whether to show the effective target diameter on the axial view. Sight-in Dist is the distance from the shooter to the target being used to sight-in the firearm. This distance could be the same as the "Zero Distance", but most often is not. The final member of the four related boxes is S-I Vert Offset. This box shows the vertical offset, in inches, that the bullet must strike the target located at

the "sight-in distance" in order to strike the center of the target at the "zero distance" with the given bullet, velocity, inclination and environmental conditions.

Zeroing a Firearm with the XBC
For the target shooter who wishes to sight-in his firearm to "zero" at a specific distance, the procedure is simple. First select the bullet, establish the velocity, set the target diameter at "0". Enter any pertinent environmental conditions, set the "zero distance" and the "sight-in distance". RCBS.LOAD will compute the correct vertical offset for the sight-in distance selected.

Maximum Point Blank Range
Maximum Point Blank Range is the maximum distance that the firearm can be aimed at the center of the target with certainty that, at all points along its flight, the bullet will strike within the "effective" target diameter. For the hunter who wishes to know the "Maximum Point Blank Range" (MPBR), the procedure is easy. With the correct bullet selected and the velocity set, enter the appropriate **Target Diam** using the **up/down arrows**. Enter the correct sight-in distance using the same method. Click on the **OptmzPBR** Button and RCBS.LOAD will compute the MPBR for the load, the correct vertical offset at the selected sight-in distance to attain the MPBR and the zero distance for the load. You must be able to see the path line cross the lower target diameter line before calculating MPBR.

Note: When establishing Maximum Point-Blank Range, RCBS.LOAD uses a sophisticated mathematical technique to determine this value in three dimensions. Although not a concern on faster computers, the time required may exceed 20 seconds on a minimum system, such as a 75 MHZ Pentium processor. To reduce the time to obtain this information on a slower machine, make sure that the **OptmzPBR** button is inactive ("-" sign in its button) and then enter all the conditions you wish to be included in the calculation. Once all parameters are entered, click the **OptmzPBR** button ("+" sign in its button) to calculate the MPBR. If you wish to change some value, click **OptmzPBR** off while making changes, then reactivate it to see the new value.

Comparing Trajectories
If you want to compare alternatives in bullets, velocities, conditions, etc., you can do so by using the **Add as Reference** button. When you click on the button, the currently displayed trajectory will be stored as a reference. Make the desired changes in bullet, velocity, etc. and a new trajectory will be displayed that can be compared to the original. Up to six trajectories can be displayed at one time. If you place the cursor on a point along the trajectory and right or left button click (as described earlier), then the specifics of each of the numbered trajectories for that point will be displayed. Each reference trajectory in the *Lateral View* window is numbered and keyed to the specifics window. The **Clear References** button does just what it says.

Accessing the XBC through the Graph Utility
At the beginning of this section, it was pointed out that there are two ways to access the XBC. The first was described through the "Tools" menu. The second way to access the XBC can be very handy if you are graphing load data for a cartridge. As explained in the section concerning graphing load data, you can call up a box with the specifics of a graphed load by **right button** clicking on the graph line for the load. If you **right mouse button** click again on one of the specific columns (or any column) of data in the new window, the *XBC* screen will appear with the correct bullet, velocity and trajectory for the load. *See figure 9.* Those with a technical bias will be happy to know that you have the option of choosing from three different zeroing procedures:

1) Standard Zero **(Std Zero)** for a fast calculation. It uses the standard approach found in the literature for the zeroing coordinate system. It is a rough approximation which assumes a zero coordinate system generated by the drop at the

required zeroing distance, of level fire shooting at standard atmospheric conditions.

2) Local Zero **(Local Zero)** gives a more precise zeroing calculation. It takes up to three times longer since it obtains the exact zeroing under the local environmental conditions entered through a convergence procedure.

3) Special Zero **(Spcl Zero)**, also a pre cise zeroing calculation that provides the possibility of dialing the conditions at which the gun was zeroed, and of observ ing the variations due to changes in the local environmental situation. The initial zeroing conditions of the gun can be entered by setting the correct values in th dialog box that appears when clicking on **Set Spcl. Zero.**

To obtain the angle subtended by the ver cal drop at the target, activate the **+MOA** (minutes of angle) toggle button. This action adds a vertical scale with the appr priate angle units to the Lateral View frame. The user can also view this drop i milliradians or scope clicks: MILr (real), MILa (artillery), MILi (infantry), CLK8 (1/8 clicks), or CLK4 (1/4" clicks). The termina (at-target) values of drop, horizontal displacement, time-of-flight and remaining velocity at the requested distance are als displayed in text form at the bottom right the screen, with their appropriate units.

