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<b>6</b>	<b>Bale Manager .....</b>	<b>6-1</b>
6.1	Initial considerations .....	6-1
6.2	About this Chapter .....	6-3
6.3	Getting Started .....	6-4
6.4	Making Mixes/Laydowns .....	6-12
6.4.1	Make a Mix .....	6-12
6.4.2	Active Mixes.....	6-13
6.4.3	Preview/Accept Mix .....	6-14
6.4.4	View Inventory Bale Data .....	6-15
6.4.5	View Mix History .....	6-16
6.4.6	View Mix History Histograms.....	6-16
6.5	Application examples.....	6-17
6.5.1	Introduction .....	6-17
6.5.2	ABC Yarns .....	6-17
6.5.3	XYZ Yarns .....	6-42

## 6 Bale Manager

### 6.1 Initial considerations

Before starting the Bale Manager program, it is important to understand its impact on the spinning mill's operation. The overall objective is to accomplish raw material consistency in the bale mixes or laydowns, as described earlier in Chapter 5. However, every plant has its specific setups and priorities that need to be taken into consideration.

Several functional areas in the company will be affected. It is recommended to think about the following questions, first:

#### **Cotton Purchasing and Storage:**

- What is the current warehouse capacity? How many bales can be stored?
- How is cotton being bought? What are the normal purchasing procedures?
- How do the bales arrive, and what are the current test procedures?

The warehouse capacity is of utmost importance for the implementation of a bale management program. For example, if a spinning mill maintains a one-month inventory, only, then it is not recommended to even start with it. The reason is that there will not be enough bales in the warehouse to enable long-term consistency in the bale mixes or laydowns.

The current cotton purchasing procedures need to be known because they affect how the bales arrive at the plant. For example, if the mill buys on description only, then the bales are usually tested upon arrival at the plant in order to verify the shipment. However, many mills do not use the HVI data for bale storage, but use traditional sorting mechanisms (see Chapter 3, part 3.2 Sampling).

In order to use the Bale Manager program properly, it is necessary to use the HVI data for storing the bales by categories in the warehouse. This is not much different than the traditional systems, which stored the bales by lot ID, truck/ delivery date or country of origin. However, it requires careful planning how to make the necessary logistical changes. It is not recommended to start with the Bale Manager program, if a spinning mill does not want to change their current warehousing system – unless it is based on HVI data, already. The time frame for an existing plant to change their warehousing system over to a HVI data based system is estimated to be one year. The bales currently stored in the warehouse need to be used up, first, and the newly arrived bales need to be stored in the newly designed categories, which require space becoming available in the warehouse over time.

#### **Production:**

- How many bales are being consumed per day?
- How many opening lines are being used in the plant? How many bales are in the different laydowns or mixes?
- What are the most common yarn count and end use ranges (for example, Ne 30 – 40, 100% cotton, combed ring-yarn for knitting)?

The amount of bales consumed per day gives a good indication of how many bales need to be in the warehouse to enable the Bale Manager program to work effectively. At minimum, it is recommended to have 30 x the number of bales used per day by the plant in the warehouse.

For example if a plant uses 60 bales per day, a minimum of 1,800 bales (60 x 30) should be stored in the warehouse.

The number of bales in the mix or laydown is important because it determines how to enter the bale ID numbers in the Bale Manage program. For example, if only a small number of bales are used in the laydown or mixes (< 30), then entering the bale ID numbers manually is still feasible. However, most mills use larger number of bales in the laydowns today. Therefore, it is recommended to use a bar code system for Bale identification, and a bar code reader for the Bale Management program.

The number of opening lines, yarn counts and end uses helps planning the setup of the software program. For example, different end-uses require different mixes with different priorities for different spinning systems. It is helpful to know these requirements before implementing the Bale Manager program to ensure the production program is fully covered.

### **Quality Control:**

- How is yarn quality measured today? What do the spinning mill customers require? What does the spinning mill require itself?
- Does the plant store all QC data in a central database, which allows tracking raw material to yarn quality?

These questions are very important for the spinning mill in order to determine the objective of the implementation of a bale management program in further detail. For example, if a spinning mill does not know its customer's quality requirements, a bale management program will not result in the desired changes – if these are known at all. The same applies for its own operation. The spinning mill needs to know where it wants to improve, to what extent and why. In addition, these improvements should be measurable, in order to get some objective information about the outcome. Therefore, it is highly recommended to have a central database in place, which enables a mill manager to exactly trace the quality and efficiency of his production as well as the resulting yarn quality.

### **Sales:**

- Aside of price – what are the biggest concerns regarding yarn quality?
- What competitive advantage do you seek?

Often, the level of information in manufacturing is very different than in sales. Therefore, it is recommended to discuss the biggest concerns regarding yarn quality also with the sales force, the company's interface with the customer. At the same time, the company's competitive environment might influence some of the decisions how the Bale Manager program will be used. For example, if the yarn is being sold to knitters, it may require tight control of Micronaire in order to prevent fabric barré (see Chapter 5). In such situations, using a bale management system might even be used as a sales tool, showing customers that the mill effectively controls its raw material variations.

## 6.2 About this Chapter

This chapter is divided in three major parts:

- Getting Started

Application Examples:

- ABC Yarns, 100% System Testing
- XYZ Yarns, Module Testing

The first, “Getting Started”, is intended to show a spinning mill how to use the Bale Manager program for the first time. The emphasis is on how to determine the different bale categories, in which the cotton will be stored in the warehouse. This is very important since it affects the warehouse organization, and, therefore, needs careful analysis of the current situation in the plant.

Then, two examples are shown how to use the Bale Manager program with different setup configurations:

“ABC Yarns” is an example of a spinning mill that uses 100% System Testing. This means, the mill tests every bale that arrives at the plant, then stores it, and later retrieves it from the warehouse for the bale mix or laydown. This part shows a step-by-step procedure of the Bale Manager Software operation, using the System Testing configuration.

The last part of chapter 6.5.3, “XYZ Yarns” shows an example of a spinning mill that uses Module Testing. This means, only a certain percentage of the bales that arrive at the plant in a lot are being tested. The average test results are then being assigned to all the bales in the lot, which is already stored in the warehouse. This part shows also a step-by-step procedure of the Bale Manager Software program, using the Module Testing configuration.

The intention is to show the user step-by-step how to get started with the Bale Manager program, and how to use the various operations to make a mix, view the results, make changes etc.. This chapter does not provide a “one-rule-fits-all” solution how to operate the Bale Manager software in every spinning plant in the world. Each spinning mill needs to decide for them how they want the Bale Manager to work within their specific operation. The examples shown in this chapter should help the mill manager getting familiar with the Bale Manager software operation, and getting ideas how to apply it in his or hers own manufacturing environment.

### 6.3 Getting Started

Controlling the distribution and the averages of important physical properties of cotton presented to spinning is the main function of a well-organized and beneficial bale management program. However, these fiber property distributions are not known in the beginning because all of the warehoused bales have not yet been measured by the HVI system.

For centuries, spinners have used the category system. Cotton has been purchased, warehoused and selected for laydowns according to growth-area categories as well as staple-length and other categories.

- Therefore, the first step is to determine the distribution of unmeasured bales in the warehouse.
- Because distribution is displayed by category in histogram form, the second step is to assign categories to each HVI-measured fiber property.
- The third step is to devise a practical method of selecting unmeasured bales from the warehouse while making the distribution of selected important fiber properties consistent every day.
- The fourth step is to measure incoming bales before they are placed in the warehouse followed by storage according to category numbers.
- The fifth step is to continue these procedures until all bales originally in the warehouse are consumed and all bales are stored according to category number as well as growth area and end use.

#### **STEP 1: What are the distributions?**

1. Each day, take a sample from the center of each open bale in the laydown being fed into the opener(s). The sample should be large enough for proper HVI testing.
2. Put the samples in a single paper bag. Mark the bag with a lot ID (identifier). Use the letter "L" followed by a number such as the date, for example "L329" (March 29). It is necessary that all lot IDs begin with the letter "L." The reason for using "L" is that all "L" lot ID data will have to be deleted later from computer memory.
3. Using separate bags, do the sampling for at least 20 days or until no fewer than 500 samples have been taken. Keep the lot IDs in numerical order such as L329, L330, L331, etc. Store all samples in the HVI test room, preferably under temperature- and humidity-controlled conditions.

**STEP 2: Category Assignment**

1. When the time comes to perform tests of all samples, enter into the HVI the following initial category definitions:

Property	Highest Value of Category	Interval Between Categories	First Category Number	Number of Categories
SCI	87	8	1	20
Micronaire	2.2	0.2	1	20
Length (inch)	0.86	0.03	1	20
Length (mm)	21.8	0.08	1	20
Uniformity	70.5	1.0	1	20
Strength	18.5	1.0	1	20
Rd	46.0	2.0	1	20
+b	4.5	0.6	1	20
Short Fiber Index	2.0	2.0	1	20
Elongation	1.0	1.0	1	20
Trash Count	5	5	1	20
Trash Area	0.50	0.50	1	10
Trash Grade	1	1	1	10

Table 6-1 Initial Category Definition I

These definitions are only temporary. Final definitions will be assigned after studying data from step 3 above.

2. After careful calibration of the HVI system, make tests of all samples under each lot ID, assigning bale ID numbers to all samples. Do not duplicate bale ID numbers.
3. Print the histograms of SCI data of each lot ID and observe the variations of each laydown. Fig. 6-1 through Fig. 6-3 show how these histograms might look.

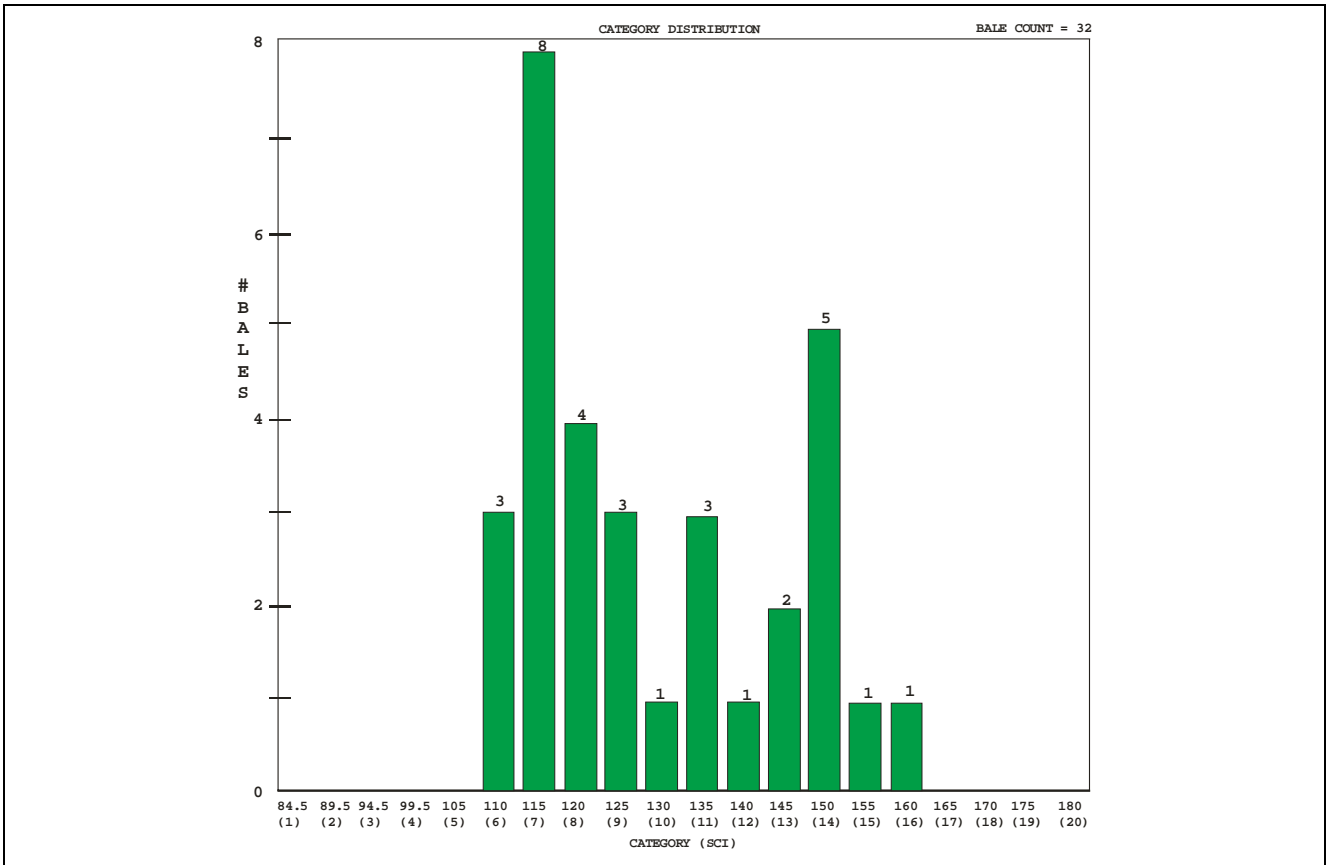


Fig. 6-1 SCI Histogram of Lot 329, 04/15/99

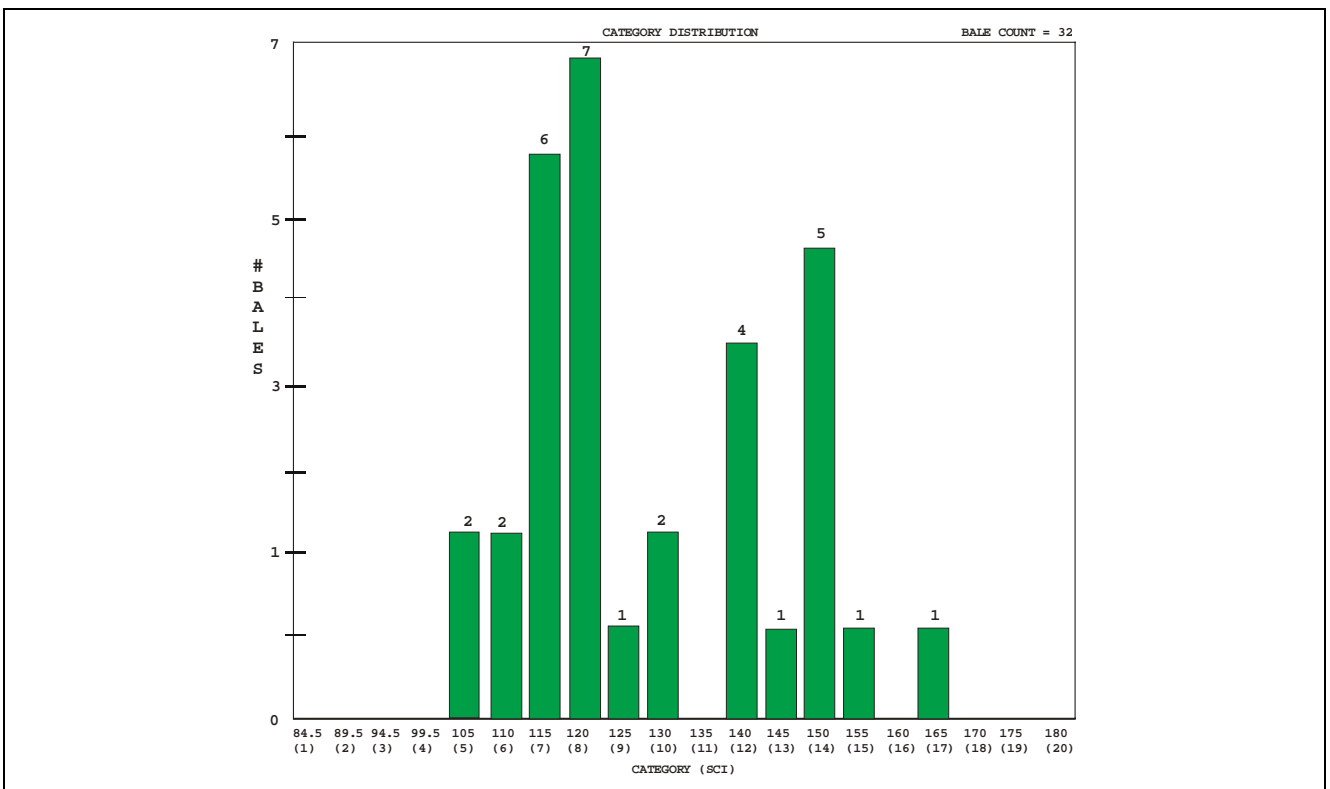


Fig. 6-2 SCI Histogram of Lot 330, 04/15/99

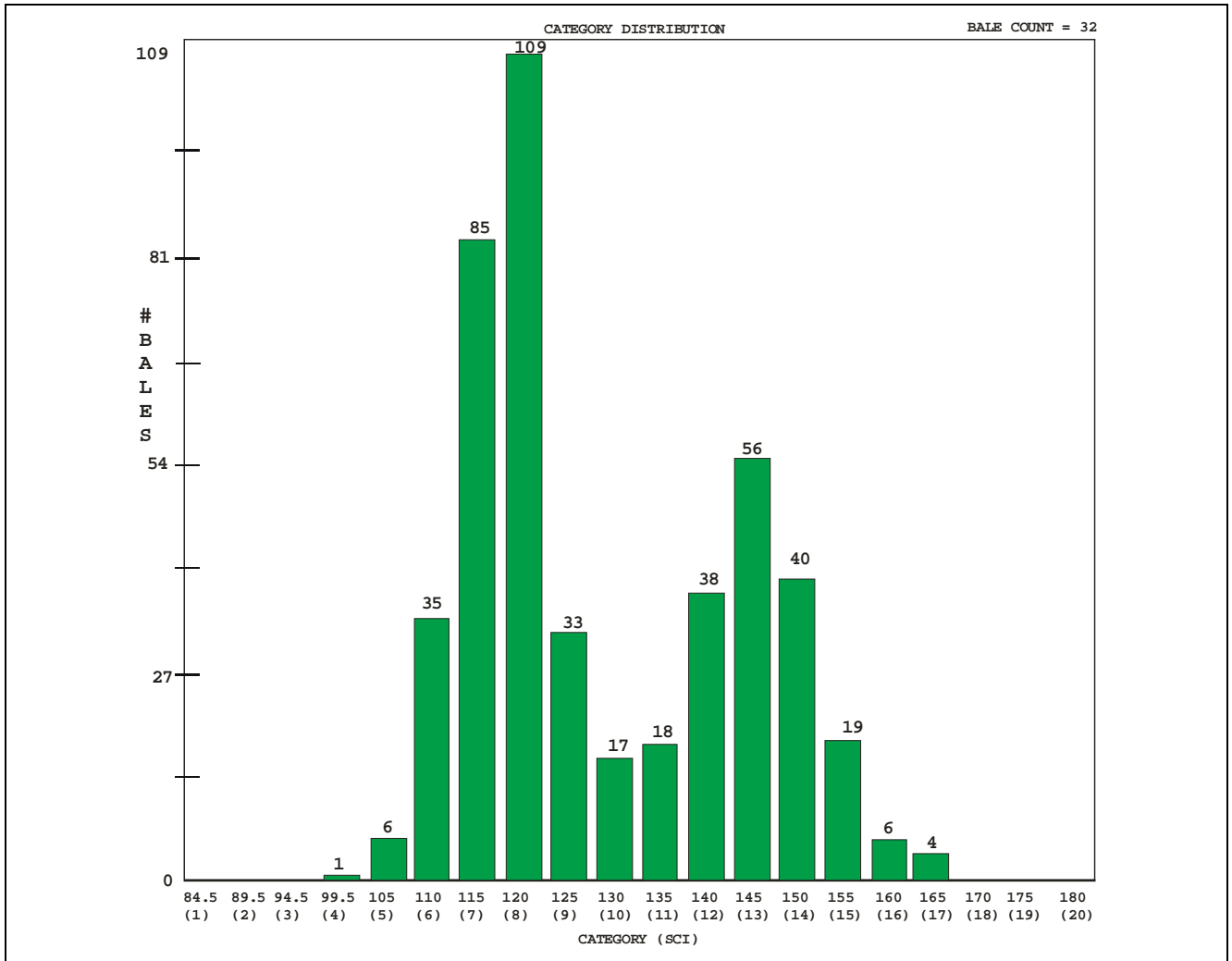


Fig. 6-3 SCI Histogram of all Lots, 04/15/99

Initial Category Definition	
Highest Value of First Category	87
Interval Between Categories	5
First Category Number	1
Number of Categories	20

Table 6-2 Initial Category Definition II

4. Print histograms for all other HVI measured properties.
5. For each property, make a more practical adjustment of the category definitions:
  - a) Reduce the number (quantity) of categories to 10 for each property.
  - b) For each property, set the highest value of the first category and the interval so that the results appear approximately similar as shown in the following histogram:



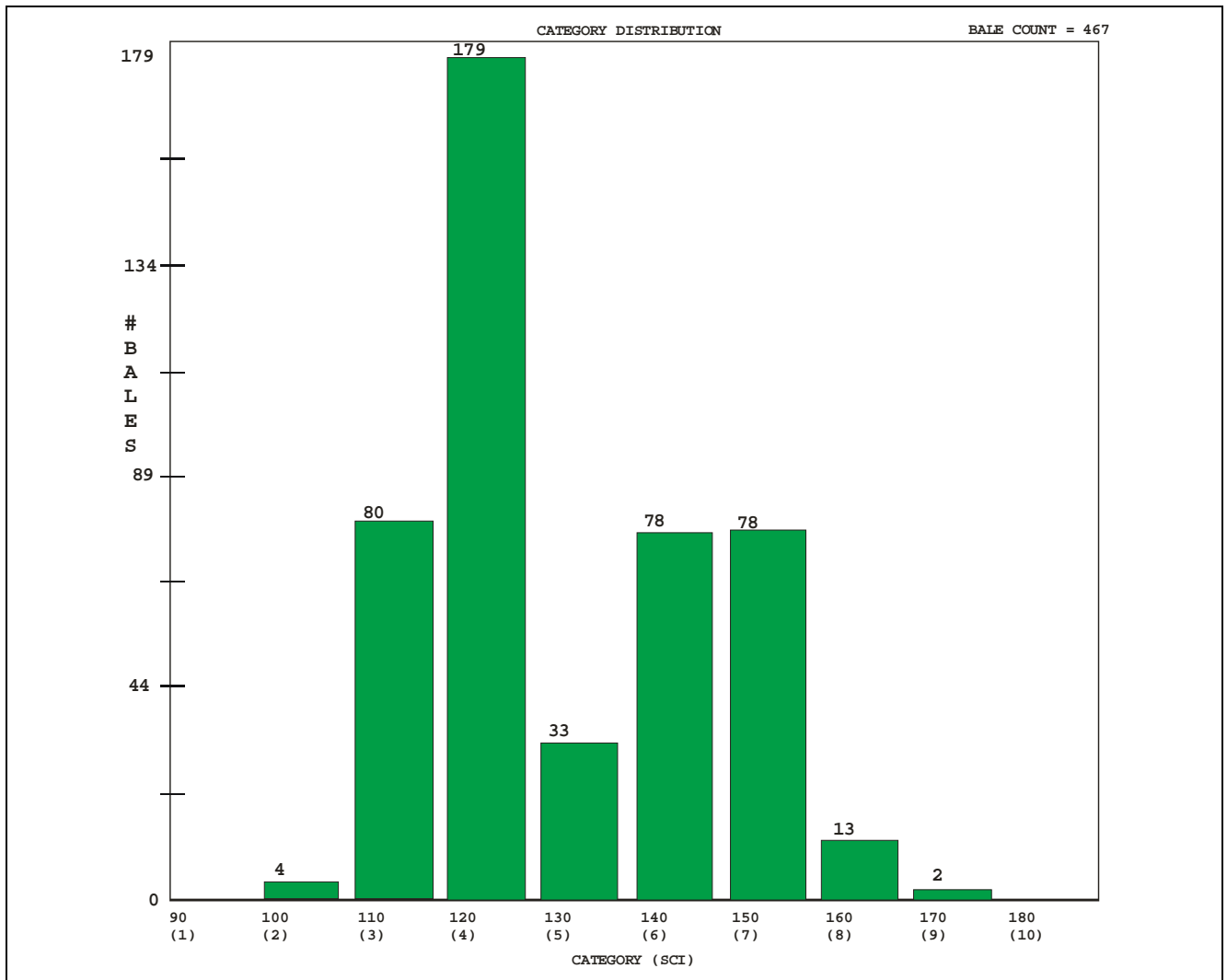


Fig. 6-4 Even Category Distribution, 04/15/99

**Note:**

This is a trial-and-error procedure of achieving final category definitions by changing definitions, observing changes on the monitor, changing definitions again, observing changes on the monitor again, etc. It is desirable to have no more than six or seven (preferably five or fewer) categories for each property. By having a maximum of 10 categories and making the average of each property fall within category five, uniformity of presentation is advantageous.