CARTRIDGE DRAWINGS
RCBS.LOAD has a database with dimensioned drawings for about 330 cartridges. This database can be accessed through th
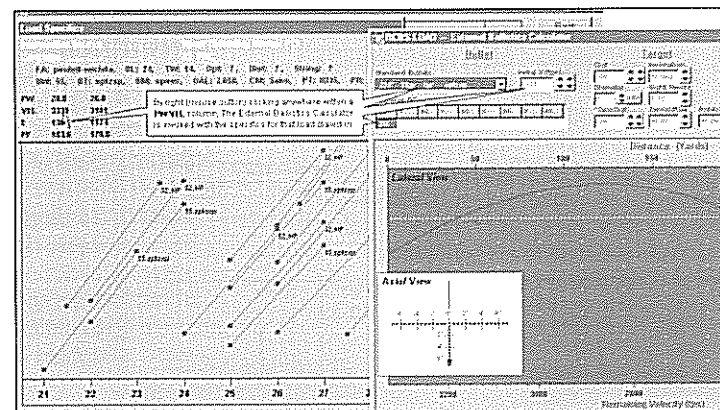

Figure 9. Accessing the External Ballistics Calculator through the Graph Utility

"Tools" menu. When you place the cursor on "Draw Cartridge" in the "Tools" menu, an additional listing of "Selected", "Additional", "Catalog" and "Resume" appears. If you select "Catalog", a window is created with a list of cartridges for which there are drawings. You can click on one, or hold down the Ctrl key and click on multiple cartridges, then click on **Draw** or **right button** click anywhere in the window, to view the drawings *See figure 10.*

If you have already selected a cartridge from the *Main Screen*, you can click on **Selected** to see the drawing for the cartridge. Clicking on **Done**, selecting another cartridge from the *Main Screen*, calling up the "Tools" menu, going to "Draw Cartridge" and clicking on "Additional" will put the new cartridge on the same screen with the first.

Clicking on the "Resume" option recalls the most recently used drawing from the RCBS.LOAD memory. When multiple cartridges are displayed on the screen, any individual drawing can be zoomed to full screen by clicking on the drawing. Clicking on the full screen drawing returns the presentation to the multiple drawing screen. Zooming a drawing to full screen then pressing the Delete key on the keyboard will clear the drawing. Cartridge drawings can be printed in either the full-screen or multipane views by clicking on the **Print** button at the upper right corner of the screen.
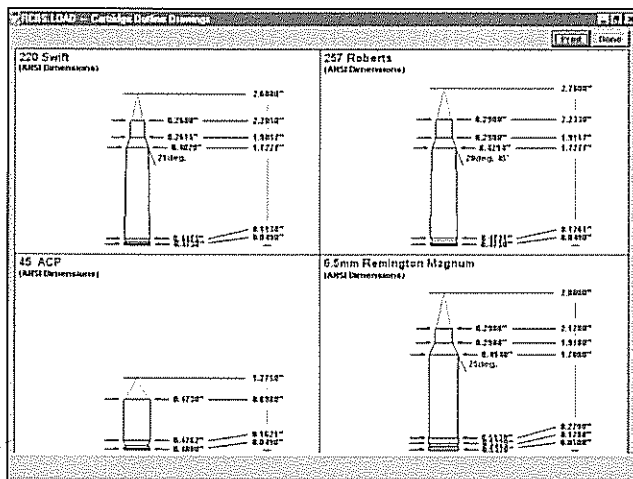

Figure 10. Cartridge Outline Drawings

DESIGNING YOUR CUSTOM CARTRIDGE

RCBS.LOAD gives you the ability to create new cartridges quickly and easily by modifying the dimensions of existing cartridges. The first step in creating a new cartridge design is to bring up the "Tools" menu by clicking on **Tools** on the *Main Screen* or **right mouse button** click anywhere on the Main Screen. Then click on "Cartridge Designer" from the Tools menu. The *Cartridge Case Designer Screen* appears and looks like a blank sheet of paper with a column of buttons on the right side of the screen. *See figure 11.*

To begin designing a cartridge click on **New Cart** in the column on the right. A bright yellow box will appear in the center of the screen. Your first job is to name the cartridge you are designing by typing the name in the Replacement Cartridge Name box. Tab takes you to the next box, Specify Basis Cartridge. Click the down arrow to reveal a list of over 330 reference cartridges for which there are technical drawings with all pertinent dimensions. Scroll the list and highlight the most appropriate parent cartridge for your new cartridge. The highlighted cartridge will appear in the Specify Basis Cartridge box. Click on **Done** and the drawing of the parent cartridge appears on the screen with all dimensions shown. In the upper left corner of the screen the name of the new cartridge appears along with the name of the parent cartridge, case capacity data, case mouth thickness and bullet seating depth. Data other than the names can be hidden or displayed by clicking on **Case Cap** on the right side of the screen.

To begin modifying the parent case, **right mouse button** click on the dimension you want to change. The value for that dimension will be highlighted in red. Use the up/down arrows on the right side of the screen to change the value. There are three sets of arrows for coarse, fine and very fine adjustments.

When designing a new cartridge, it is often handy to have the drawing of the parent case on the screen at the same time. It is easy to have more than one cartridge on the screen at one time. While your new cartridge is on the screen, click on **Ref Catlg**, highlight the parent cartridge and/or other reference cartridges and click on **Draw**.

Changes in the dimensions of your new cartridge can be made while the reference cartridge is on the screen or you can zoom to just your new cartridge by clicking anywhere in the new cartridge frame. Clicking anywhere on the screen will take you back to the multiple cartridge display. If you wish to change the name of a cartridge you have designed, go to the **Wrk Catlg**, click on the cartridge you wish to change, click on **Draw** and then click on the name of the cartridge in the upper left corner of the screen. The bright yellow box will reappear on the screen and allow you to change the cartridge name.

What you cannot do is often as important as what you can do. You cannot modify the dimensions of any reference cartridge in the reference catalog. You can only copy it onto the work screen with a new name and then change the dimensions of that newly named cartridge. You cannot delete a cartridge from the reference catalog, even if you try.

Cartridge Designer Buttons
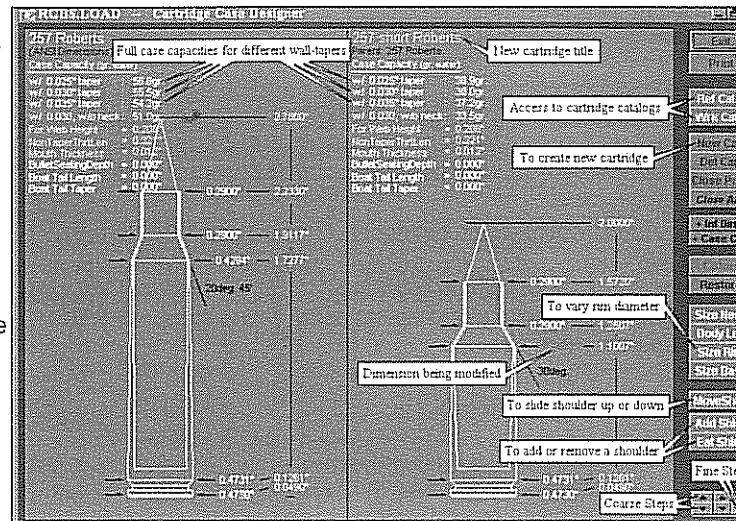The following is a brief description of the

Figure 11. Cartridge Case Designer

buttons on the right side screen of the Cartridge Designer:
- **Exit**: means just that.
- **Print**: will print what is displayed on the screen.
- **Ref Catlg**: displays the reference catalog with dimensions for more than 330 cartridges.
- **Wrk Catlg**: displays a list of cartridges you have designed.
- **New Cart**: calls up the yellow box that initiates the design of a new cartridge.
- **Del Cart**: deletes the designed cartridge that is currently displayed alone on the screen. The cartridge must be alone on the screen before it can be deleted. Use zoom, if necessary, to isolate the cartridge.
- **Close Pane**: removes the currently displayed cartridge from the screen.
- **Close All**: removes all the cartridges from the screen.
- **+/- Int Dims**: displays/hides the internal dimension information for the cartridge.
- **+/- Case Cap**: displays/hides the cartridge case capacity information.
- **Colors**: allows you to set the screen colors according to your preference.
- **Restore**: undoes all the dimensional changes made in the current work session.
- **Size Neck**: allows you to change the diameter of the entire neck as a single

operation. Click **Size Neck** then use the up/down arrows normally.
• **Body Len**: allows you to change all the dimensions related to body length as a single operation. Click Body Len then use the up/down arrows normally.
• **Size Rim**: allows you to change the rim diameter.
• **Size Base**: allows you to change the base diameter.
• **Move Shldr**: allows you to move the shoulder vertically in a single operation.
• **Add Shldr**: adds a shoulder to a straight-walled case. The shoulder can then be modified and moved in a normal fashion.
• **Eat Shldr**: removes the shoulder from a bottle-necked case in a single stroke and creates a straight-walled case.