It is also very important that the shape of the distribution for each property be approximately the same as observed after the above initial category definition.

The major benefit of bale management comes from consistent control of the of fiber properties (via category control) while at the same time using all bales in the warehouse.

For instance: (see Fig. 6-5)

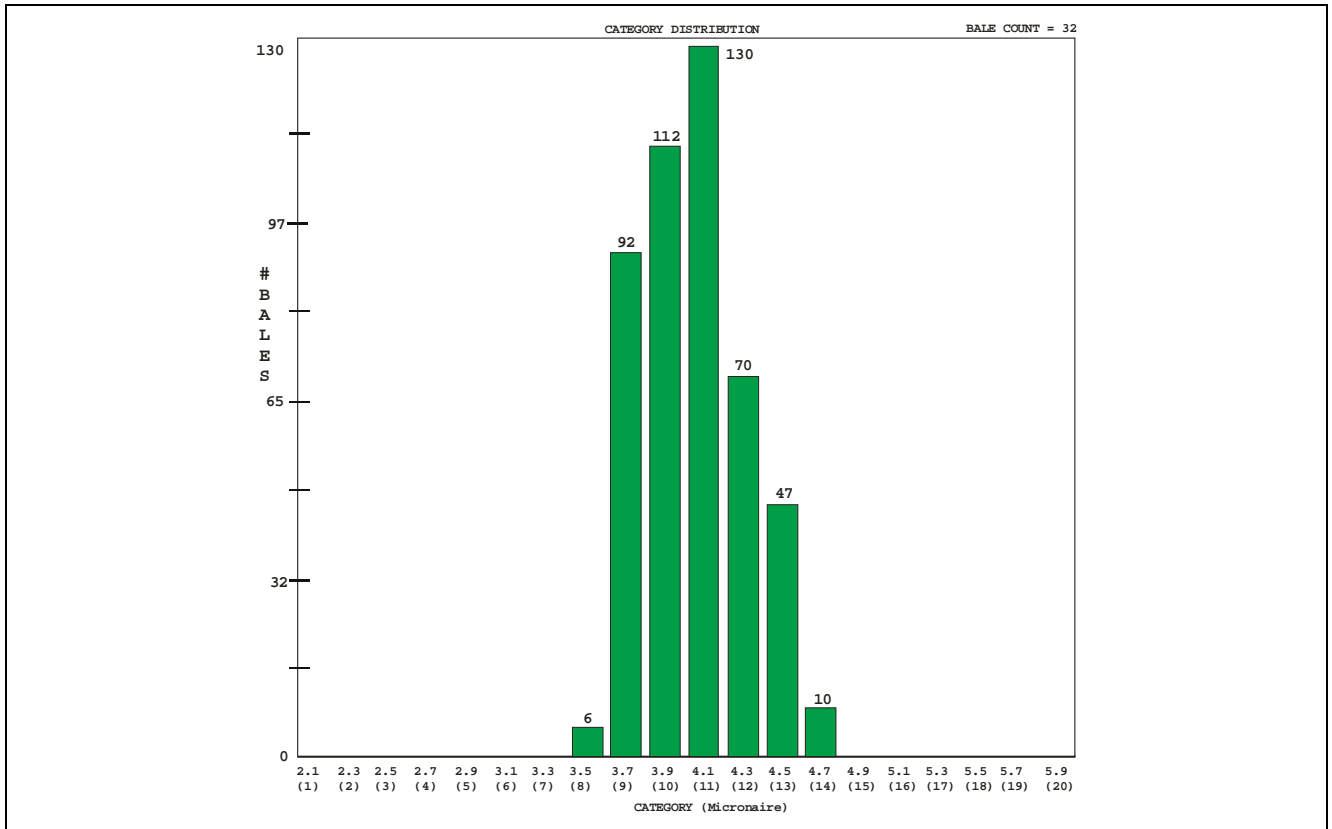


Fig. 6-5 Micronaire Histogram with Initial Category Definition, 04/15/99

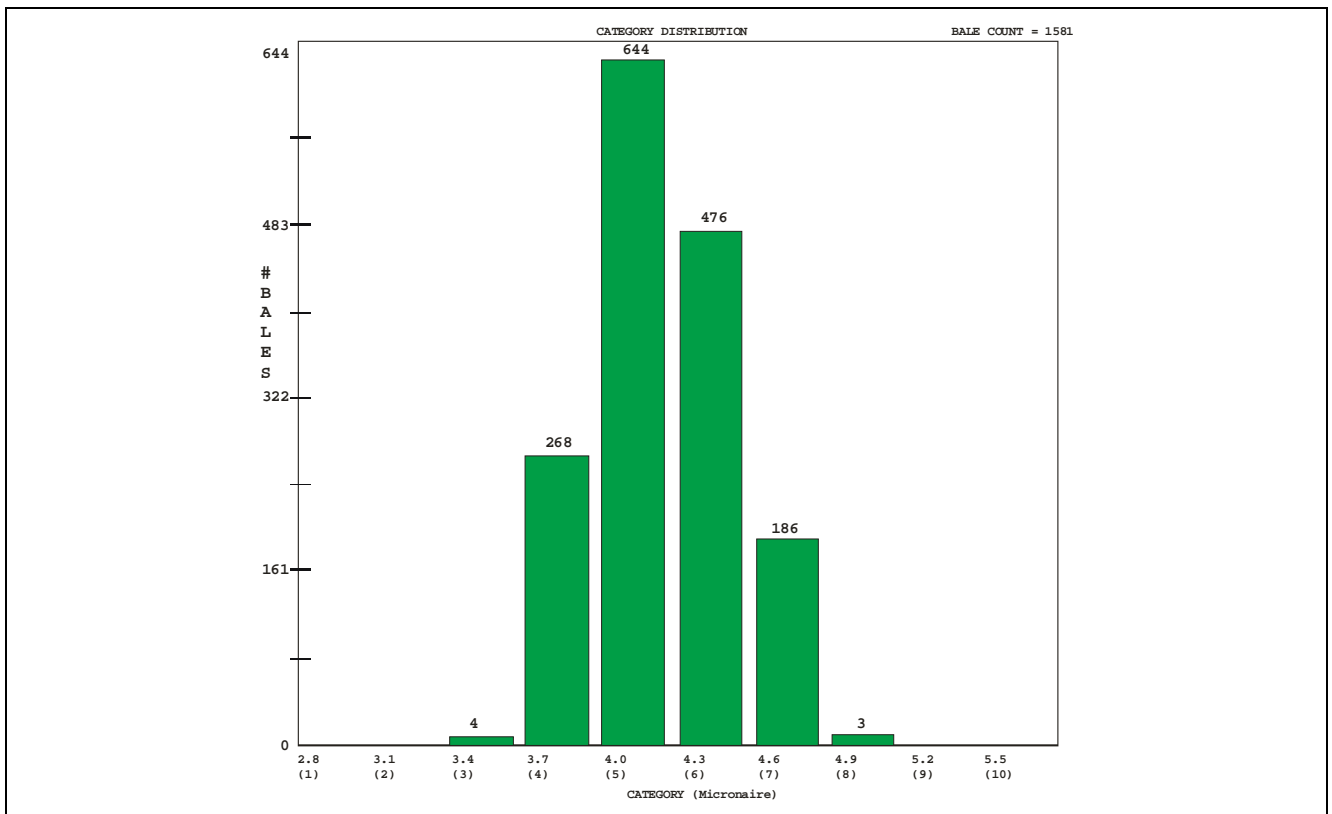


Fig. 6-6 Micronaire Histogram with Final Category Definition, 09/15/99

### Discussion

The result of completing Steps 1.0 and 2.0 is an estimate of what fiber properties are in the warehouse. Essentially, samples from the warehouse have been measured and three assumptions can be made:

- a) If samples are taken from every warehoused bale and tests are made, fiber property averages and distributions would be approximately the same as observed in Steps 3. and 4. **What** is in the warehouse is now known, but **where** it is, is not known.
- b) If a procedure could be established to make each day's bale selection contain approximately the same fiber property distributions as in the warehouse, a continuous spinning consistency could be experienced.
- c) If specifications and procedures for purchasing cotton remain unchanged, the properties of new bales probably will fall within the previously observed distributions. Therefore, as new bales arrive, they can be sampled, tested, categorized and warehoused according to fiber property categories.

### STEP 3: Bale Laydown Selection

1. Without making any changes in procedures, make a bale laydown selection from the warehouse (same grade, staple length, growth area, etc.) except increase the quantity of bales about 30%. For instance, if the normal quantity is 32 bales, select 32 X 1.3, or about 42 bales.

2. On the first day, a change in bale handling is made. Before opening, place all bales in a temporary storage location with enough space between so samples can be taken from each bale. The bales will remain in this temporary storage until HVI test results are complete.

3. Write bale ID numbers on tags (pieces of paper), place the tags in corresponding samples and put the samples in a bag marked with a lot ID number. The lot ID number should begin with the letter "T." Use the date such as "T420" (April 20). Later, all "T" lot ID data will be deleted from computer memory.

If growth area has been an important parameter in the past write the growth area on the tags along with the bale ID

4. Take the samples to the HVI system.

a) Enter the final category definition established in Step 5. These will remain unchanged throughout the complete Bale Management program.

b) Make tests after entering the lot ID and appropriate bale IDs.

c) Write the SCI category number on each tag. Lay out, on a table, the tags in histogram order. Select those tags that have a resultant histogram similar to the desired distribution established in Step 5.

The objective is to select bales having approximately the same SCI category distribution as observed in the histogram of step 5., which represents the actual SCI distribution in the warehouse and where the percent of bales in each category is observed. If 41% of all bales are in category 4, then 41% of a 32-bale laydown is 13.1 bales. Therefore, 13 bales of a category 4 are needed in the 32-bale laydown.

Likewise, if 15% of the bales are in SCI category 6, (15% of 32 is 4.8), then 5 bales in the laydown should be category 6 bales, etc.

5. Remove the 32 bales needed for the laydown from the temporary storage area according to the tags selected in Step 5.3.4 above.

6. Place corresponding tags showing category numbers on the remaining bales. These already tested and categorized bales will remain in temporary storage ready to be used, if necessary, for future laydown selection.
7. On the second day, repeat procedures of day one (Steps 2 – 6). The quantity of categorized bales in temporary storage will now be about 60% of a needed laydown.
8. On the third day, it will not be necessary to select more than the 32 bales usually needed from the warehouse. The third day's selection (after testing and tagging), along with those already tested in temporary storage, will be an adequate quantity from which a controlled SCI category laydown can be selected. There will always be about 60% more tested bales in temporary storage than necessary for laydown.
9. Continue the above procedures until all bales in the warehouse have been consumed.

#### **STEP 4: Categories and Warehousing of Incoming Bales**

1. Before new bales are placed in the warehouse, take a sample from each, put a tag marked with the bale ID number and growth area in each sample and take the samples to the HVI system for testing.
2. For testing, the lot ID should NOT begin with the letter "L" or "T." Before testing, use the HVI **DATABASE** feature under **REPORTS** to delete from the database all of the date in all lot IDs beginning with the letter "L" or "T." The result should be an empty database. Check to make sure by going to HVI **REPORTS** and run **GRAPHS**. No lot IDs should be in the database to be selected.

**Important:** As long as testing is performed during the time periods of Steps 1, 2 and 3, the database will include date from lot IDs "L" and "T." Data derived after bales have been taken from the warehouse is data that must not be included in an active future database. Therefore, Step 2. must be performed every time prior to making tests of new bales.

3. Using the established final category definitions of Step 5., test the samples and make a bale tag, showing the bale ID number and category number.
4. Attach the bale tags to the new bales and move them into warehouse storage.

#### **STEP 5: Continuation**

1. Continue the procedures described above until all old bales in the warehouse have been consumed. During this time, new bales marked by category (Step 4) will take the place of old consumed bales from the warehouse.
2. It is possible that during this period of time, a newly arrived category marked "bale" could be used to help make laydowns using old untested bales (Step 4.) If so, delete the data associated with that bale using the bale ID number.
3. So far all of the work has been done under the **REPORTS** feature of the USTER® *HVI*. At this point, the **BALE MANAGER** feature that includes making mixes (bale laydowns) will be used.

## 6.4 Making Mixes/Laydowns

A “**mix**” is defined as a group of bales or a laydown that are combined in a mill to create a yarn. The MIX menu is used to access the following screens:

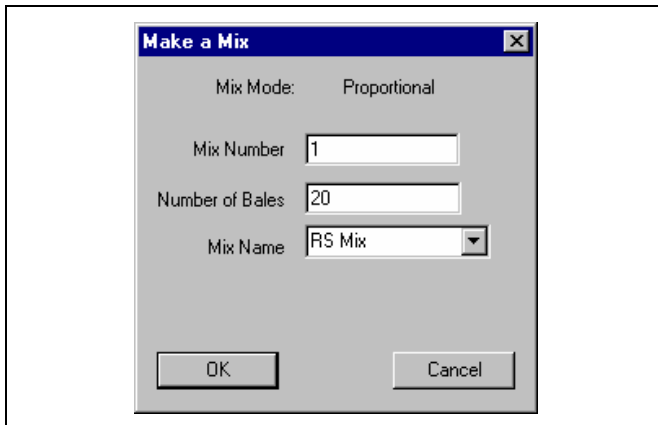
- Make a Mix (used to select a specified number of bales out of the inventory to an assigned mix name)
- Active Mixes
- Preview/Accept Mix

Each of these functions is described below:

### 6.4.1 Make a Mix

This screen is used to choose the bales from the “working” inventory that will be used to create the mix.

Select the **MIX** menu from the main **BALE MANAGER** screen. Then select **MAKE**. The **MAKE a MIX** screen will appear.



The Mix Mode is determined by the SYSTEM CONFIGURATION screen and can be either “Proportional” or “Centered.” Refer to Section 5.4 of the Instruction Manual for a detailed description of these modes.

Fig. 6-7 Make a Mix

Enter the number assigned to the mix, and then enter the number of the bales that will comprise the mix. Select the name of the mix from the “Mix Name” pull-down list. Press OK when finished. The mix name and the mix criteria are described in Section 4.4 of the Instruction Manual.

The criteria for selecting bales for a mix will appear showing the category number, the number of bales in the inventory, the number of bales in each category that needs to be selected, and the bale laydown location on the opening room floor.

SCI	Micronaire	Proportional Growth Area	Bales in Inventory	Bales in Mix
3	5	1	80	1
3	6	1	76	1
3	7	1	36	1
4	4	1	169	2
4	5	1	256	3
4	6	1	137	2
4	7	1	77	1
5	5	1	44	1
5	6	2	26	1
5	7	2	27	1
6	5	2	83	1
6	6	2	114	2
7	5	2	122	2
7	6	2	74	1
<b>Total</b>			<b>1581</b>	<b>20</b>

**Plucker Bale Laydown for Mix # 1**

1	4	2	4	3	6	4	7	5	7	6	7	8	5	9	4	10	3
	4		5		5		5		6		5		7		7		7
11	3	12	3	13	4	14	5	15	6	16	4	17	4	18	4	19	4
	6		5		4		6		6		6		6		5		5

Fig. 6-8 . Bale Laydown “Pick” Sheet

Make a print of this “pick sheet” to be handed over to the person responsible for selecting (picking) the bales from the warehouse. That person will record the bale ID numbers of the selected bales and hand over the list of numbers to the Bale Management computer operator.

### 6.4.2 Active Mixes

Select the MIX menu from the MAIN BALE MANAGER screen. Then select the ACTIVE MIX item. The ACTIVE MIXES screen will appear.

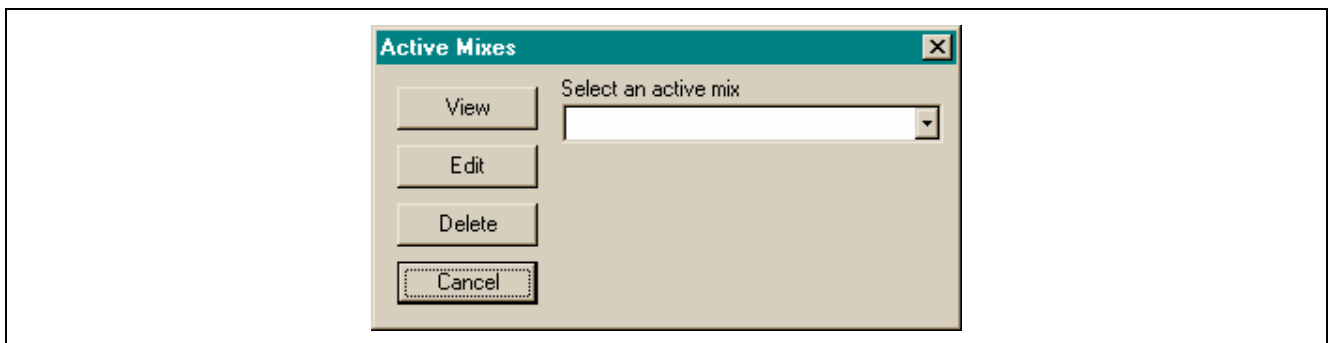


Fig. 6-9 Active Mixes

This screen is used to view, edit or delete a previously created, but unaccepted, mix. This screen also can be used to delete an active mix.

6.4.3 Preview/Accept Mix

Select the MIX menu from the MAIN BALE MANAGER screen. Then select PREVIEW/ACCEPT. The PREVIEW/ACCEPT screen will appear.

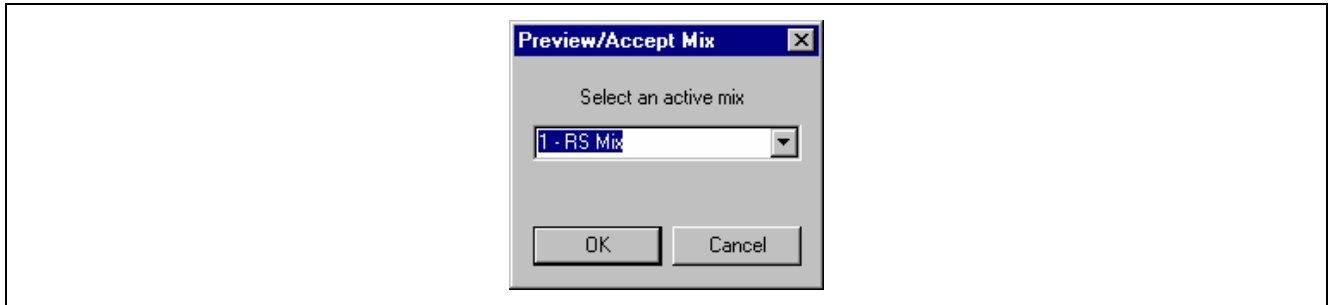


Fig. 6-10 Preview/Accept Mix

Select an active mix, and then press OK.

PREVIEW/ACCEPT MIX will appear where bale ID numbers must be entered. As each bale ID is entered, the lot ID values for each fiber property will appear. When bale ID's are entered, the summary table will appear, showing the mean (average) value, standard deviation and %CV of each fiber property in the mix/laydown.

	SCI	Micronaire	Proportional Growth Area	Bales in Inventory	Bales in Mix
	3	5	1	80	1
	3	6	1	76	1
	3	7	1	36	1
	4	4	1	169	2
	4	5	1	256	3
	4	6	1	137	2
	4	7	1	77	1
	5	5	1	44	1
	5	6	2	26	1
	5	7	2	27	1
	6	5	2	83	1
	6	6	2	114	2
	7	5	2	122	2
	7	6	2	74	1
<b>Total</b>				<b>1581</b>	<b>20</b>

Plucker Bale Laydown for Mix # 1																			
1	4 4	2	4 5	3	6 5	4	7 5	5	7 6	6	7 5	7	6 6	8	5 7	9	4 7	10	3 7
11	3 6	12	3 5	13	4 4	14	5 6	15	6 6	16	4 6	17	4 5	18	4 6	19	4 5	20	5 5

Fig. 6-11 Preview/Accept Mix

At this moment, the bales have been removed from the physical warehouse inventory but not from the computer's inventory. Therefore, the opportunity is presented to review the mix data by observing the fiber properties of any selected bales and by observing the histograms of any selected fiber property.

After observing the fiber property date, it may be decided that an undesirable bale has been selected. After entering the bale ID, that bale can be removed from the computer program by using the REMOVE button. However, it also must be physically removed from the laydown. Another bale can then be selected from the warehouse and the bale ID entered.

If the mix selection is approved and the bales are placed in the opening room for consumption, the data is removed from the computer inventory and transferred to the MIX HISTORY file by using the ACCEPT button.

#### 6.4.4 View Inventory Bale Data

The VIEW menu is used to access the VIEW INVENTORY BALE DATA, VIEW MIX HISTORY and VIEW MIX HISTORY HISTOGRAM screens.

Select the VIEW menu from the MAIN BALE MANAGER screen. Then select INVENTORY. The VIEW INVENTORY BALE DATA screen will appear.