When finished with a design session, closing the pane or exiting the Cartridge Designer automatically saves the new cartridge in the Working Catalog for reference or future modification.

BALLISTIC COEFFICIENT CALCULATOR

Accurate computation of the ballistic coefficient of a bullet in flight is a very complicated task. Using the Ballistic Coefficient Calculator in RCBS.LOAD, however, is remarkably simple. To initiate the Ballistic Coefficient Calculator click on "BC Calculator" in the Tools menu. The *BC Calculator* screen will appear with default values in 10 boxes at the top of the screen. Each box has up/down arrows adjacent on the right. *See figure 12.*

The boxes include the following:
• Initial Velocity
• Distance
• Terminal Velocity
• Time of Flight
• BC
• Drop
• Temp F
• RH
• Altitude
• Pressure

All of these variables are interrelated and affect or are affected by the ballistic coefficient of the bullet. Using the Ballistic Coefficient Calculator in RCBS.LOAD is as simple as entering the required known values in the boxes. The unknown values are automatically calculated and displayed. For example, if you enter the initial velocity, distance and terminal velocity, then the ballistic coefficient, time of flight and drop are calculated and displayed. Entering the initial velocity, distance and time of flight will result in computation of terminal velocity, ballistic coefficient and drop.

Changing the default values for the environmental factors of temperature, relative humidity, altitude and barometric pressure will alter the computations appropriately. You will find the Ballistic Coefficient Calculator a very handy tool.

Additional Reference Materials/Tools

RCBS.LOAD has other references and tools available on the "Tools" menu such as "Minimum Twist Rate" and "Primer by Type & Mfgrs". These features are simple and straightforward to use compared to the features you have already navigated.

Figure 12. Ballistics Coefficient Calculator

TECHNICAL SUPPORT

On-screen help is available in most RCBS.LOAD screens. Click on the "Help" button to display a help window. For first-level technical support in installing and starting RCBS.LOAD,

call RCBS at 1-800-533-5000

For advanced technical support, reporting problems in program functions and other inquiries,
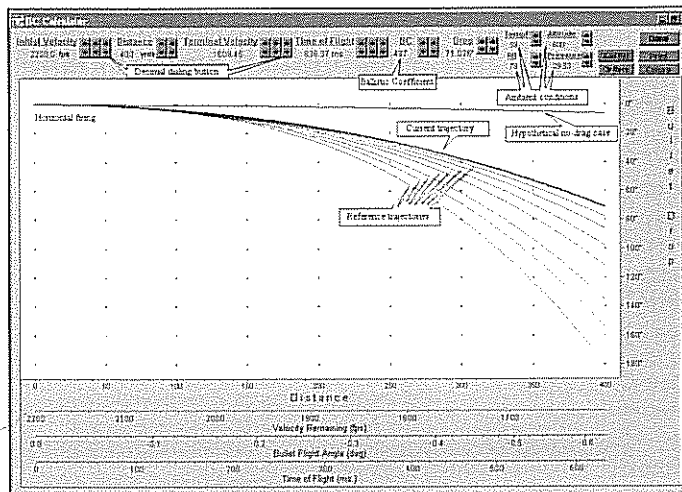
call GMDR at: 530-276-9104

OPTIONAL RELOADING DATA

OPTIONAL RELOADING DATA MANUALS FOR RCBS.LOAD

When purchased, RCBS.LOAD includes reloading data from several reloading guides and manuals—see Handloading Data on page 2. These guides and manuals give you load data for many cartridges, bullets and powders, but you may want to add to that database. After all, the idea behind RCBS.LOAD and reloading in general, is the ability to filter, sort and compare many different loads and cartridges on the basis of an array of variables that are important to you. To add depth and breadth to your database, load data from many additional manuals is available to you. If additional data sounds interesting to you, read on.

Historical Manuals

The RCBS.LOAD CD-ROM has all the Historical Manuals in a locked format when purchased. To unlock a manual or manuals you will need an unlocking key or keys. Call RCBS Customer Service and you will be given instructions on how to supply an "ID Key" specific to your PC. You will then be given the unlocking key or keys. The Historical Data contains only the load data. Pictures, text and other materials from the printed version are not available. This Historical data is available with permission of the companies who published the data because the manuals are no longer in print and not otherwise available to reloaders.

Current Manuals

Like the Historical Manuals, the Current Manuals are available in a locked format and an "ID Key" will be required to use them. Current data is reloading data from manuals currently in print and easily available to all reloaders. The data is covered by copyright to protect the publishers. The companies who have published these manuals have agreed to allow RCBS to offer this data only in a format that functions in RCBS.LOAD and ONLY to RCBS.LOAD owners who also own printed copies of the underlying specific manual. Owners of the printed manuals could, if they so choose, personally enter each of the loads in the manual into their copy of RCBS.LOAD by hand but it would be a time-consuming task. In essence, RCBS is providing a typing service to the owner of RCBS.LOAD for a fee. RCBS fully supports the rights of copyright holders and has made every effort to assure that current data is only sold to owners of the printed manual(s) involved. To this end, each copy of current data is only sold in an electronically locked format. To unlock the data the user will be asked questions (multiple and randomly selected) that can only be answered by referring to the manual. The requirement to unlock the data will occur multiple times at unpredictable intervals. For those of you who own the correct manual, it will be a minor inconvenience and the extra data will be a real boon to your use of RCBS.LOAD. For anyone with the desire to cheat the copyright holders who went to the time and expense to produce the data, it will be a well-designed nightmare.

Again, from each manual, only the reloading data is included. Tables, graphics, photos and text are not reproduced. Copies of historical and current data manuals can be ordered directly from RCBS. To order, call RCBS Customer Service at 1-800-533-5000 Monday–Friday 6:30 AM to 4:00 PM Pacific Time. Be sure to have your MasterCard or Visa handy when ordering.

MANUALS FOR RCBS.LOAD

Part #	Description	Cost
Historical Manuals		
00900	Barnes Reloading Manual Number One	$11.9
00901	Hodgdon's Reloading Data Manual #19	$11.9
00902	Hodgdon's Reloading Data Manual No. Twenty	$11.9
00903	Hodgdon's Reloading Data Manual No. Twenty One	$11.9
00904	Hodgdon's Reloading Data Manual No. Twenty Two	$11.9
00905	Hodgdon's Modern Smokeless Powders Data Manual No. Twenty Three	$11.9
00906	Hodgdon's Modern Smokeless Powders Data Manual No. 24	$11.9
00907	Hodgdon Data Manual No. 25	$11.9
00938	Hodgdon Data Manual No. 26	$11.9
00908	Hornady Handbook of Cartridge Reloading	$11.9
00909	Hornady Handbook of Cartridge Reloading Rifle–Pistol, Vol.II	$11.9
00910	Hornady Handbook of Cartridge Reloading, Third Edition	$11.9
00939	Hornady Handbook of Cartridge Reloading, Fourth Edition	$11.9
00911	Lyman Ideal Handbook No. 39	$11.9
00912	Lyman Ideal Handbook No. 40	$11.9
00913	Lyman Ammunition Reloading Handbook 41st Edition	$11.9
00914	42nd Edition Lyman Reloader's Handbook	$11.9
00915	Lyman Reloading Handbook 43rd Edition	$11.9
00916	Lyman Reloading Handbook 44th Edition	$11.9
00917	45th Edition Lyman Reloading Handbook	$11.9
00918	Lyman Reloading Handbook 46th Edition	$11.9
00944	Nobel Reloading Data #7	$11.9
00919	Nosler Reloading Manual Number One	$11.9
00920	Nosler Reloading Manual Number Two	$11.9
00921	Nosler Reloading Manual Number Three	$11.9
00922	Speer Manual #1	$11.9
00923	Speer Manual #2 (Wildcat cartridges only)	$11.9
00924	Speer Manual #3	$11.9
00925	Speer Manual #4 (Wildcat cartridges only)	$11.9
00926	Speer Manual #5	$11.9
00927	Speer Manual #6	$11.9
00928	Speer Manual #7	$11.9
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00931	Speer Manual #10	$11.9
00932	Speer Manual #11	$11.9
00942	Speer Manual #12	$11.9
00933	Sierra 1st Edition Reloading Manual	$11.9
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00936	Sierra Rifle Reloading Manual Third Edition	$11.9
Current Manuals		
00937	Barnes Reloading Manual Number Two*	$11.9
00945	Hodgdon Data Manual #27*	$11.9
00946	Hornady Handbook of Cartridge Reloading 5th Edition*	$11.9
00943	Lapua Reloading Manual #1*	$11.9
00940	Nosler Reloading Manual #4*	$11.9
00947	Vihtavuori Oy Reloading Manual 3rd Edition*	$11.9

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