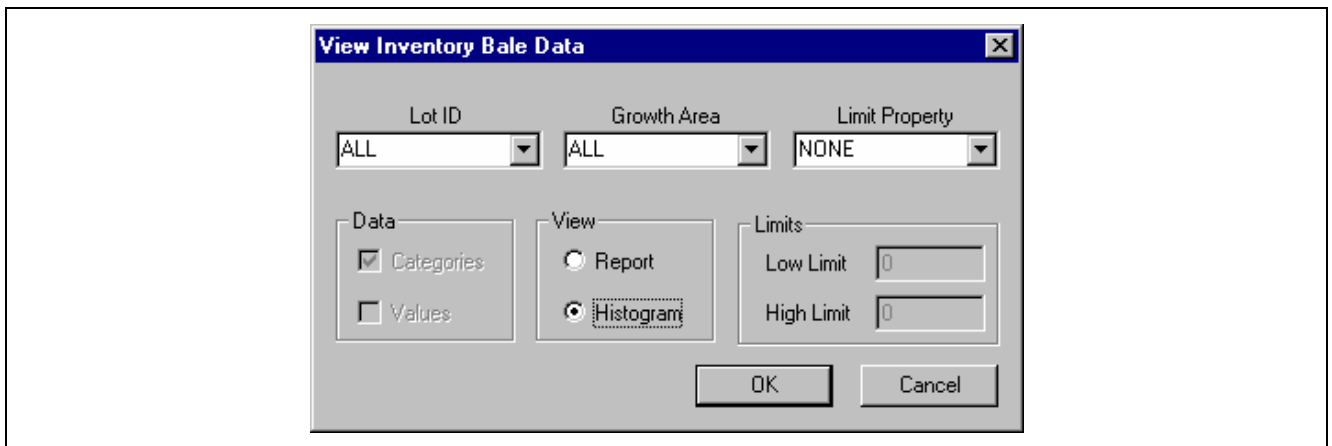


Fig. 6-12 View Inventory Bale Data

This screen is used to generate inventory reports based on the selected criteria.



### 6.4.5 View Mix History

Select the VIEW menu from the MAIN BALE MANAGER screen. Then select HISTORY. The VIEW MIX HISTORY screen will appear.

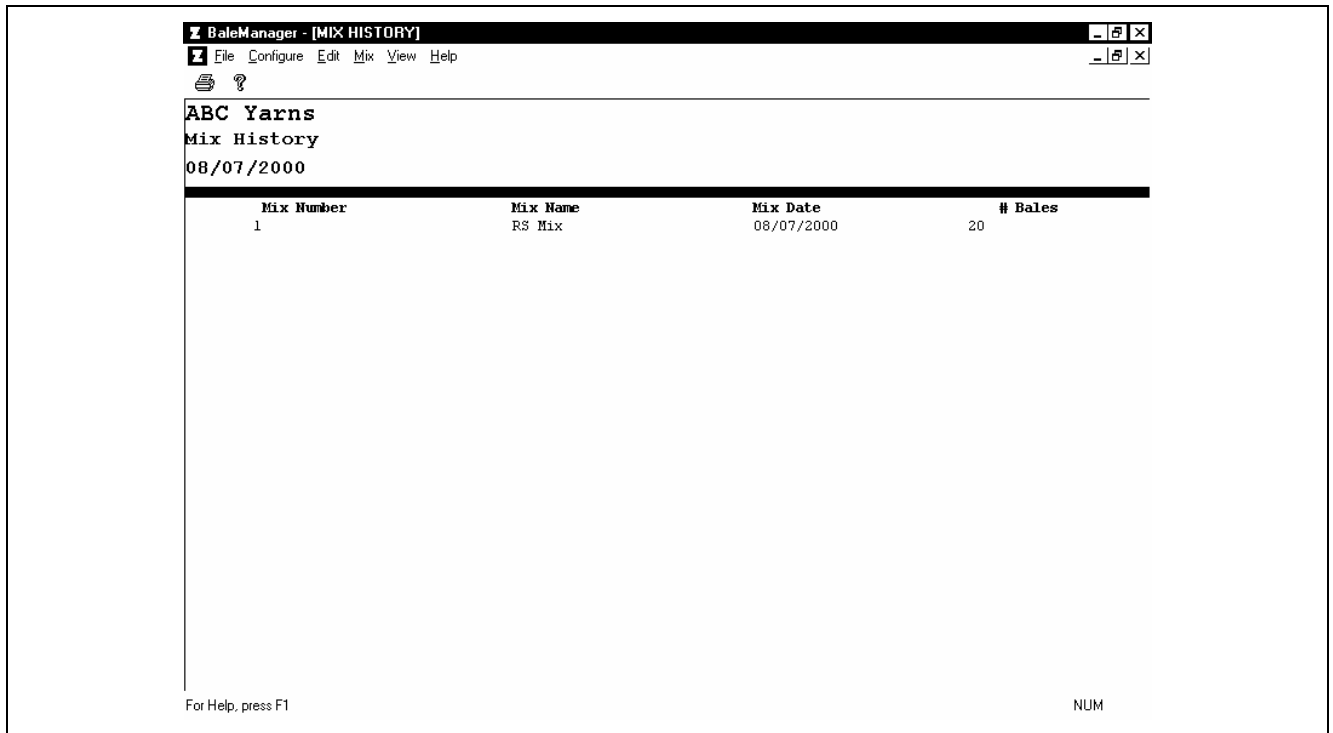


Fig. 6-13 Mix History

The mix history is used to document what mixes have been made in the past. This information is useful for the mill manager developing trend analyses.

### 6.4.6 View Mix History Histograms

Select the VIEW menu from the MAIN BALE MANAGER screen. Then select HISTORY and HISTOGRAM. The VIEW MIX HISTORY HISTOGRAM screen will appear.

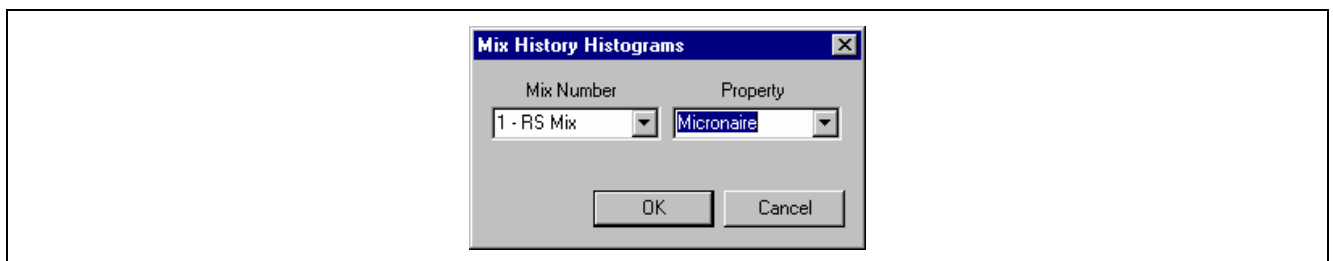


Fig. 6-14 Mix History Histograms

Enter the Mix Number and the Property by selecting them from the pull-down lists in the window. The histogram will be displayed.

## 6.5 Application examples

### 6.5.1 Introduction

Section 6.3 of this chapter shows how to get started with BALE MANAGER, specifically how to set up a category system. The different BALE MANAGER functions are described in further detail in this section.

Working through the following two application examples explains the BALE MANAGER concept to the HVI user in detail. The step-by-step procedures show every necessary operation that is required, starting with data import until making a mix. The user learns selecting the right bales for a specific application, as defined by the respective spinning mill.

One example named “ABC Yarns” shows the software use by a yarn spinner testing every bale of cotton; the other named “XYZ Yarns” is for use when only a percentage of bales are tested in Module Testing:

- **ABC Yarns – 100% System Testing** (every bale)
- **XYZ Yarns – Module Testing** (only a number of bales tested per lot)

The BALE MANAGER operates as a completely software separate program of the USTER® *HVI*. The USTER® *HVI* runs its database independently during test operation. Therefore, the test data from the USTER® *HVI* test mode needs to be imported to the BALE MANAGER software in a separate step (see Chapter 8 of the USTER® *HVI* Instruction Manual). It is very important to use the same setups in both software parts (the TESTING and the BALE MANAGER), specifically the category definitions and the SCI coefficients. Also, we recommend using the BALE MANAGER on a separate PC since regular cotton testing on the USTER® *HVI* may interfere with the BALE MANAGER operation.

The data used for these two application examples is available on the following data diskettes:

- ABC Yarns, Eastern Growth Area (diskette 1)
- ABC Yarns, Western Growth Area (diskette 2)
- XYZ Yarns (diskette 3)

Only data from these disks should be used for the following step-by-step procedures in order to get to the same results as described in the Manual.

### 6.5.2 ABC Yarns

Universally, there are two general methods used by spinners to purchase and warehouse bales of cotton. The traditional method named “Module” in the Bale Manager Software assigns to all bales received the average values of a small tested percentage of bales. The result is that all bales in a received group are declared identical. In the modern method, “100% System”, each and every bale received for consumption is tested. This method recognizes the between bale differences, leading to benefits gained by better control of those physical properties which dictate spinning performance and yarn quality.

The following is an example, step-by-step “100% System” procedure, of the use of Bale Manager software by hypothetical cotton yarn spinner named “**ABC Yarns**”.

Spinning:	Ring (RS) and Open End (OE)
Yarn:	100% Carded
Cotton Procurement:	2 Classer Grades 2 Classer Staple Lengths (inches) 2 Growth Areas (Eastern & Western) Micronaire (4.1 average with 3.5 to 4.9 range)
Warehouse Capacity:	2000 Bales
Areas within Warehouse:	One for Eastern Growth Area Bales One for Western Growth Area Bales
Within Growth Area Storage:	By Grades
Within Grades Storage:	By Staple Lengths
Consumption:	20 Bales per Day
Mix Selection:	In Proportion to Growth Area, Grade, Staple Length
Openers:	Automatic Plucker

### Step 1: Configure software to match the mill’s mode of operation

1. Select Bale Manager on the USTER® *HVI* screen (Fig. 6-15)

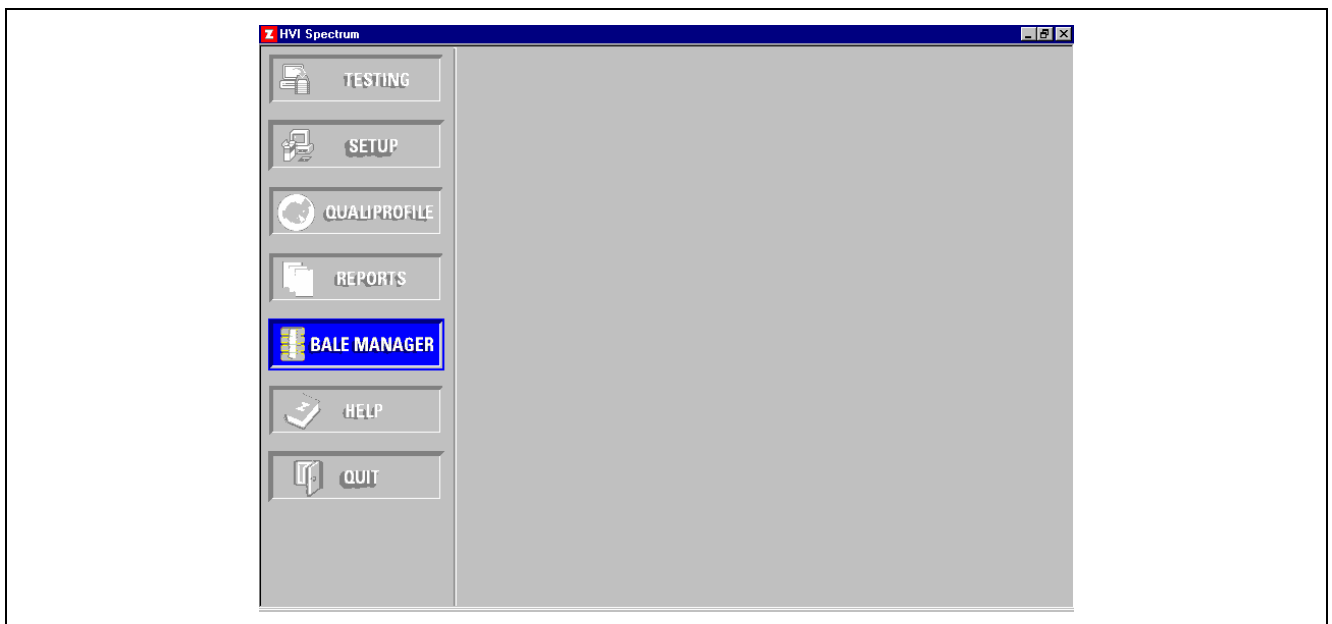


Fig. 6-15 USTER® *HVI* – Main Screen

2 Immediately, the Bale Manager window will appear (Fig. 6-16).

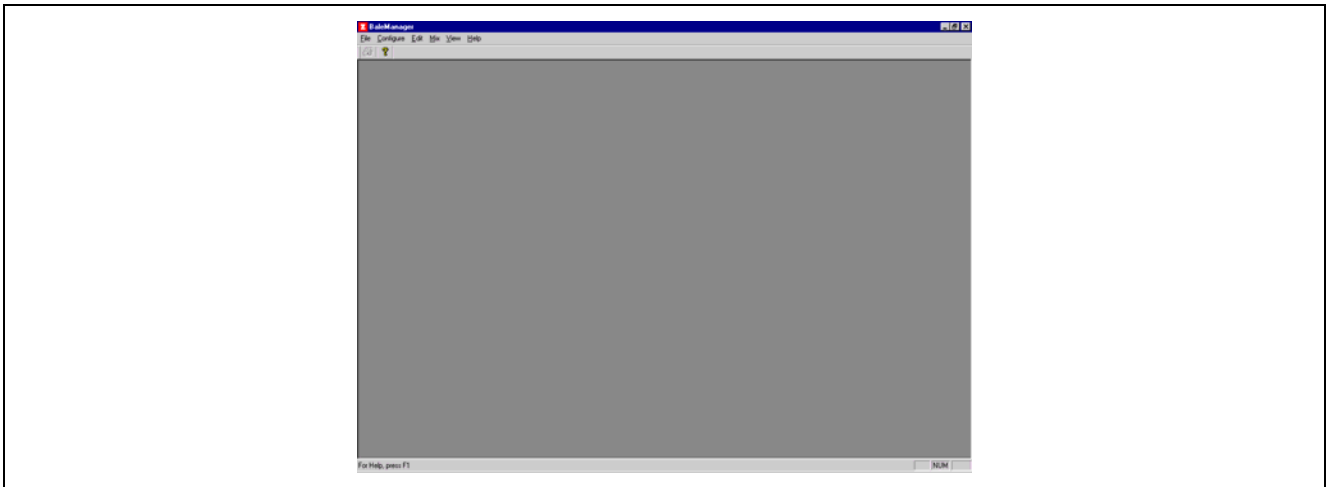


Fig. 6-16 Bale Manager Main Screen

3 Select Configure and a pull-down window will appear.

4 System

Select System from the pull-down menu and the following screen will appear (Fig. 6-17)

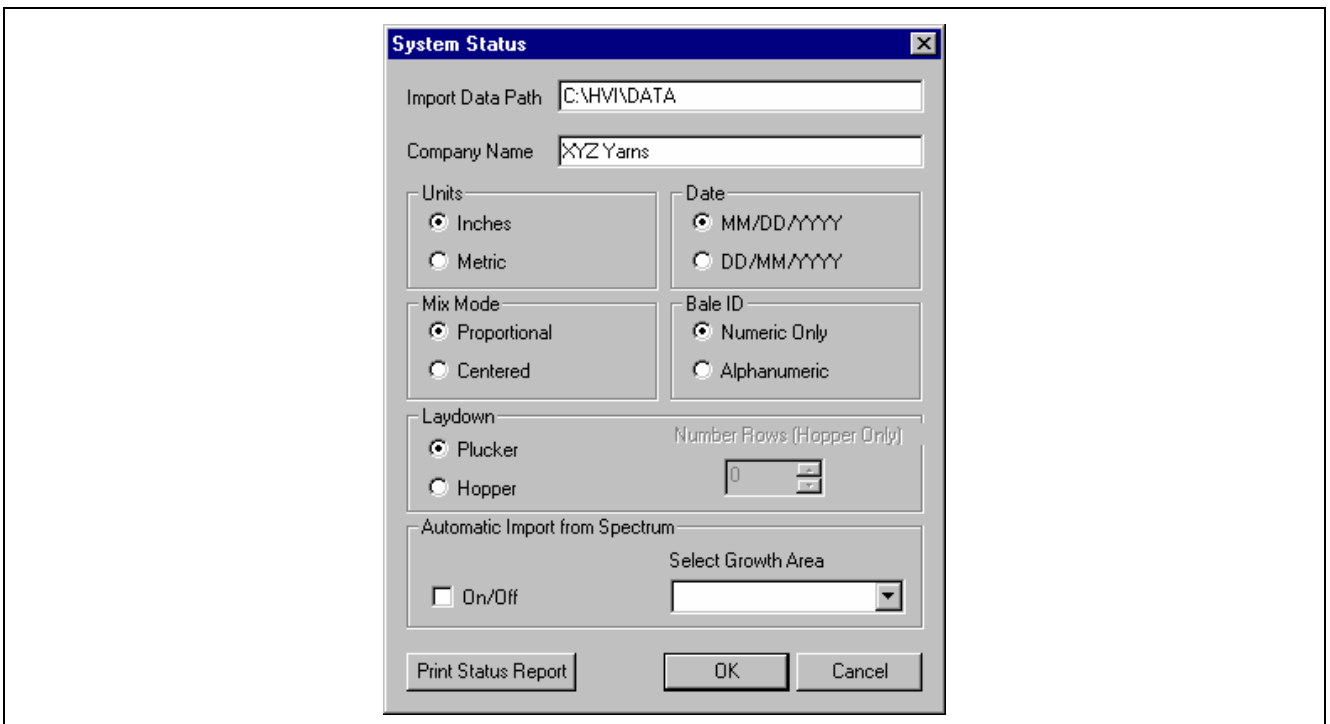


Fig. 6-17 System Status Screen

4.1 Leave the import data path at C:\HVI\DATA (Attention: DO NOT CHANGE).

4.2 Highlight and delete the existing company name and enter "ABC Yarns"

- 4.3 Select Inches for Units.
- 4.4 Select Proportional for Mix Mode.
- 4.5 Select Plucker for Laydown.
- 4.6 Select mm/dd/yyyy for Date.
- 4.7 Select Numeric for Bale ID.
- 4.8 Leave On/Off and Select Growth Area blank. These 2 choices will be selected and changed at the time when data will be directly imported from the Database.
- 4.9 Select OK to exit the System Status window and go back to the Bale Manager window (Fig. 6-16).

### 5 Categories

Select Configure again and on the pull-down menu select Categories. The Define Categories window appears (Fig. 6-18).

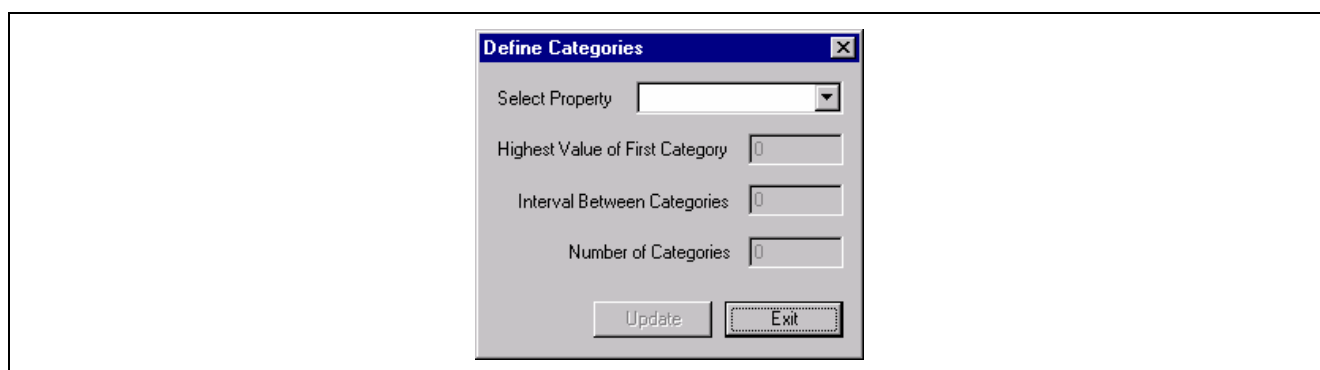


Fig. 6-18 Define Categories Screen I

#### Discussion:

As explained in section 5.1 of the “HVI Application Handbook”, spinners have used the Category System for some sort of Bale Management for a very long time.

For purchasing, warehousing, and mix selection in this example, ABC Yarns has 2 Growth Areas, 2 Grades and 2 Staple Lengths equaling a total of 8 Categories of cotton.

In order to use the HVI data and to observe measured fiber property distribution, it is necessary to put the data of all measured properties into Categories.

Since in the beginning range in measurements is not known (tests have not yet been made), Initial Category Definitions that cover the range of the world’s medium length cottons are entered.

**Please, read section 6.3 “Getting Started” of this Application Manual before proceeding further in this example.**

## 6 Temporary Initial Category Definition

Select the down arrow (Fig. 6-18) to position the cursor at Select Property to see the list of fiber properties (Fig. 6-19).

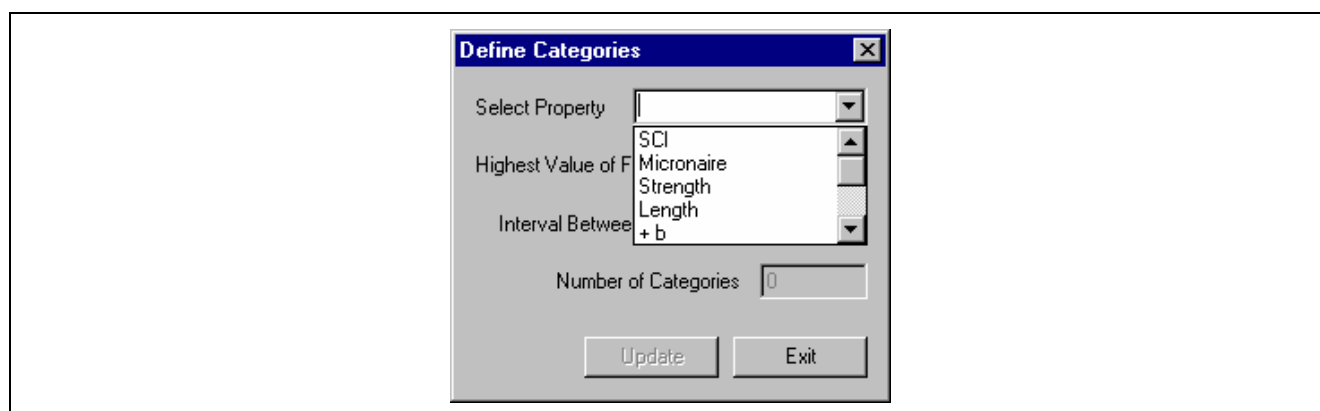


Fig. 6-19 Define Categories Screen II

6.1 Select and highlight SCI. Enter 87 for the Highest Value, 5 for the Interval Between and 20 for the Number of Categories (Fig. 6-20)

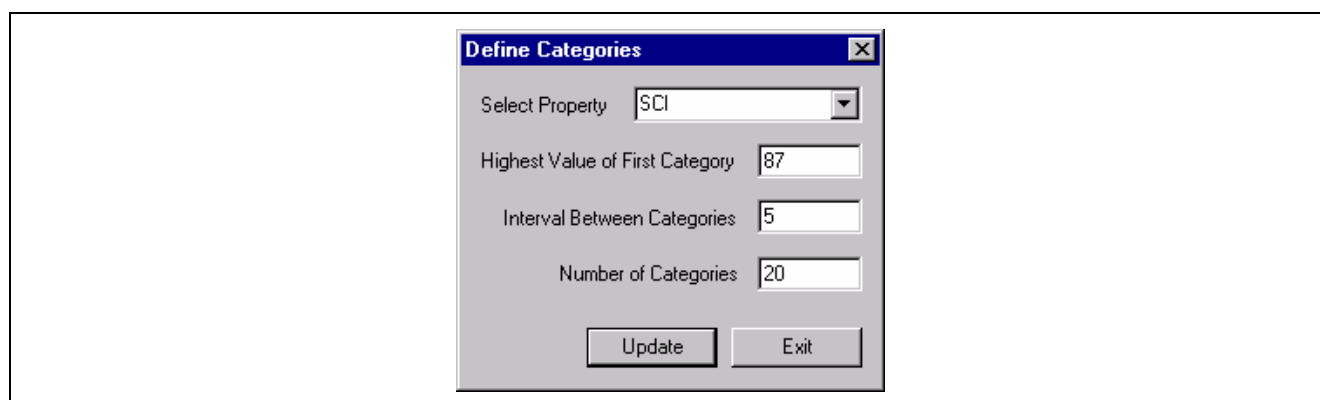


Fig. 6-20 Define Categories Screen III

6.2 Select Update then Exit.

6.3 A warning screen appears that makes you aware of the impact that changing the categories does have (Fig. 6-21).

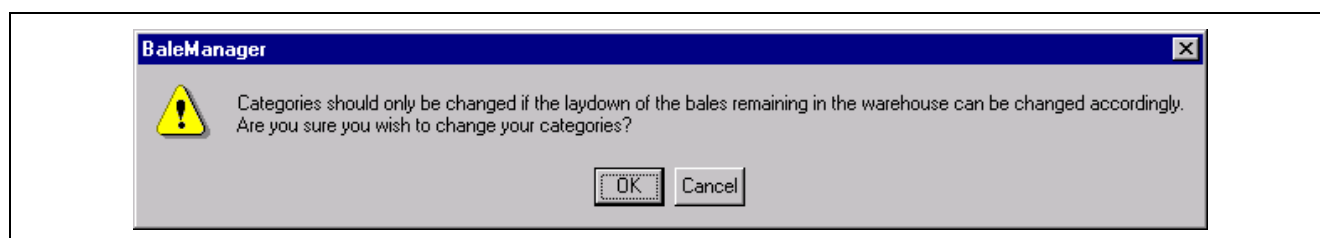


Fig. 6-21 Category Warning Screen

Ignore the message at this point in time and select O.K.

## 6 Bale manager

- 6.4 Select Configure again and on the pull-down menu select Categories (Fig. 6-18). Same as step 5.
- 6.5 Select and highlight Micronaire. Enter 2.2, 0.2, and 20 respectively, for the Highest Value, Interval Between, and Number of Categories.
- 6.6 Perform the above procedures for all of the listed fiber properties using the following values, then Exit to return to Bale Manager (Fig. 6-15).

Property	Highest Value of First Category	Interval Between Categories	Number of Categories
SCI	87	5	20
Micronaire	2.2	0.2	20
Strength	18.5	1.0	20
Length (inches)	0.86	0.03	20
+b	4.5	0.6	20
Rd	46.0	2.0	20
Uniformity	70.5	1.0	20
SFI	2.0	2.0	20
Elongation	1.0	1.0	20
Trash Count	5	5	20

Table 6-3 Initial Category Definition

## 7 Growth Areas

Select Configure again and on the pull-down menu select Growth Areas (Fig. 6-22).

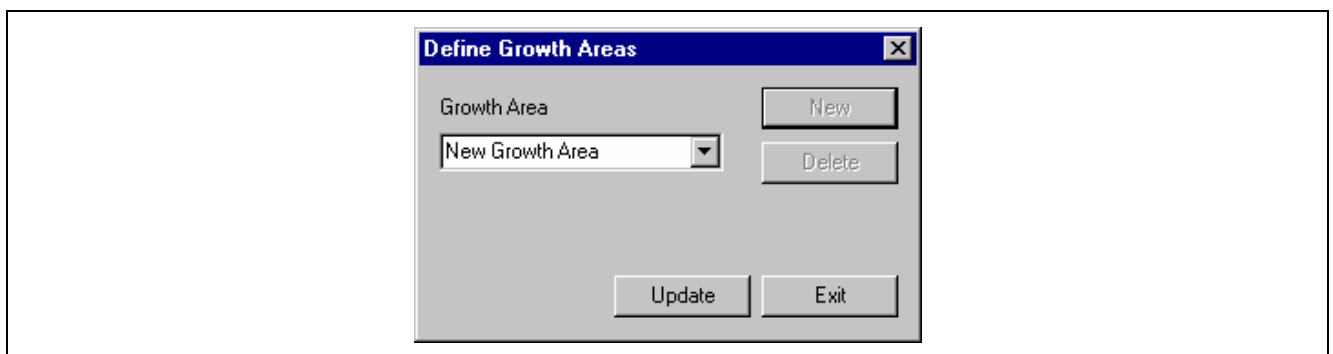


Fig. 6-22 Define Growth Areas, Screen 1

- 7.1 Select New. "New Growth Area" will appear. Highlight it and type in Eastern, followed by selecting Update. The window of Fig. 6-23 will appear.

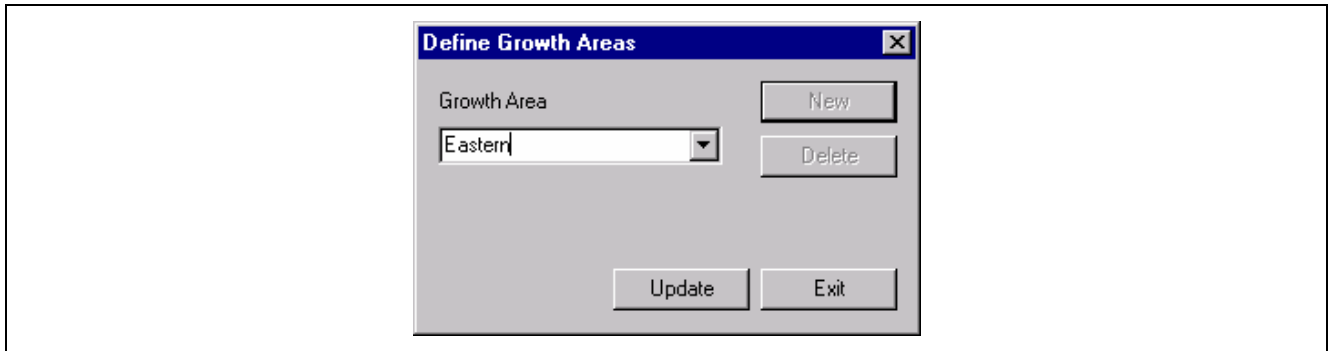


Fig. 6-23 Define Growth Areas, Screen II

7.2 Fig. 6-24 will allow you to select OK returning to the window of Fig. 6-22



Fig. 6-24 Added Growth Area Screen

7.3 Select New, highlight it and type in Western followed by selecting Update. The window of Fig. 6-23 will re-appear.

7.4 Select OK to return to the window of Fig. 6-22.

7.5 Select Exit to complete Growth Area entry and return to the Bale Manager window of Fig. 6-16.

## 8 Mix Criteria

Select Configure again and on the pull-down menu select Mix Criteria. The Define Proportional Mix Criteria window of Fig. 6-25 will appear.

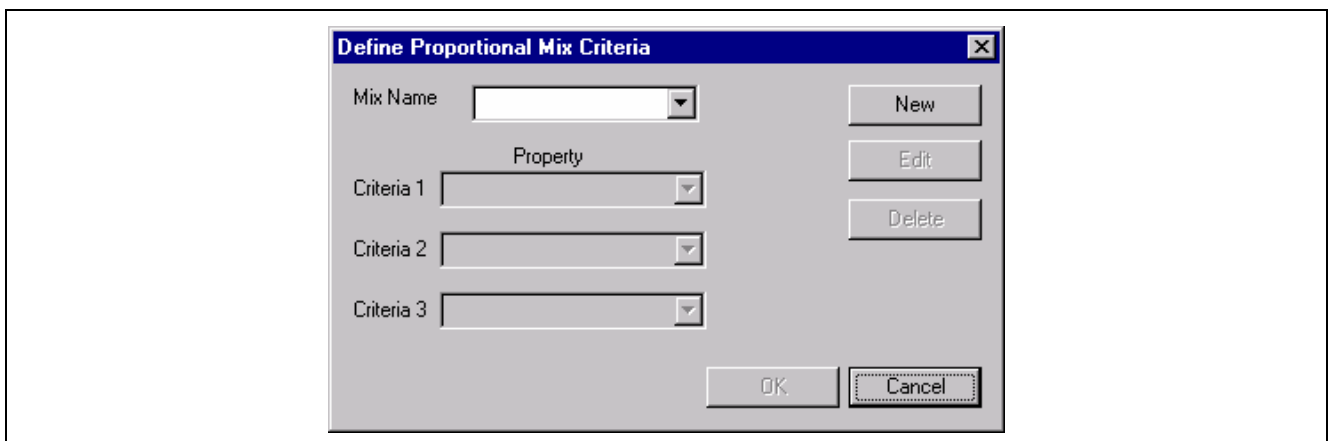


Fig. 6-25 Define Proportional Mix Criteria, Screen I



8.1 Select New. "New Mix Criteria" will appear. Highlight it and type in the name "RS Mix", followed by selecting OK (Fig. 6-26).

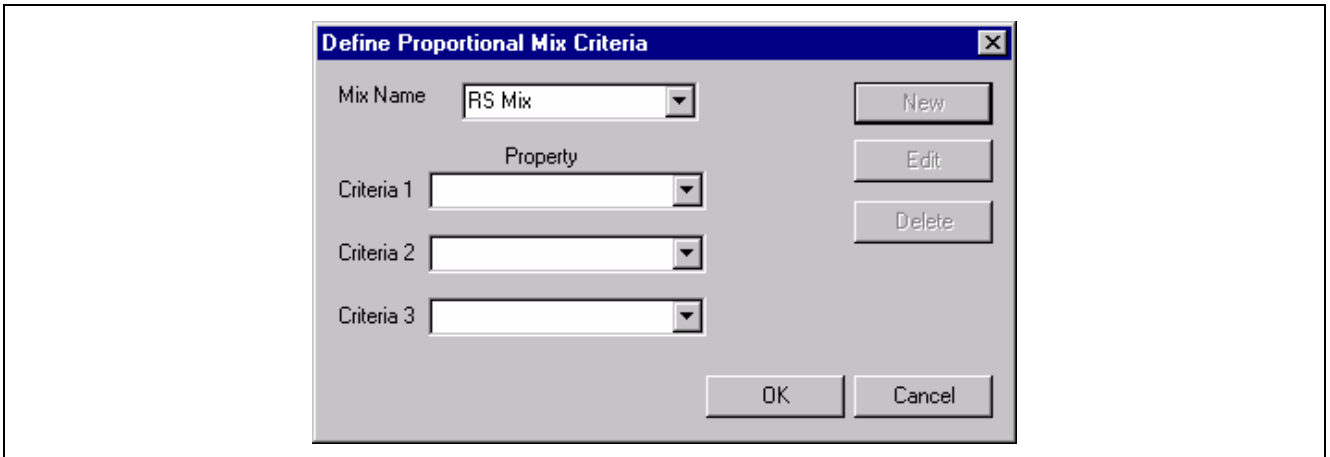


Fig. 6-26 Define Proportional Mix Criteria, Screen II

8.2 Use the pull-down menu at Property to select SCI, Micronaire and Proportional Growth Area for Criteria 1, 2 and 3 (Fig. 6-27).

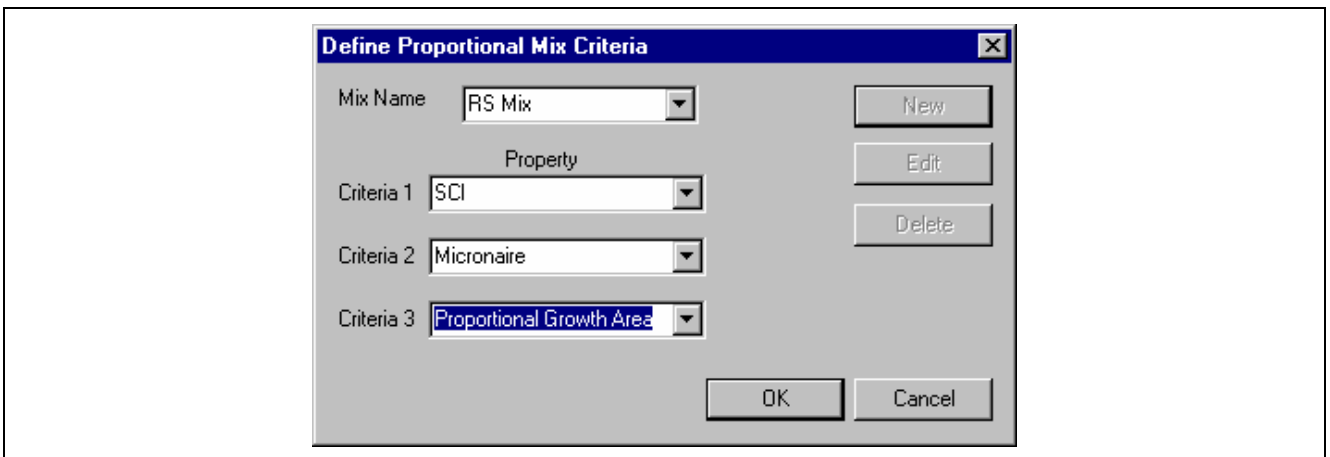


Fig. 6-27 Define Proportional Mix Criteria, Screen III

8.3 "Mix name added" will appear (Fig. 6-28). Select OK to return to the Bale Manager window of Fig. 6-16.



Fig. 6-28 Added Mix Name Screen

8.4 Select OK and return to the Bale Manager window of Fig. 6-16.

## 9 SCI Calculation

Select Configure again and on the pull-down menu select SCI Calculation. The screen of Fig. 6-29 will appear.

		Standard
Constant	-414.67	-412.70
Strength	2.9	2.90
Micronaire	-9.32	-9.32
Length	49.17	49.28
Uniformity	4.74	4.80
Rd	0.65	0.65
+b	0.36	0.00
Trash Area	0	0.00

Reset

OK Cancel

Fig. 6-29 Define SCI Coefficients Screen

### Discussion:

The Standard values are coefficients derived from extensive research by multiple regression analysis establishing the relationships of fiber properties to yarn properties and spinning performance. Data were obtained from tests of a large number of samples from many growth areas, and many varieties, having a wide range in values approximately equal to the range of the world's short and medium length cotton. It is recommended that the Standard coefficients be used and never changed without consultation with Uster Technologies.

9.1 Select OK to return to the Bale Manager window in Fig. 6-16.

Note: These seven steps, 2.0-9.0, complete the software configuration to match the mills mode of operation.

**Step 2: Import data**

In order to simplify the explanation of this step-by-step procedure, without having to make tests, data import is made by the use of two floppy disks for ABC Yarns supplied with this Bale Manager Example. Disk 1 contains Eastern Growth Area data and disk 2 contains Western Growth Area data.

10.0 In the Bale Manager window of Fig. 6-16, select File then Import in the drop-down menu.

10.1 The Data Import window will appear (Fig. 6-30).

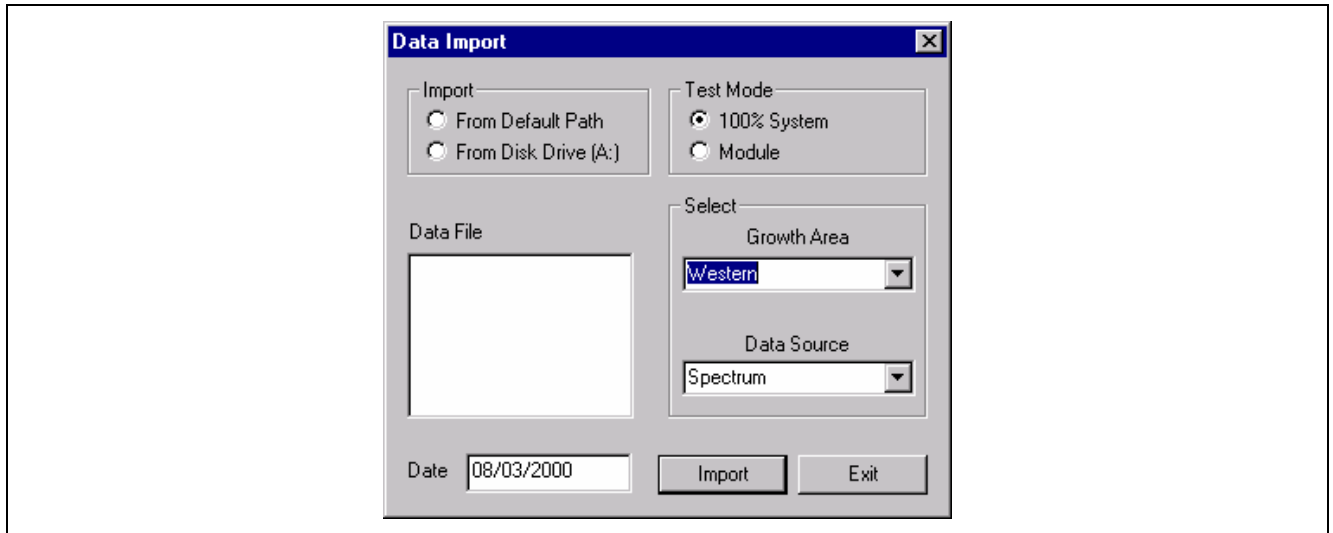


Fig. 6-30 Data Import, Screen I

10.2 Insert disk 1, ABC Yarns, Eastern Growth Area in the A drive on the computer. Under Import select "From Disk Drive A" ("From Default Path" would have been selected if data had come directly from the Database). Under Test Mode select "100% System", at Growth Area select "Eastern" and at Data Source select "Version 09" (Fig. 6-31).

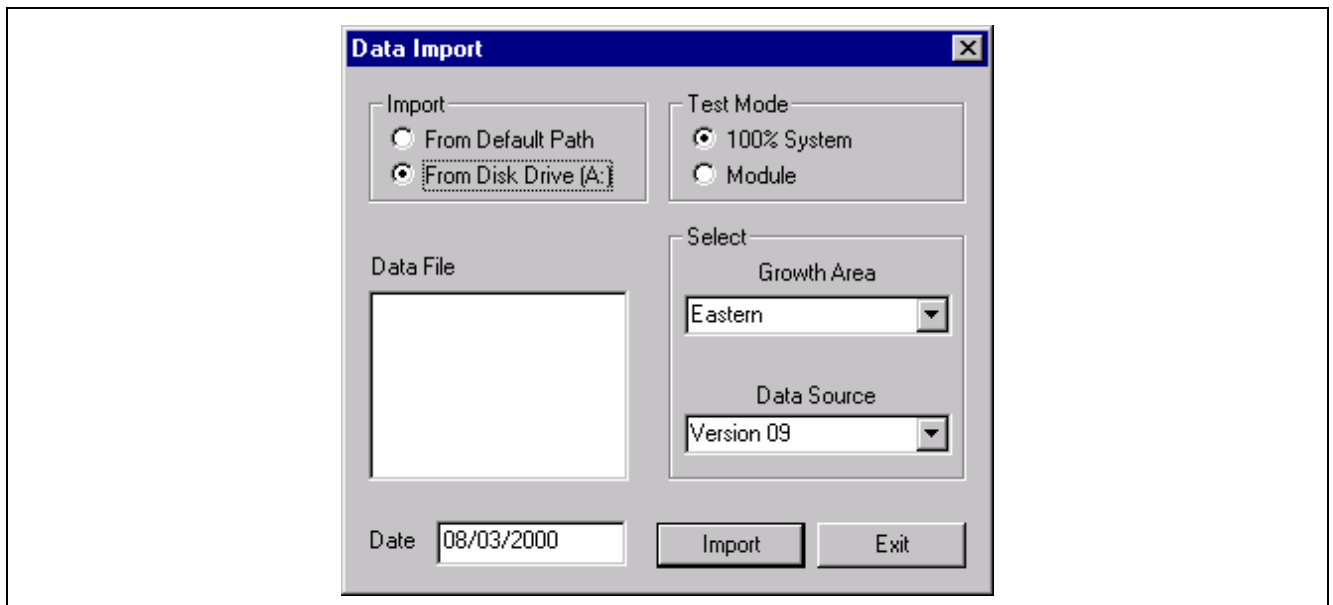


Fig. 6-31 Data Import, Screen II

10.3 The window of Fig. 6-32 will appear showing a list of Lot Identifiers.

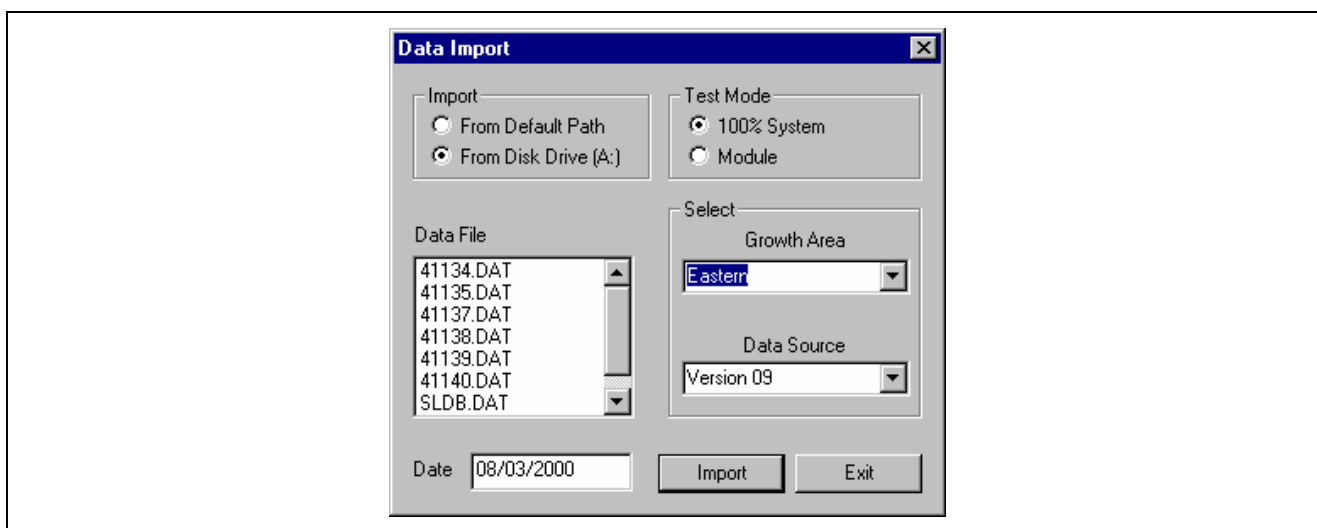


Fig. 6-32 Data Import, Screen III

10.4 Select and highlight 41134.DAT then select Import. The data of Lot Identifier 41134 will be imported. The window of Fig. 6-33 will appear. Select OK and repeat steps 10.3 and 10.4 until data of all Lot Identifiers are imported.

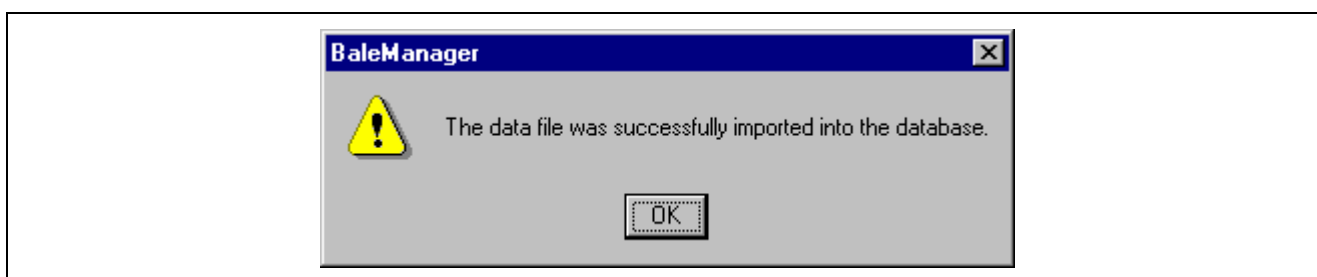


Fig. 6-33 Added Data File Screen

### Warning – Important:

If Growth Area is believed to be an important parameter in Bale Management (ABC yarn did), at the moment of importing data the correct Growth Area must be selected for each and every Lot Identifier. Growth Areas were designated at step 7.0.

10.5 Similar to Step 10.2, insert disk 2, ABC Yarns Western Growth Area disk in the A Drive. Under Growth Area select "Western". "100% System" and "Version 09" remain the same. Again, select "From Disk Drive A" and the window of Fig. 6-34 will appear.

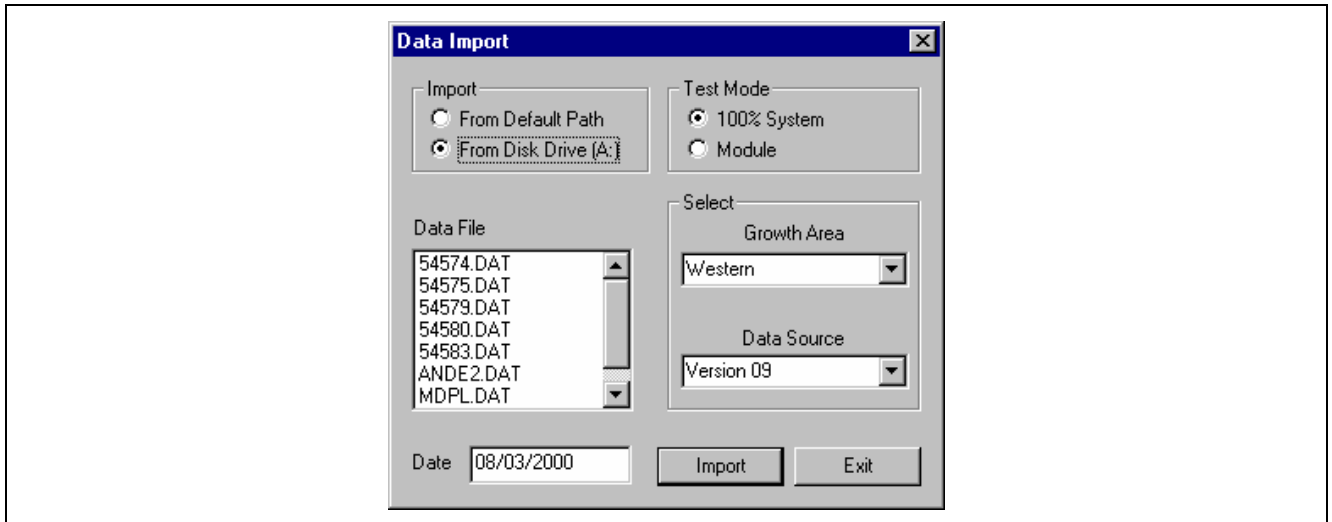


Fig. 6-34 Data Import, Screen III

10.6 Select and highlight each Lot Identifier followed each time by selecting Import until all have been imported. Select Exit to return to the window of Fig. 6-16.

**Step 3: View data**

One of the most important features of Bale Manager is the ability to see not only fiber property averages but also, and most important, the distributions. Maintaining consistency in distributions is the key to gaining consistency in yarn quality and processing performance. Fluctuations in distributions within and between mixes will cause spinning problems even when averages appear to be consistent. For this reason, Bale Manger data is put into categories and viewed in the form of Histograms.

11.0 In the Window of Fig. 6-16 and highlight View and then Inventory in the drop-down menu.

11.1 The View Inventory Bale Data window of Figure 11.1 appears. At Lot ID and Growth Area use the down arrows to select ALL and ALL respectively. Likewise NONE should be selected for Limit Property. Under View, select Histogram (Fig. 6-35).

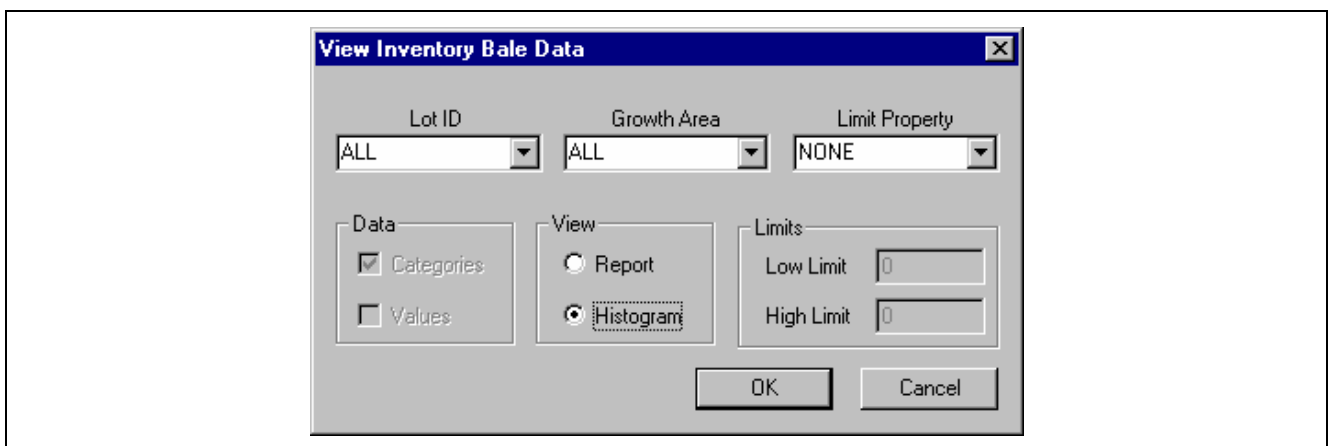


Fig. 6-35 View Inventory Bale Data Screen

11.2 Select OK and the View Histogram window of Fig. 6-36 appears.

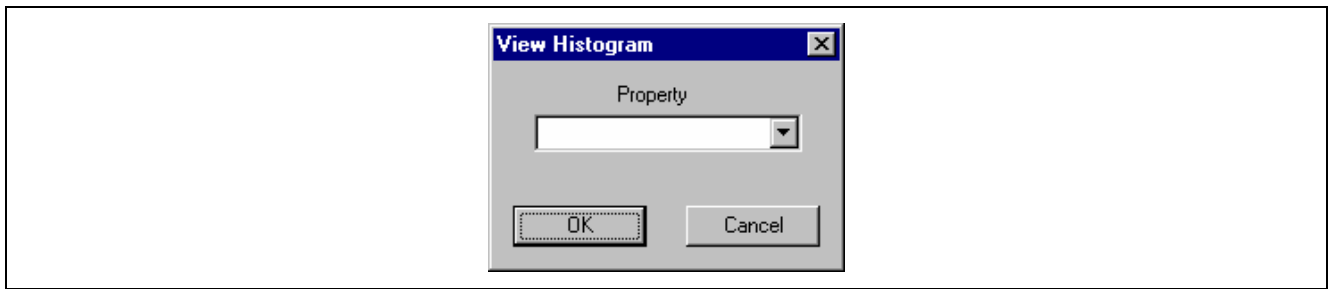


Fig. 6-36 View Inventory Histogram Data

11.3 Use the pull-down arrow at Property to highlight and select SCI. Select OK and the Histograms of the distributions of SCI appears.

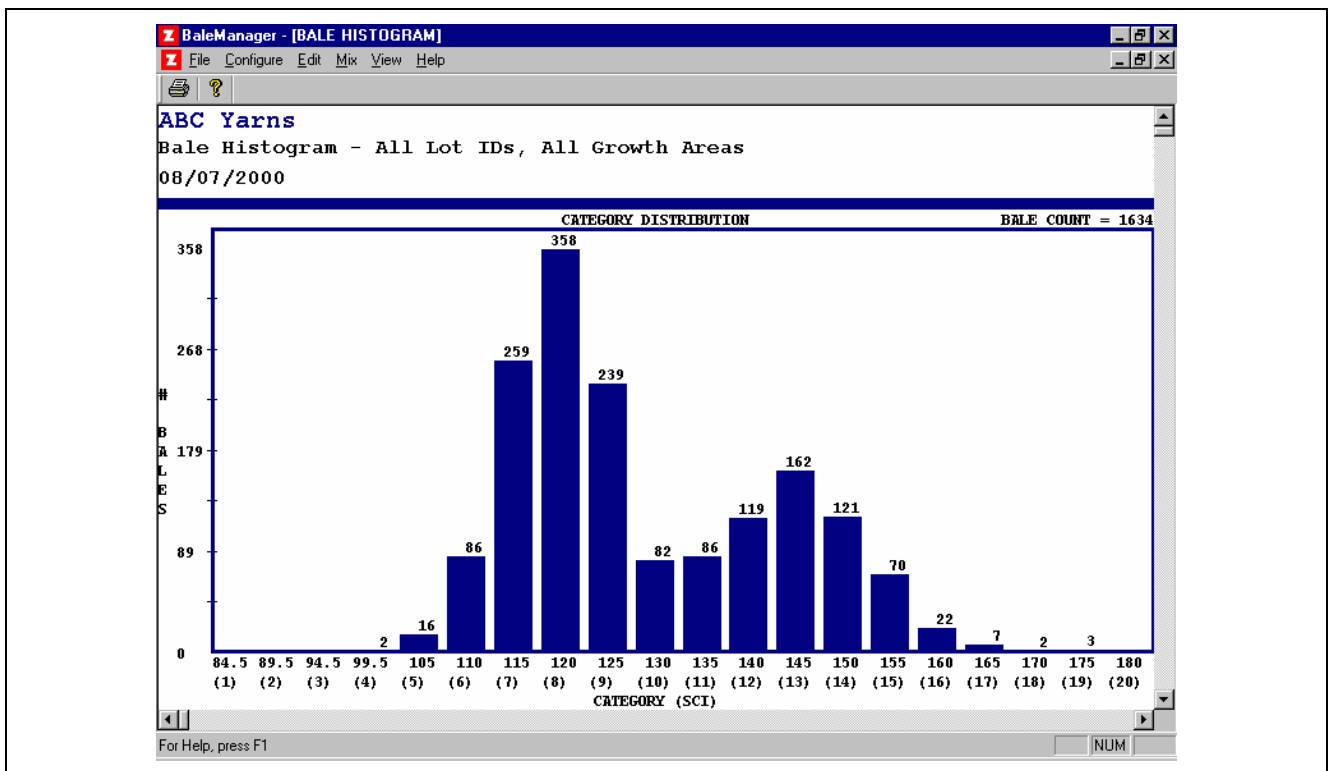


Fig. 6-37 SCI Histogram, All Lot Ids; Initial Category Definition

Bale Count will be shown in the upper right hand side. Also shown are the Category numbers, average value for each Category, and the number of Bales in each Category.

Select the Printer Icon in the upper left-hand corner to print the SCI Histogram (Fig. 6-37) that uses the Temporary Initial 87-5-20 Category Definition of Fig. 6-23.

Exit by use of the upper right hand corner X to return to Fig. 6-16.

11.4 Follow the steps under “View Data” (11.1, 11.2, and 11.3) but instead of SCI select Micronaire to view, and then print the Micronaire Histogram (Fig. 6-38), which uses the temporary Initial 2.2-0.2-20 Category Definition of Table 6-3.

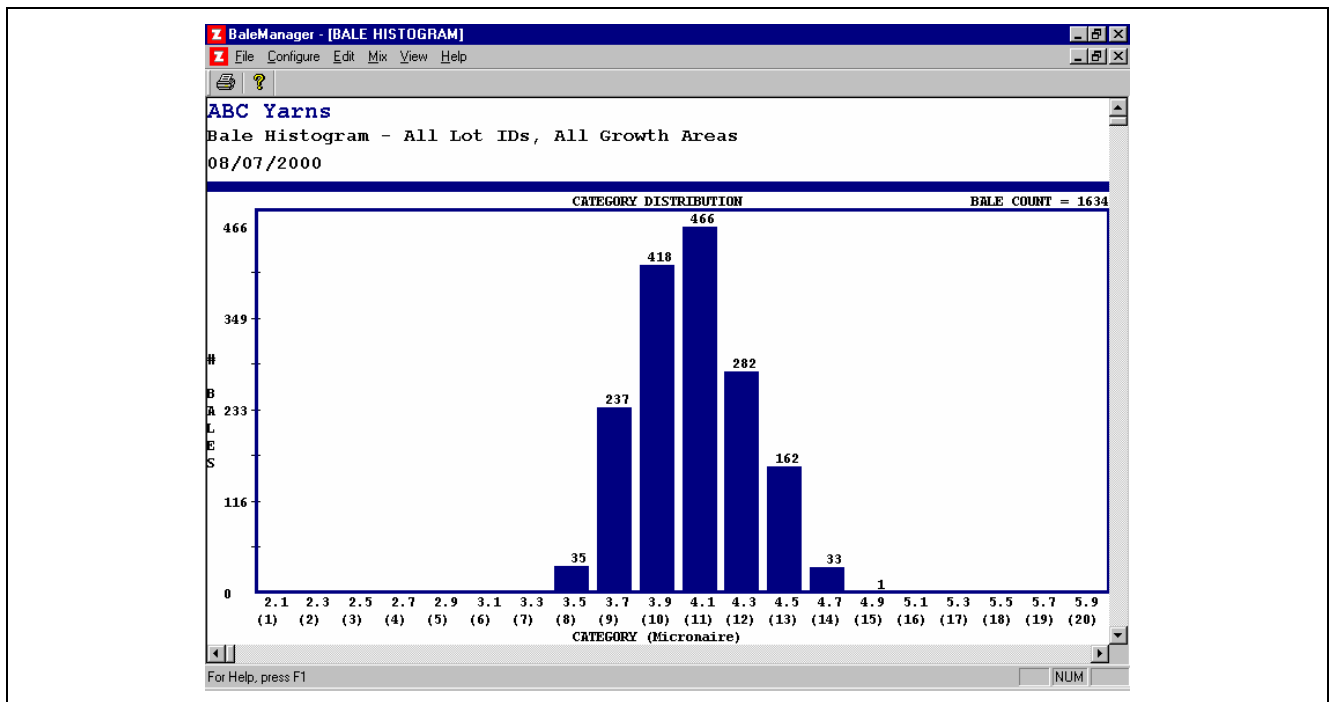


Fig. 6-38 Micronaire Histogram, All Lot Ids; Initial Category Definition

11.5 As seen in the window of Fig. 6-35, data can be viewed by Categories or by Value. Reports can be by Report (listing data) or by Histogram. Entering Low and High Limits allows viewing portions of data after selecting a property in the pull-down menu at Limit Property.

**Step 4: Final category definition**

In Steps 5.0 and 6.0, the need for use of Temporary Initial Category Definition is explained. The result is too many Categories for practical applications in Bale Warehousing and Mix Selection. The change to Final Category Definition should be made after enough tests have been made to represent the Distributions of all cotton available for spinning.

**Suggestion: Study again 5.3 “Getting Started” of this chapter.**

12.0 The SCI Histogram of Fig. 6-37, based upon the Initial Category Definition, shows that bales are listed in approx. 16 different Categories. Now, the objective is to reduce the number of Categories to a practical level by increasing the Interval Between Categories while at the same time, VERY IMPORTANT, to maintain the shape of the Distribution (bi-modal in case of ABC Yarns’ SCI).

Experience has shown that 10 is a convenient maximum number of Categories for viewing Distribution. The maximum number of Categories for Bale Warehousing and Mix Selection should be, if possible, no more than six or seven (preferably five or fewer) for each fiber property. It is very desirable that the Interval Between Categories be no more than three or four statistical Standard Deviations of each property.

The range in SCI, Fig. 6-37, is about 80. Using 10 for the Number of Categories dictates that the Interval Between Categories be no more than 8. Therefore, 10 might be a good choice.

As explained in the Application Handbook, Final Category Definition is a trial and error procedure of changing Category Definition Values, observing changes by viewing Histograms on the monitor, changing Definitions again, observing the effect of the changes, etc.

Choosing the Highest Value of the First Category is not always easy. For Fig. 6-37, Category 4 is the first one to contain data. It is obvious that the Highest Value of the First Category must be less than about 97. Therefore, 90 might be a good choice.

- 12.1 Keeping in mind the SCI Distribution of Fig. 6-37, in the Bale Manager window of Fig. 6-16, select Configure, then Categories to view the Define Categories window (Fig. 6-22). Select and highlight SCI. Erase the values in each of the three observed values and enter 90, 10, and 10 respectively (Fig. 6-39).

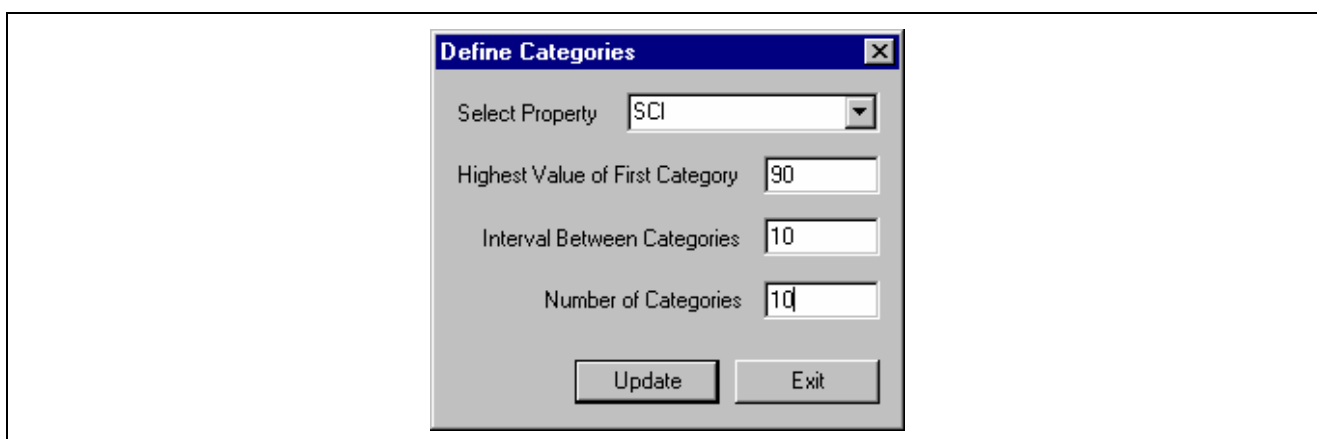


Fig. 6-39 Define Categories Screen; Attempt 1

Then select Update. Select OK at the warning message. Then select Exit to go to the Bale Manager window (Fig. 6-16)



12.2 Select View, then Inventory. At the View Inventory window, select ALL, ALL, NONE and HISTOGRAM then OK to go to View Histograms. For Property select SCI, then OK. The Histogram of Fig. 6-40 will appear.

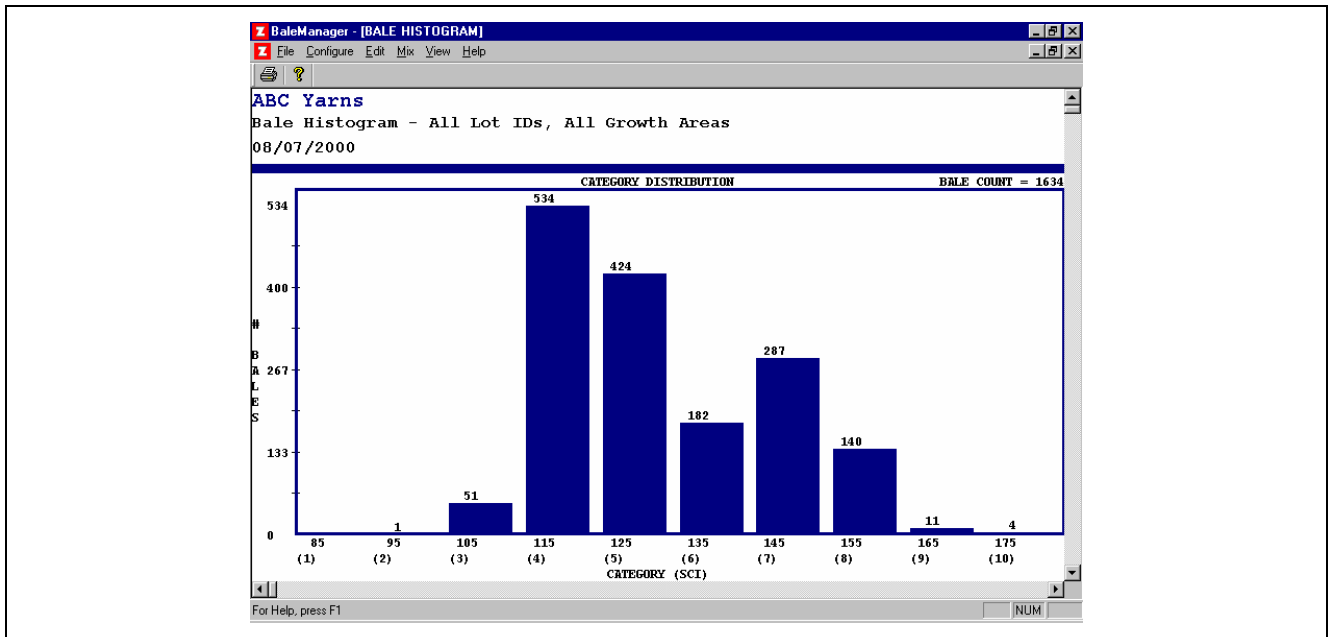


Fig. 6-40 SCI Histogram, All Lot Id; Category Definition 1

The shape of the Histogram is similar to that of Fig. 6-37. The number of Categories is 10; however there is only one bale in Category 2 and it could be considered as Category 3 bale for Mix Selection purposes. And the 11 in Category 9 plus 4 in Category 10 could be used as Category 8 bales for Mix Selection. Therefore, the Number of Categories for practical application is 6.

The average SCI value of all 1634 Bales is about 130, which falls between Category 5 and 6. In order to be consistent in viewing Histograms of all properties, it is convenient to have, if possible, the average value of each property be within Category 5. To try to accomplish this, a change in Category Definition is needed. Therefore, select the upper right hand corner X to Exit and go to the window of Fig. 6-16.

12.3 Follow the procedure of Step 12.1. Since 10 appears to be a good choice for Interval Between Categories and 10 a good choice for Number of Categories, do not change them. Change the Highest Value of the First Category from 90 to 95 (Fig. 6-41).

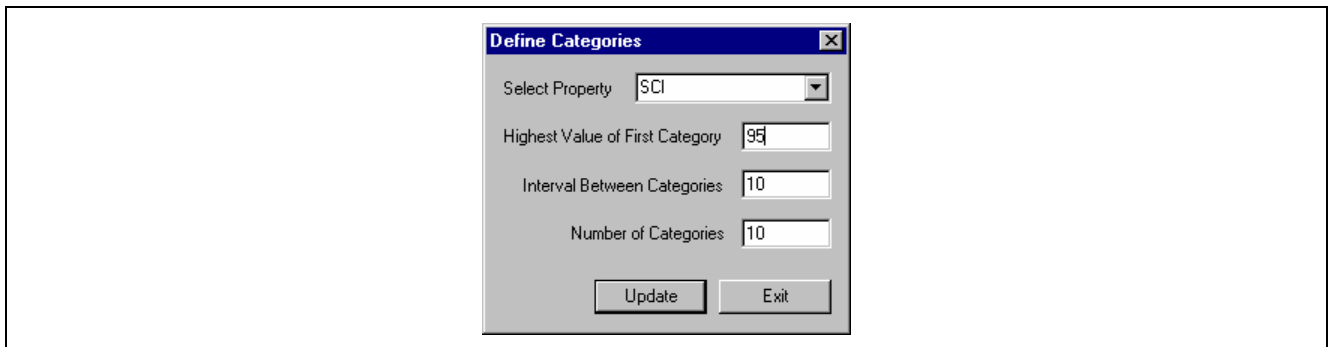


Fig. 6-41 Define Categories Screen; Attempt 2

12.4 Select Update, then OK at the Warning window, then Exit. When the window of Fig. 6-41 reappears to back to Fig. 6-16, follow the procedures of Step 12.2 to view the new Histogram (Fig. 6-42).

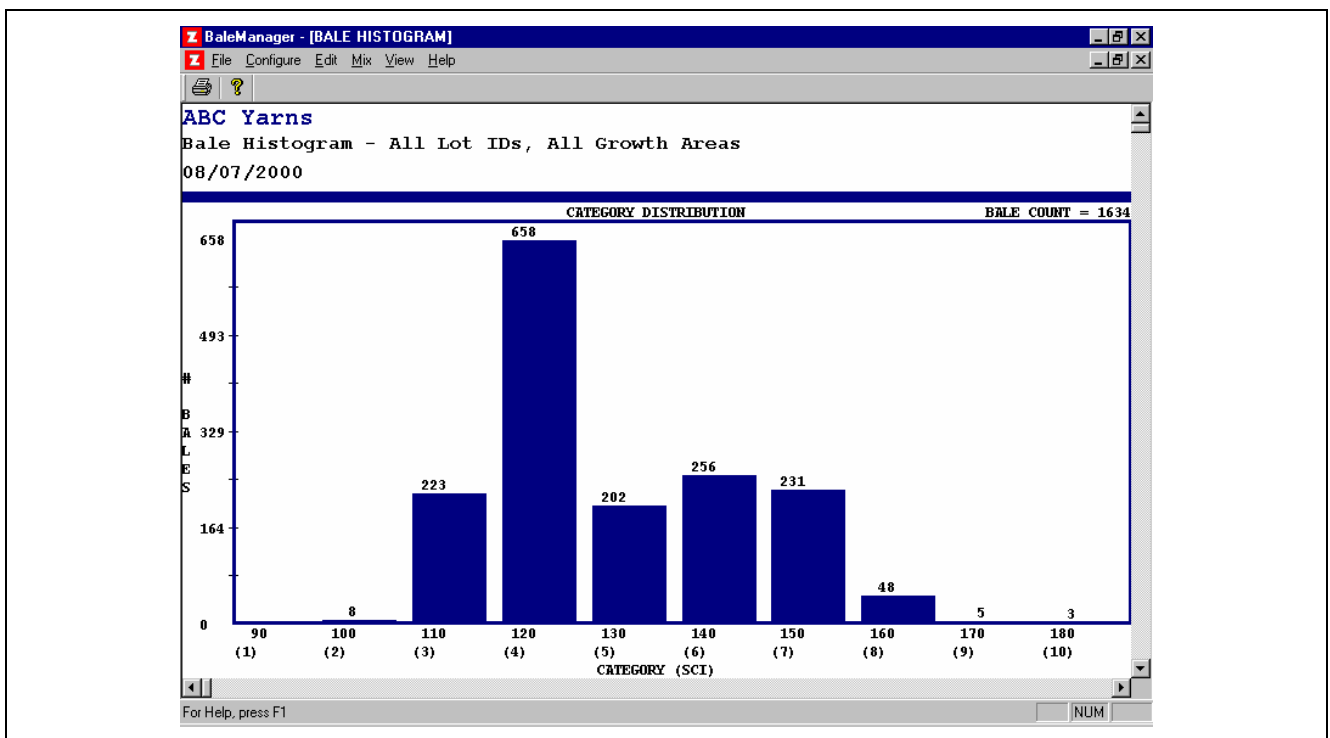


Fig. 6-42 SCI Histogram, All Lot Ids; Category Definition 2

Discussion: Both Histograms (Fig. 6-40 and Fig. 6-42) have distributions similar to Fig. 6-37. Fig. 6-42 has the SCI average of 130 in the central category 5, which is desirable. However, the Histogram of Fig. 6-40 shows more between Category variations, and is therefore a better representation of Fig. 6-37 and a better choice – even if the 130 average is not between Category number 5 and 6. Since the Histogram of Fig. 6-40 is the better choice, make a change in Category Definition. Select the upper right hand corner X to exit and return to the window of Fig. 6-16.

12.5 Follow the procedure of Step 12.1 resulting in entering the final chosen values 95, 10, and 10 (Fig. 6-39). Then Exit to go to the window of Fig. 6-16.

Now the final chosen value for SCI Category Definition should be entered at “Reports”. Exit the window of Fig. 6-16 by using the upper right hand X. In the USTER® HVI window select the lighted Bale Manager, select Reports to see the window USTER® HVI (Fig. 6-43).

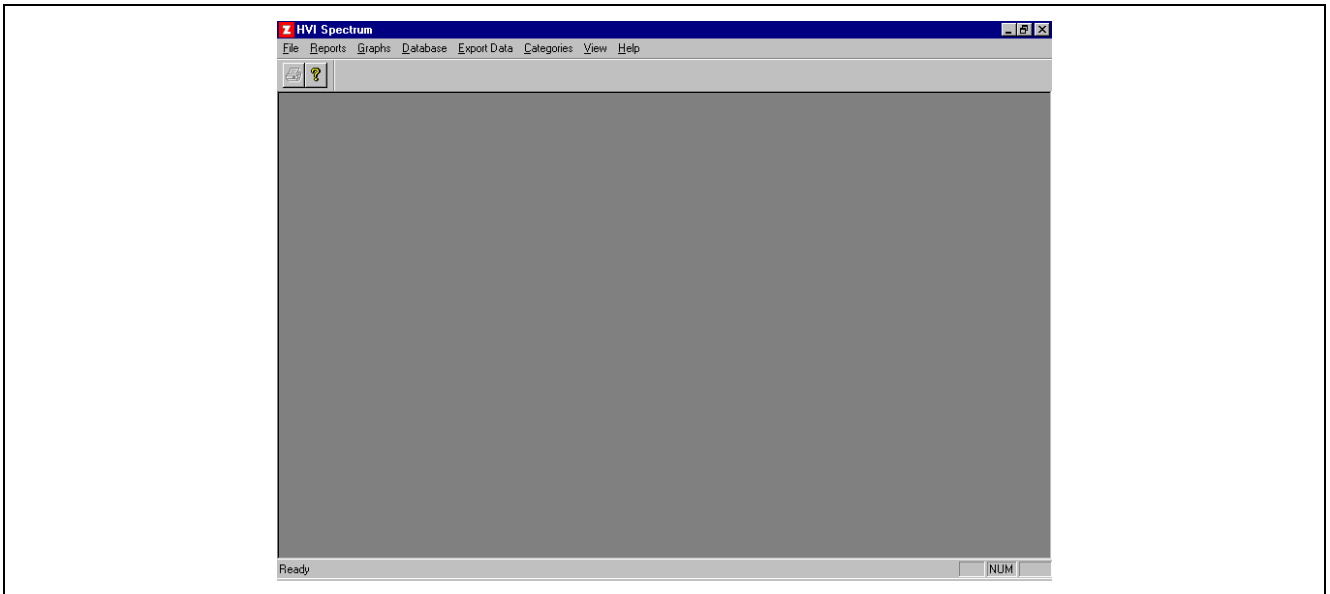


Fig. 6-43 Reports Main Screen

12.6 Select Categories to view the Category window. Highlight and Delete each of these values for SCI Highest Value of First Category, Interval and Number of Categories. Enter the new Final Category Definition values 95, 10, and 10 respectively (Fig. 6-44).

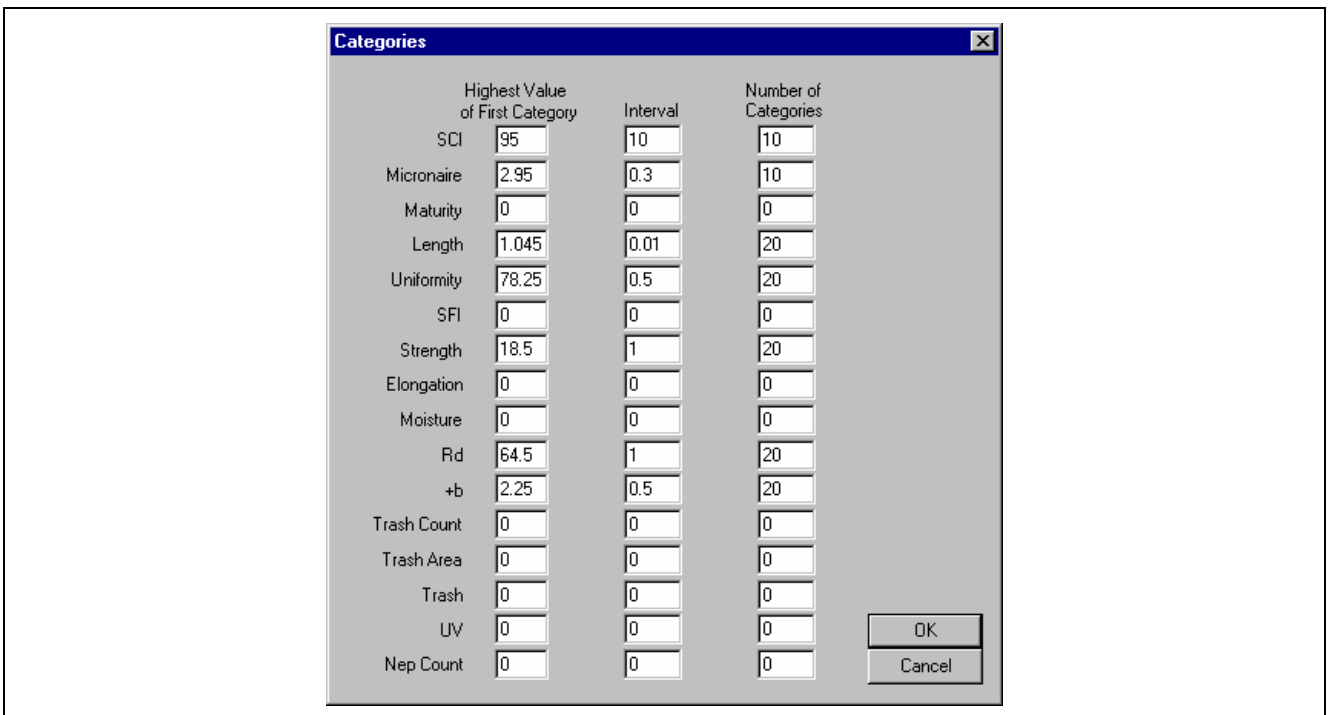


Fig. 6-44 Reports Category Screen

Select OK followed by OK at the Warning window to return to the window of Fig. 6-43.

Follow the above procedure beginning at Step 11.0 to determine the Final Category Definition for all of the measured and listed fiber properties.

**Step 5: Make a Mix**

13.0 In the window of Fig. 6-16, select Mix then Make.

13.1 The Make a Mix window will appear (Fig. 6-45)

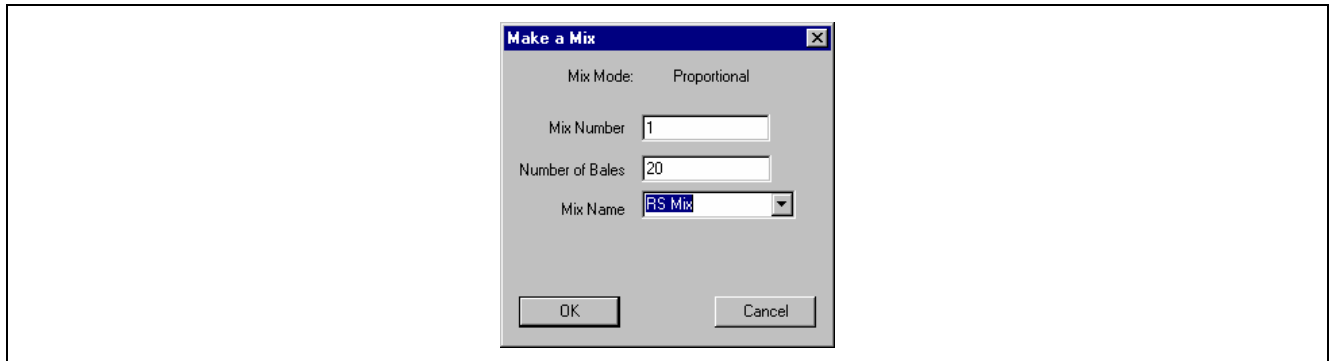


Fig. 6-45 Make-a-Mix Screen

Enter the desired Mix Number. Note: The software automatically sequences the Mix Number each time a mix is made. Keeping the mixes in numerical sequence is desirable for viewing later in Mix History. The Mix Mode was entered at Step 4.0 System Fig. 6-18.

Enter the Number of Bales in the mix. Use the pull-down arrow to select the Mix Name (names were entered at Step 8.0) enter OK.

13.2 The window Bale Manager – (MIX REPORT) will appear showing the information required for use in selecting bales from the warehouse (Fig. 6-46 below). A print of this window should be made and handed over to the person responsible for moving bales from the Warehouse into the Spinning Mill Opening Room.

**Note:** Growth Areas were assigned Category numbers by the software in sequential order as they were entered in, in Steps 7.1-7.4. The category Number and position of each bale on the Opening Room Floor is shown.

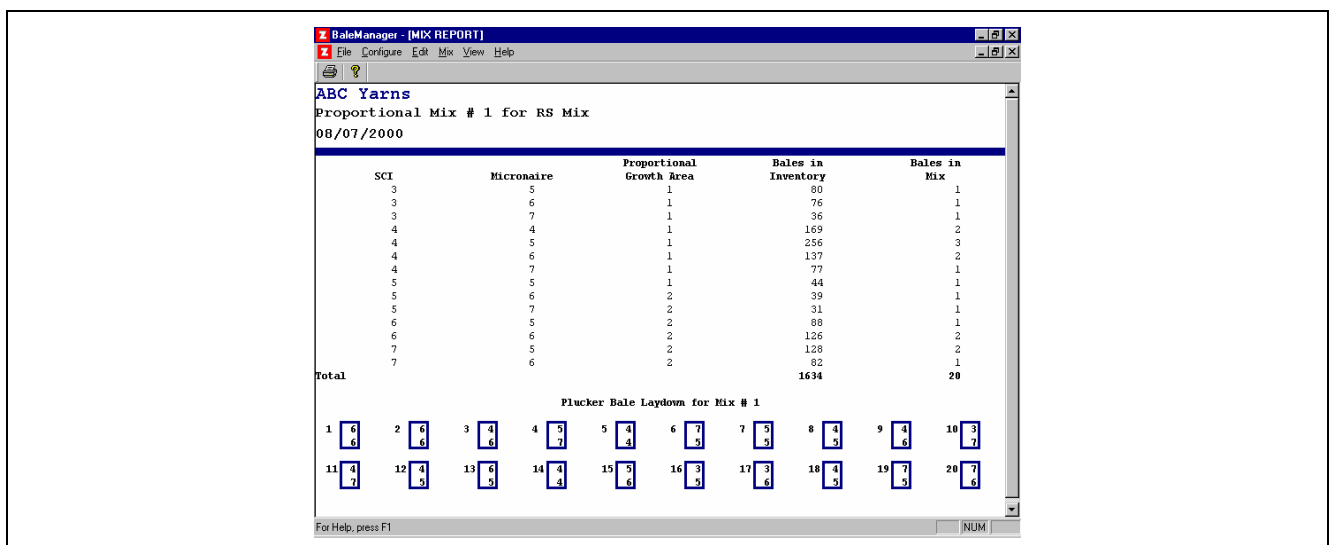


Fig. 6-46 Mix Report Screen

Exit the window by using the upper right hand corner X to return to the window of Fig. 6-16.

13.3 In the window of Fig. 6-16 select Mix then Preview/Accept. The window of Preview/Accept Mix will appear. Use the pull-down arrow to select 1-RSMIX, (Fig. 6-47) then select OK.

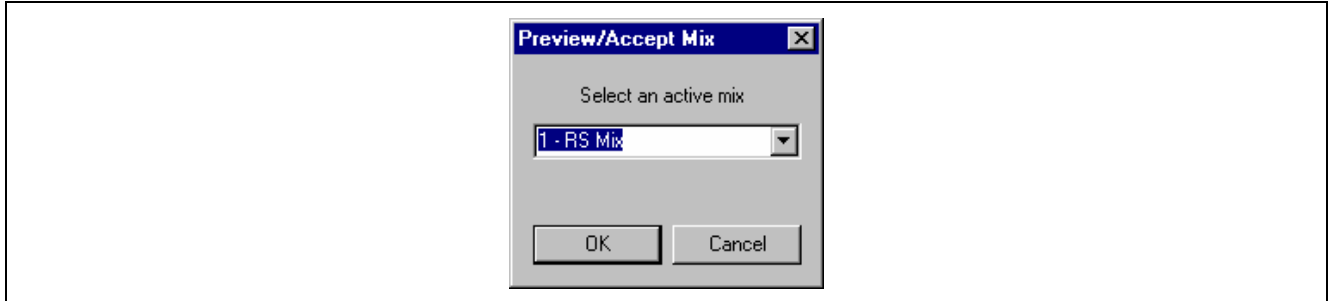


Fig. 6-47 Preview/ Accept Mix Screen

13.4 A larger Preview/Accept Mix will appear.

**Discussion:** Bales are selected from the Warehouse according to the Bale Manager – (MIX REPORT). Selections are made according to Category numbers, not Bale ID number. Therefore, as bales are selected by Category numbers Bale ID numbers must be recorded and entered at the Preview/Accept A Mix window. As each Bale ID is entered, the associated test data will appear.

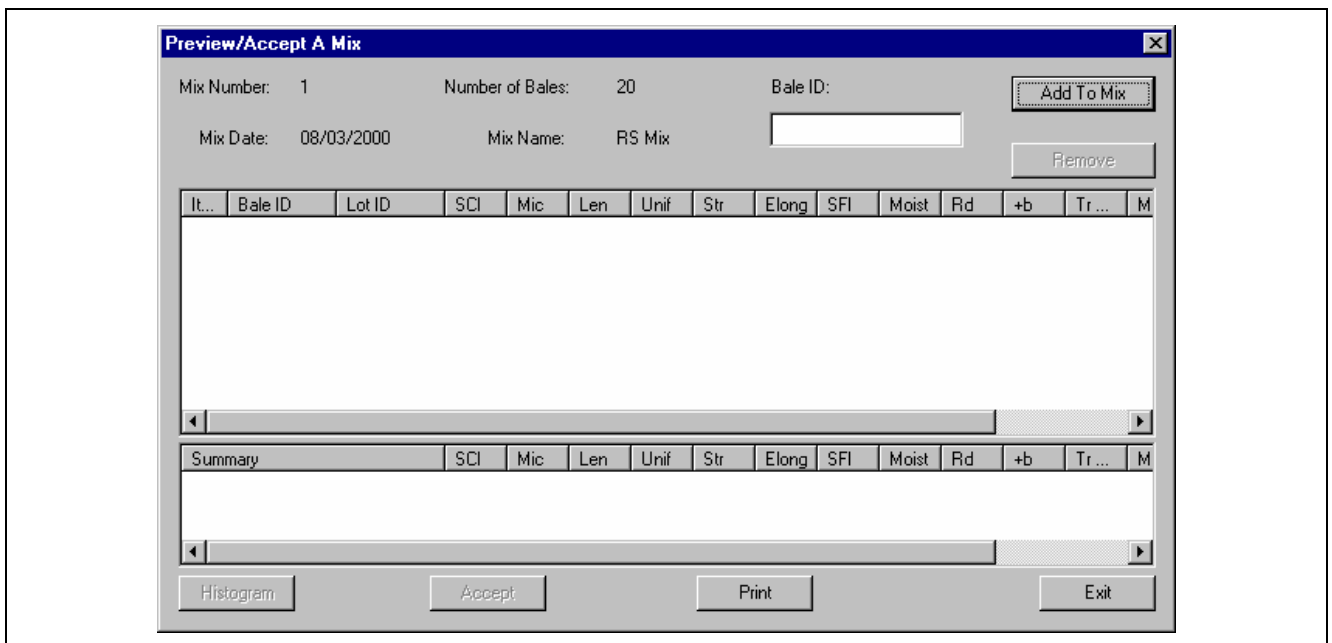


Fig. 6-48 Preview/ Accept A Mix Screen I

Enter a number at Bale ID. For instance, if the Bale ID for the first Bale listed in Fig. 6-46 (the 351 Category Bale) is 0286315, enter that number, then select Add to Mix (Fig. 6-49).

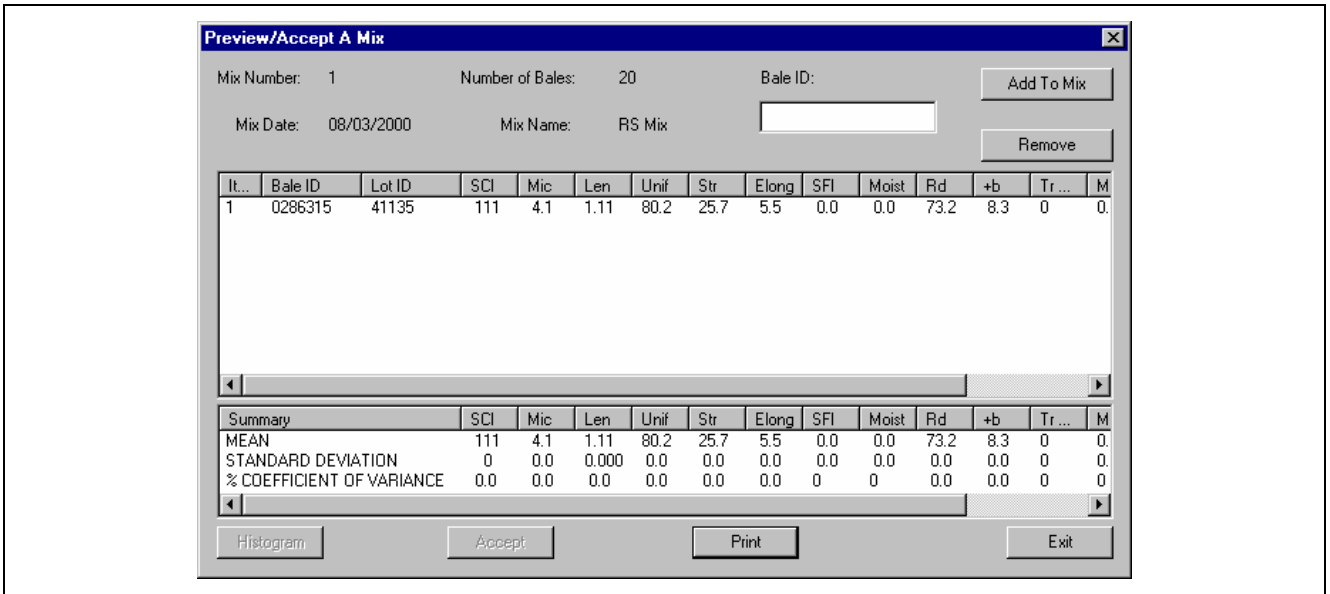


Fig. 6-49 Preview/ Accept A Mix Screen II

13.5 Complete the Preview/Accept A Mix window by entering the Bale ID Numbers for the remaining 19 Bales (Fig. 6-50).

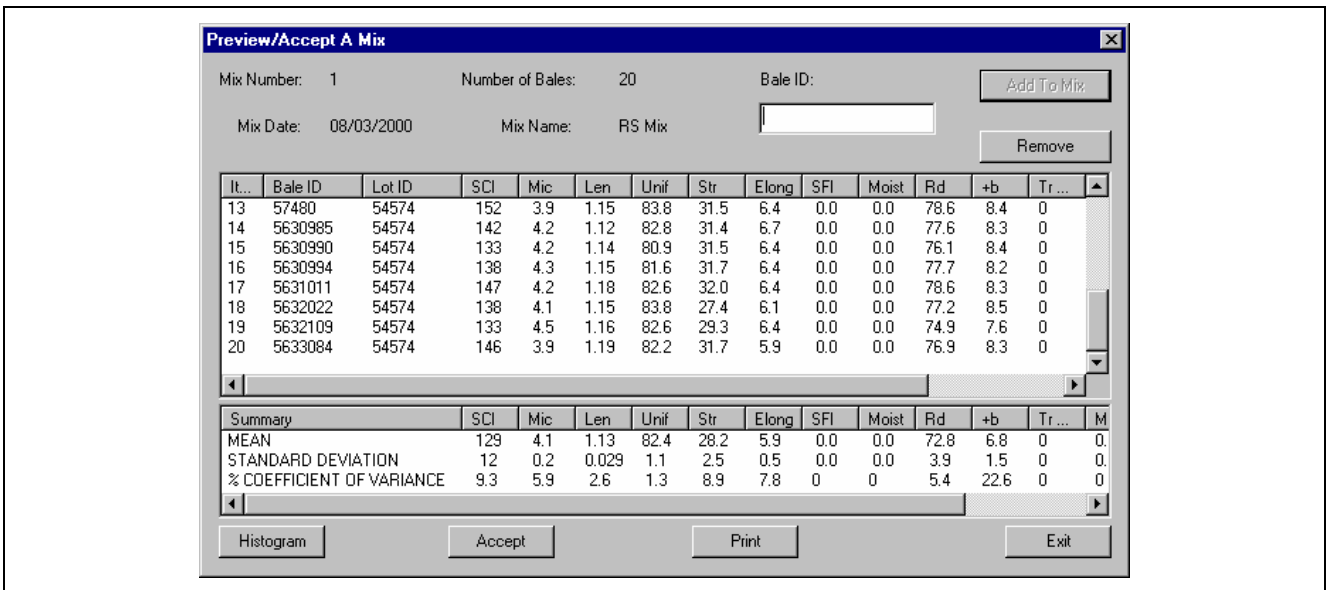


Fig. 6-50 Preview/ Accept A Mix Screen III

**Note:** As seen on the computer monitor, the vertical space is not large enough to see all 20 Bales

**Discussion:** Bales have been removed from the Warehouse inventory. Now, they must be removed from the Bale Manager Inventory. However, it may be desirable to Preview the mix before removing the Bales from the Bale Manager Inventory.

13.6 In the Preview/Accept A Mix window of Fig. 6-50 select Histogram to see the Mix Preview Histograms. As Property, use the pull-down arrow to select SCI, (Fig. 6-51).



Fig. 6-51 Mix Preview Histogram Screen

13.7 Select OK and the Histogram of SCI in mix no. 1, Fig. 6-50 shows the resemblance to the SCI Histogram of the 1581 Bale warehouse in Fig. 6-40. Exit the window by using the X in the upper right hand corner to go to the window of Fig. 6-16.

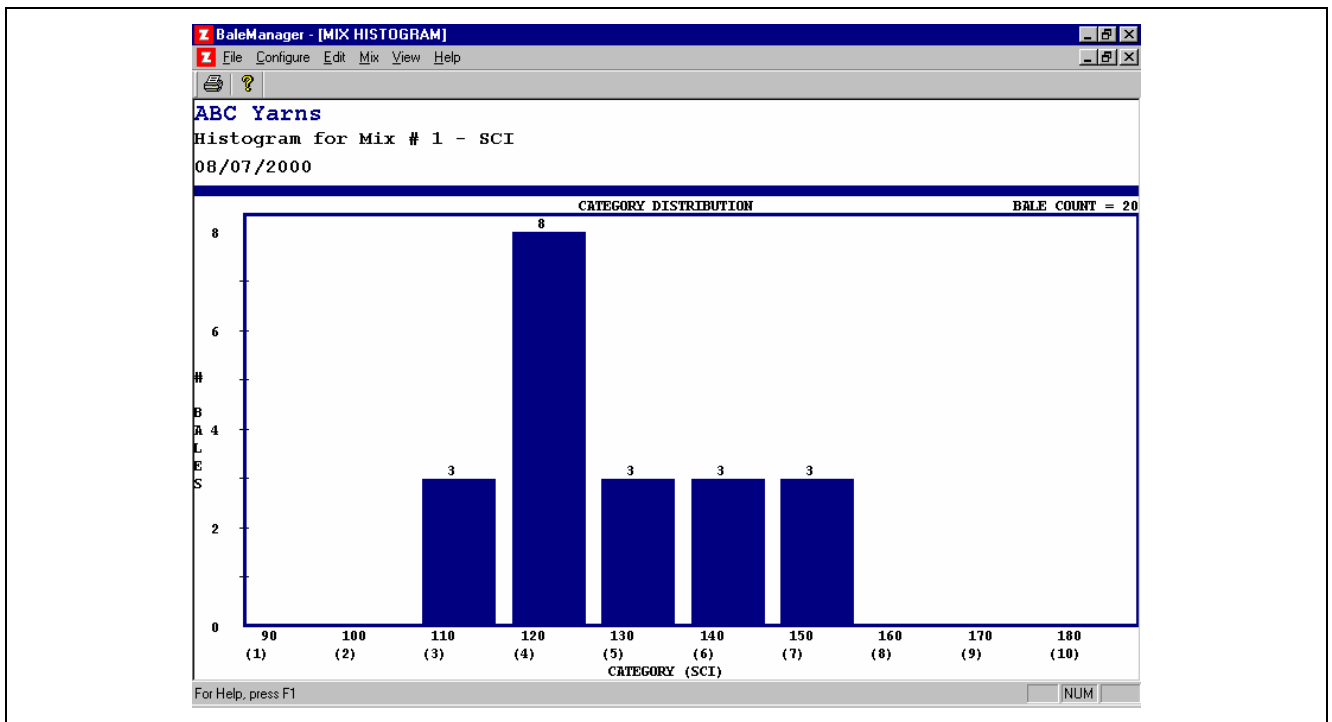


Fig. 6-52 Mix Histogram, Mix no. 1 - SCI

The Histogram of all of the fiber properties can be seen by selection in the window of Fig. 6-51.

13.8 Select Mix then Preview/Accept to see the window of Fig. 6-47. Use the down arrow; select 1-RSMIX, then OK, to return to the window of Fig. 6-50. Select Accept and all of the data will be transferred form the Bale Manager inventory to Mix History and the window Fig. 6-16 will reappear.

**Step 6: Mix history**

14.0 From the window of Fig. 6-16, select View, then History.

14.1 Select Mix History and the window of Fig. 6-53 appears listing all of the previous 20 mixes. Exit by used of the upper right hand corner X to return to the window of Fig. 6-16.

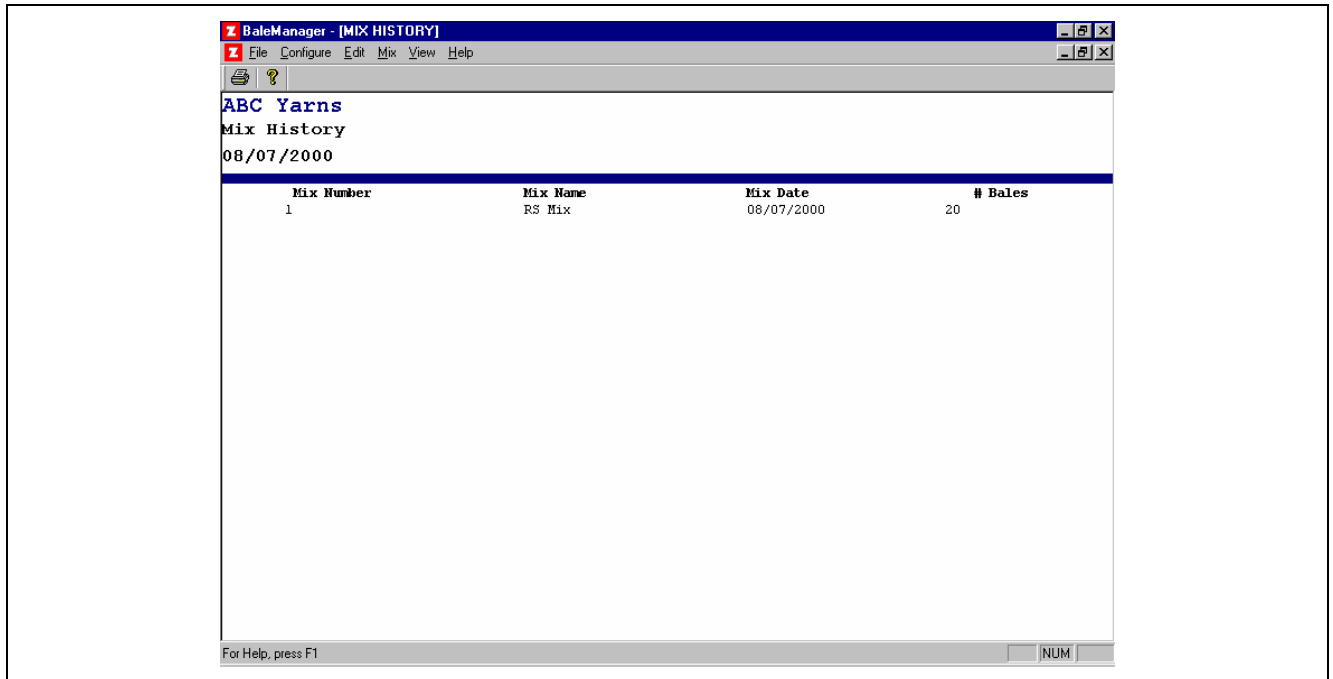


Fig. 6-53 Mix History Screen

14.2 From the window of Fig. 6-16, select View, then History, and then select Histograms to see the window Mix History Histograms. Under Mix Number use the down arrow to select 1-RSMIX and under Property use the down arrow to select a fiber property. Select Micronaire, for a change (Fig. 6-54).

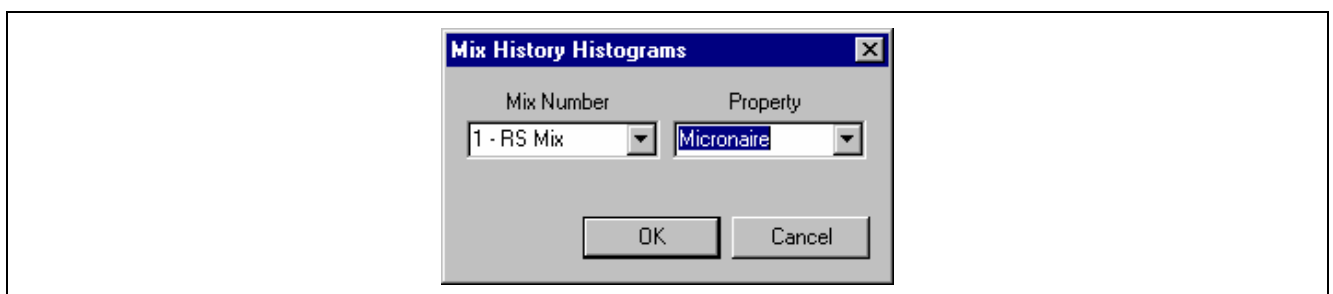


Fig. 6-54 Mix History Property Screen



14.3 Select OK and the Micronaire Histogram of Mix no. 1 appears (Fig. 6-55). Exit the window by using the upper right hand corner X.

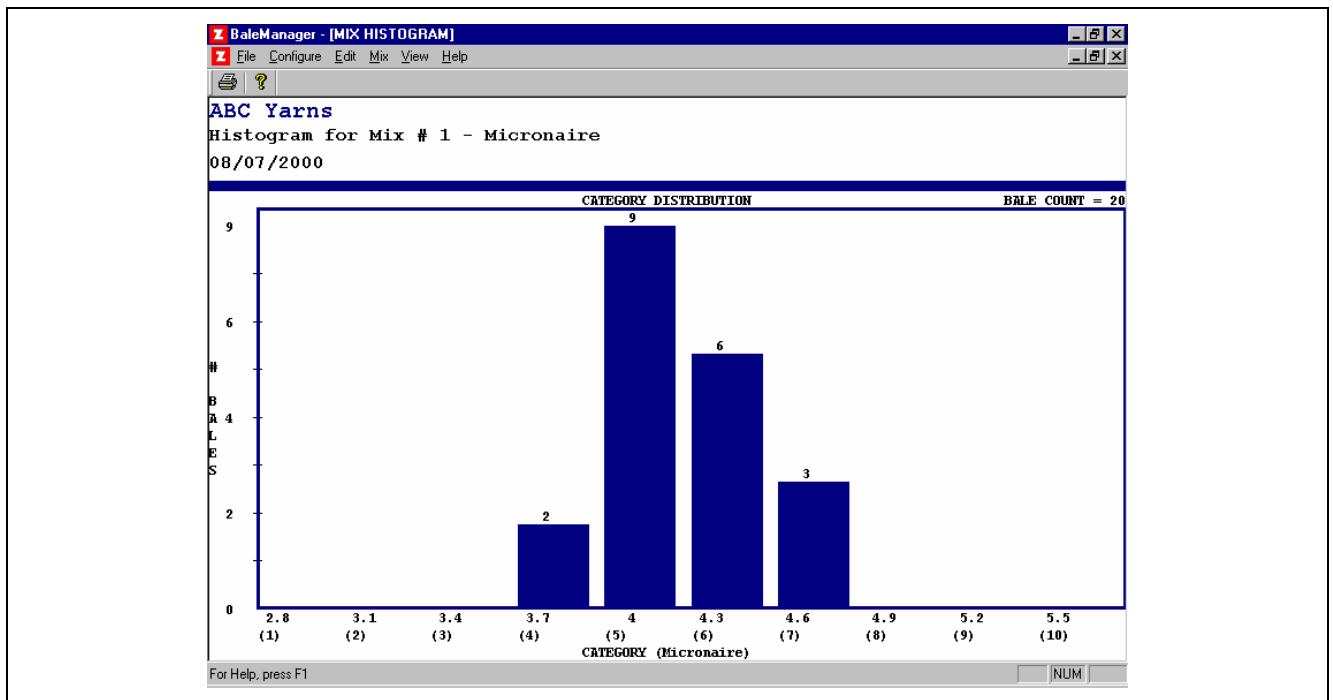


Fig. 6-55 Mix History Histogram, Mix no. 1 - Micronaire

Computer program space in Mix History allows the viewing any and all Fiber Property Histograms for up to 20 of the most recently made mixes.

**Step 7: Edit data**

It is very important that the Bale Manager inventory of Bales be identical to the actual bale inventory in the Warehouse. Perhaps for some reason warehoused bales may be removed and not used for Mix Selection; therefore, they must be removed, by Bale ID Number from Bale Manager Software inventory.

15.1 In the window of Fig. 6-16, select Edit.

15.2 Select Bale Data to see the window of Fig. 6-56.

Fig. 6-56 Edit Bale Data Screen

After using the down arrow at Lot ID, a list of Lot ID's will appear. After selecting a Lot ID number and after using the down arrow at Bale ID, a list of Bale ID numbers will appear. Select the desired Bale ID number and the measured values for that Bale will appear.

The Growth Area for a Bale can be changed. Selecting Edit can change measured values. The bale can be deleted from inventory by selecting the Delete button. If when data was imported the appropriate Growth Area was not selected, a change in Growth Area for selected Lot ID's can be made by selecting Change Growth Area in the pull down menu under Edit.

### 6.5.3 XYZ Yarns

The following is a step-by-step procedure using Bale Manager Software by a hypothetical cotton yarn spinner named “XYZ Yarns.” Besides using the traditional cotton classer Grade and Staple Length method of purchasing and warehousing bales, HVI tests are made on only a small percentage of bales received. The averages of those tests are assigned to each and every bale within a received group. The result is declaration that all bales in the received group are identical. In the Bale Manager software this method is named “module.”

Spinning:	Ring (RS) and Open End (OE)
Yarn:	100% Carded
Cotton Procurement:	2 Classer Grades 2 Classer Staple Lengths (inches) 2 Growth Areas (Eastern & Western) Micronaire (4.1 average with 3.5 to 4.9 range)
Warehouse Capacity:	2000 Bales
Areas within Warehouse:	One for Eastern Growth Area Bales One for Western Growth Area Bales
Within Growth Area Storage:	By Grades
Within Grades Storage:	By Staple Lengths
Consumption:	20 Bales per Day
Mix Selection:	In Proportion to Growth Area, Grade, Staple Length
Openers:	Automatic Plucker

**Step 1: Configure software to match the mill's mode of operation**

Configure software to match the mill's mode of operation.

16.0 Select Bale Manager on the USTER® HVI Screen (Fig. 6-57).



Fig. 6-57 USTER® HVI – Main Screen

16.1 Immediately, the Bale Manager window will appear (Fig. 6-58)

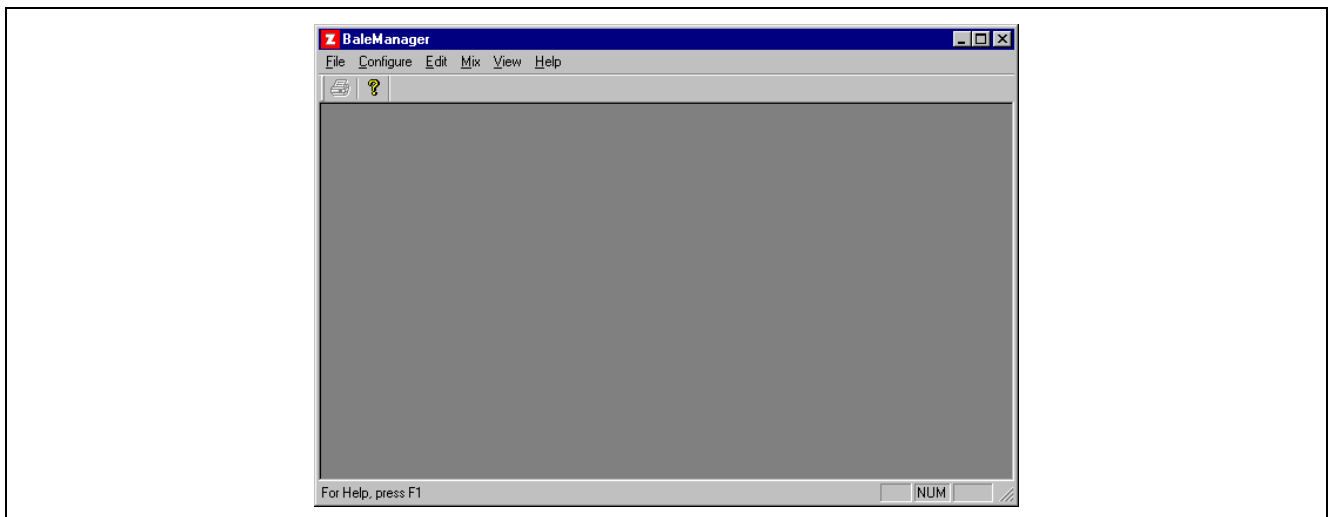


Fig. 6-58 Bale Manager Main Screen

17.0 Configure: Select Configure and a pull down menu will appear.

18.0 System

Select System and the System Status window will appear (Fig. 6-59).

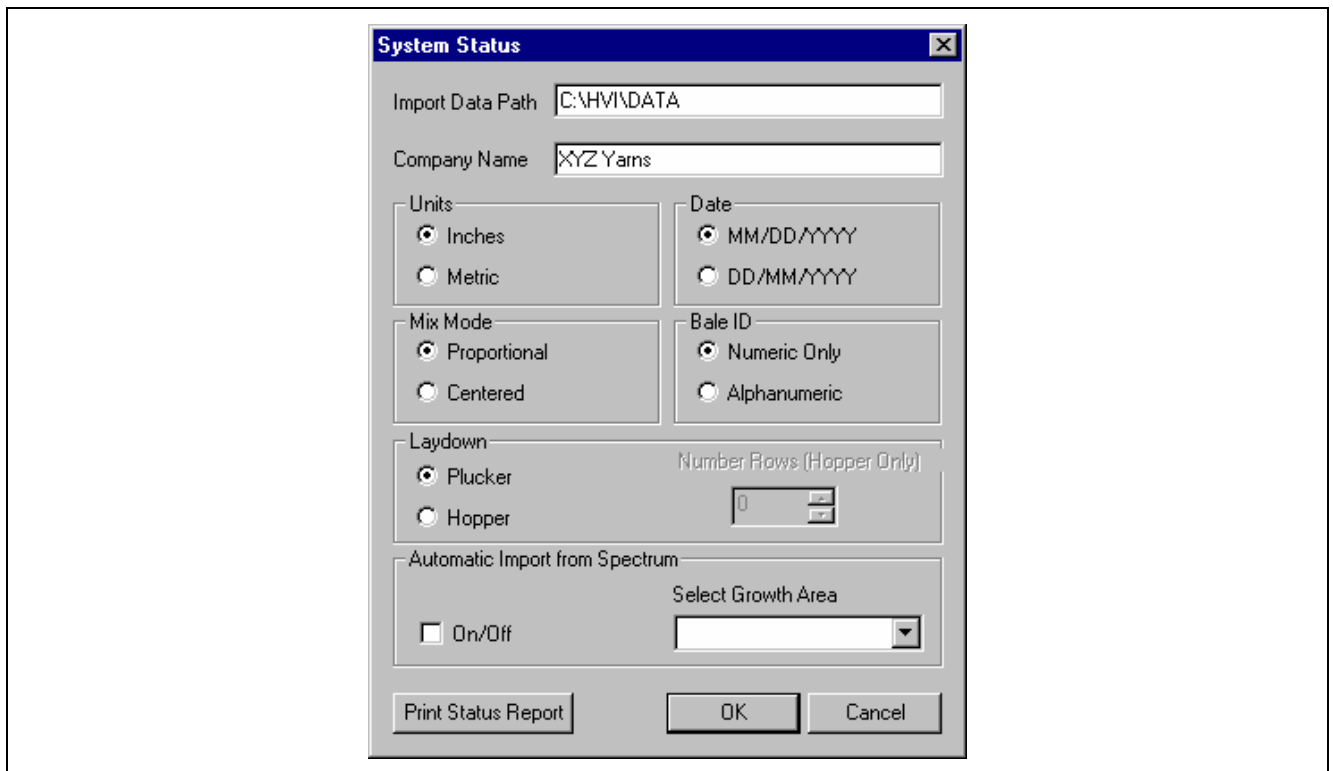


Fig. 6-59 System Status Screen

- 18.1 For import data path, enter C:\HVI\DATA
- 18.2 Highlight and delete the existing company name and enter “XYZ Yarns”
- 18.3 Select Inches for Units
- 18.4 Select Proportional for Mix Mode
- 18.5 Select Plucker for Laydown
- 18.6 Select mm/dd/yyyy for Date
- 18.7 Select Numeric for Bale ID
- 18.8 Leave On/Off and Select Growth Area blank. These 2 choices will be selected and changed at the time when data will be directly imported from the Database.
- 18.9 Select OK to exit the System Status window and go back to the Bale Manager window (Fig. 6-58).

## 19.0 Categories

Select Configure again and on the pull-down menu select Categories. The Define Categories window appears (Fig. 6-60).

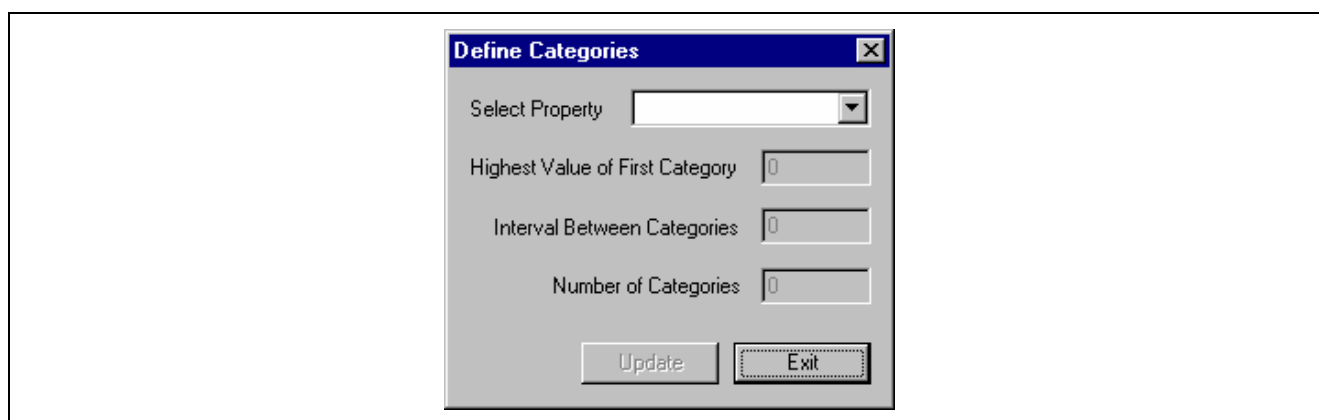


Fig. 6-60 Define Categories Screen I

Discussion: As explained in Section 5.1 of the "HVI Application Handbook", for centuries spinners have used the Category system for bale management.

For purchasing, warehousing, and mix selection in this example, XYZ Yarns has 2 growth Areas, 2 Grades, and 2 Staple Lengths equaling a total of 8 Categories of cotton.

In order to use the HVI data and to observe measured fiber property distribution, it is necessary to put the data of all measured properties into Categories.

Since in the beginning range in measurements is not known (tests have not yet been made), Initial Category Definitions that cover the range of the world's medium length cottons are entered.

20.0 Initial Category Definition

Select the down arrow (Fig. 6-60) to position the cursor at Select Property to see the list of fiber properties (Fig. 6-61).

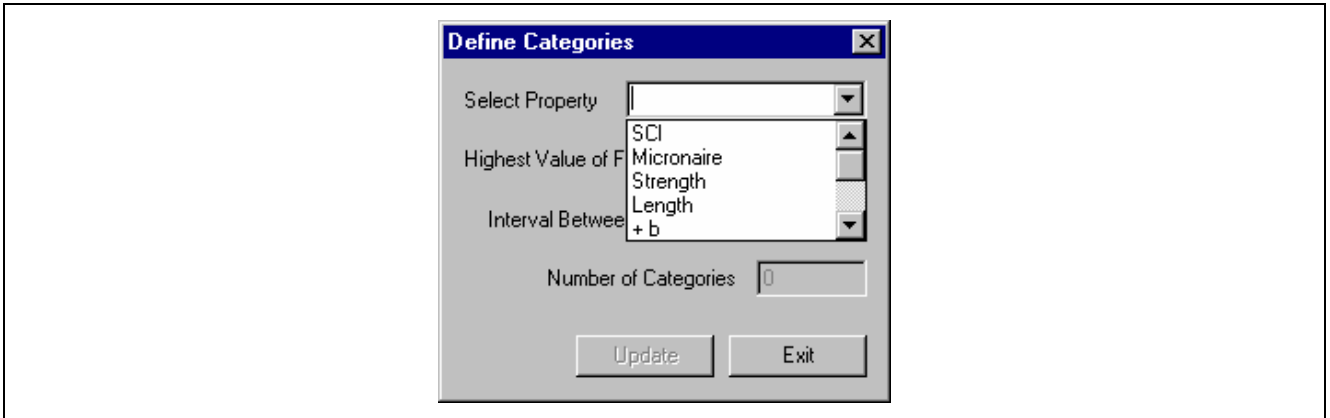


Fig. 6-61 Define Categories Screen I

20.1 Select and highlight SCI. Enter 101 for the Highest Value, 2 for the Interval Between and 20 for the Number of Categories (Fig. 6-62).

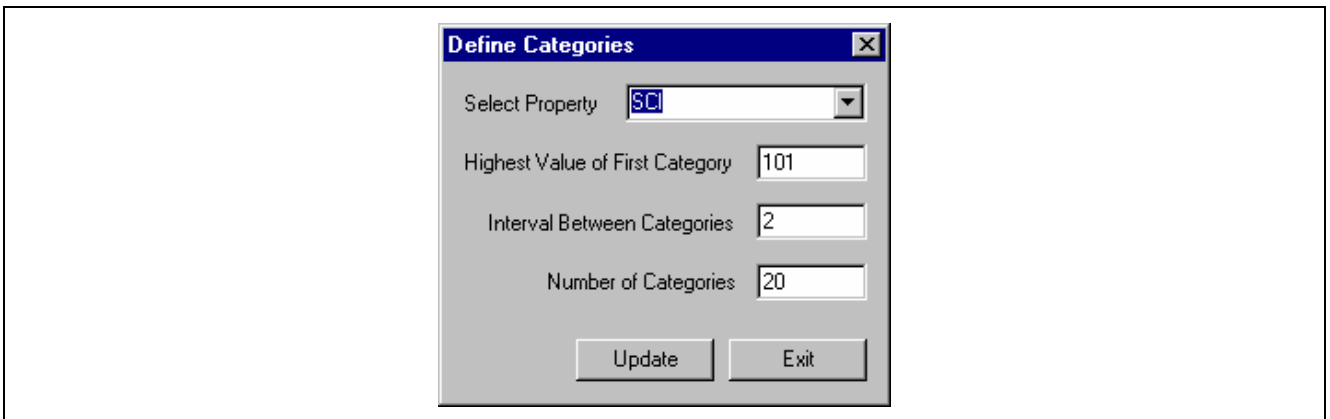


Fig. 6-62 Define Categories Screen III

20.2 Select Update then Exit.

20.3 A warning screen appears that makes you aware of the impact that changing the categories does have (Fig. 6-63).

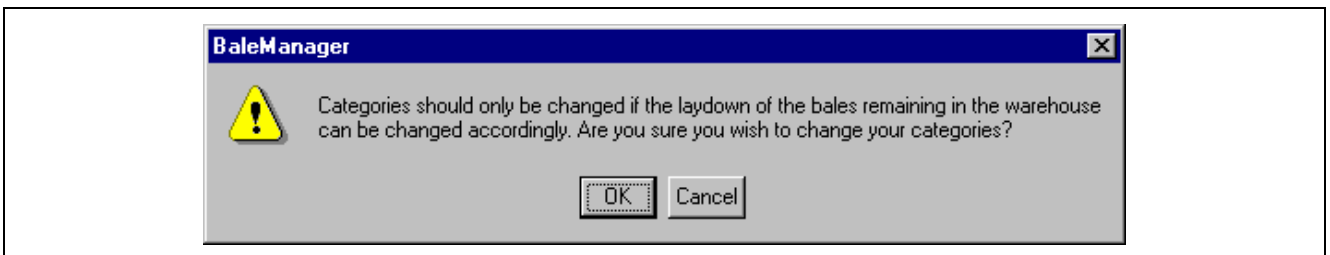


Fig. 6-63 Category Warning Screen

20.4 Select Configure again and on the pull down menu select Categories.

20.5 Select and highlight Micronaire. Enter 3.25, 0.1, and 20 respectively, for Highest Value, Interval Between, and Number of Categories.

20.6 Perform the above procedures for all of the listed fiber properties using the following values, then Exit to return to Bale Manager (Fig. 6-58).

Property	Highest Value of First Category	Interval Between Categories	Number of Categories
SCI	101	2	30
Micronaire	3.25	0.1	20
Strength	18.5	1.0	20
Length (inches)	0.86	0.03	20
+b	3.5	0.6	20
Rd	46.0	2.0	20
Uniformity	70.5	1.0	20
SFI	2.0	2.0	20
Elongation	1.0	1.0	20
Trash Growth	5	5	20

Table 6-4 Initial Category Definition

## 21.0 Growth Areas

Select Configure again and on the pull-down menu select Growth Areas (Fig. 6-64).

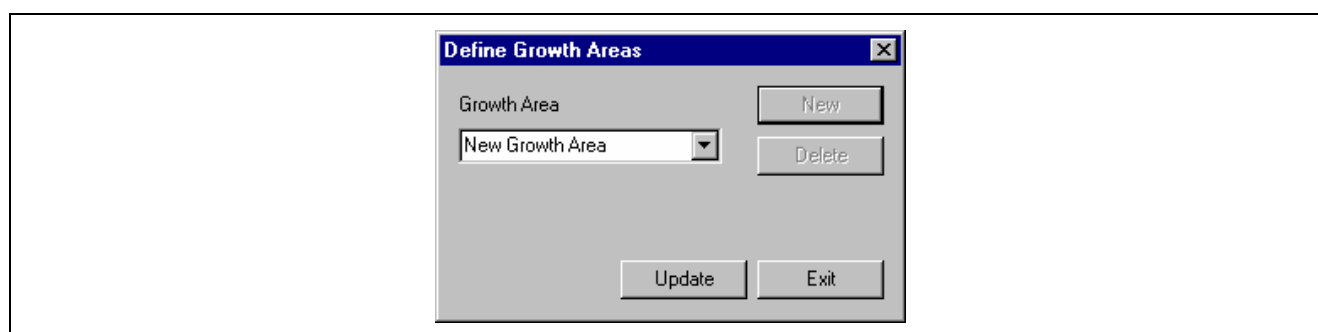


Fig. 6-64 Define Growth Areas, Screen 1



21.1 Select New. "New Growth Area" will appear. Highlight it and type in Eastern, followed by selecting Update. The Bale Manager window of Fig. 6-65 will appear.

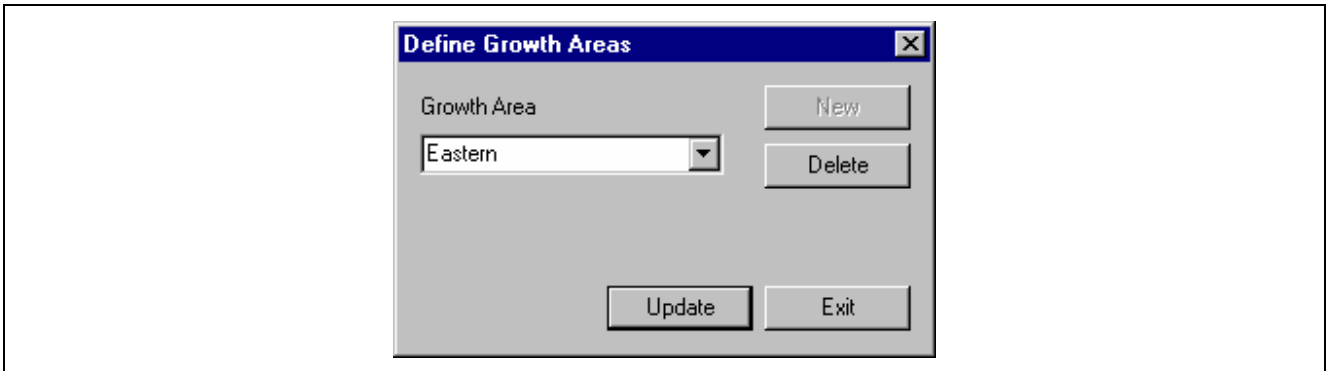


Fig. 6-65 Define Growth Areas, Screen II

21.2 Fig. 6-66 will allow you to return to the window of Fig. 6-64 by selecting OK.



Fig. 6-66 Added Growth Area Screen

21.3 Select OK to return to the window of Fig. 6-64.

21.4 Select New, highlight it and type in Western followed by selecting Update. The Bale Manager window of Fig. 6-65 will re-appear.

21.5 Select OK to return to the Define Growth Area window of Fig. 6-64.

21.6 Select Exit to complete Growth Area entry and return to the Bale Manager window of Fig. 6-58.

## 22.0 Mix Criteria

Select Configure again and on the pull down menu select Mix Criteria. The Define Proportional Mix Criteria window of Fig. 6-67 will appear.

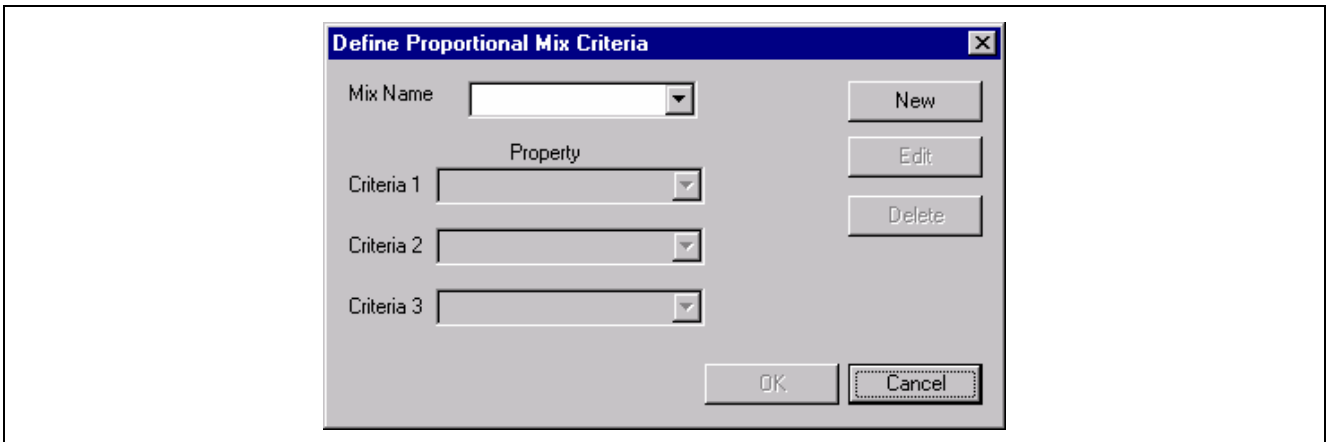


Fig. 6-67 Define Proportional Mix Criteria, Screen I

22.1 Select New. "New Mix Criteria" will appear. Highlight it and type in the name "RS MIX", followed by selecting OK (Fig. 6-68).

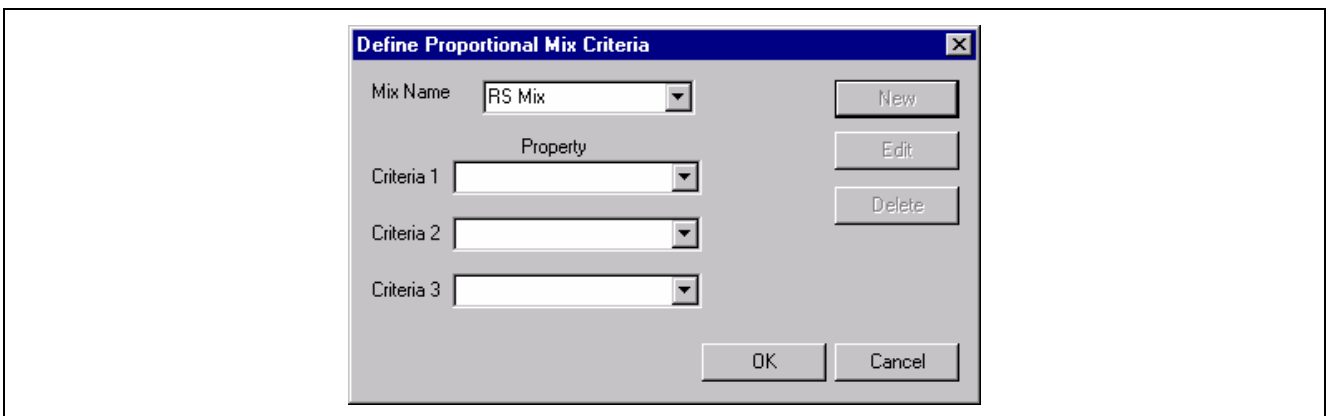


Fig. 6-68 Define Proportional Mix Criteria, Screen II

22.2 Use the pull-down menu at Property to select SCI, Micronaire and Proportional Growth Area for Criteria 1, 2 and 3 (Fig. 6-69).

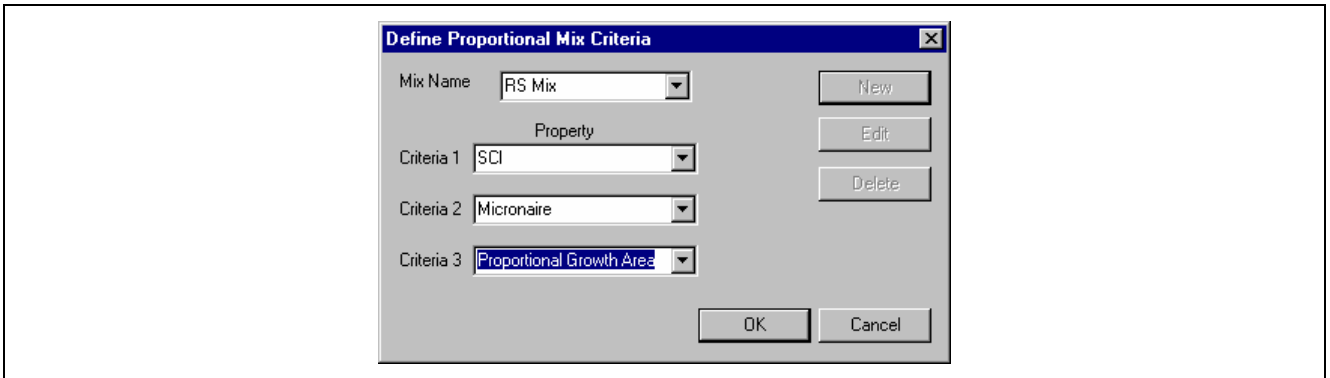


Fig. 6-69 Define Proportional Mix Criteria, Screen III

22.3 “Mix Name Added” will appear (Fig. 6-70) Select OK to return to the Bale Manager window of Fig. 6-58.



Fig. 6-70 Added Mix Name Screen

22.4 Select OK and return to the Bale Manager window of Fig. 6-58

23.0 SCI Calculation

Select Configure again and on the pull down menu select SCI Calculation. The window of Fig. 6-71 will appear.

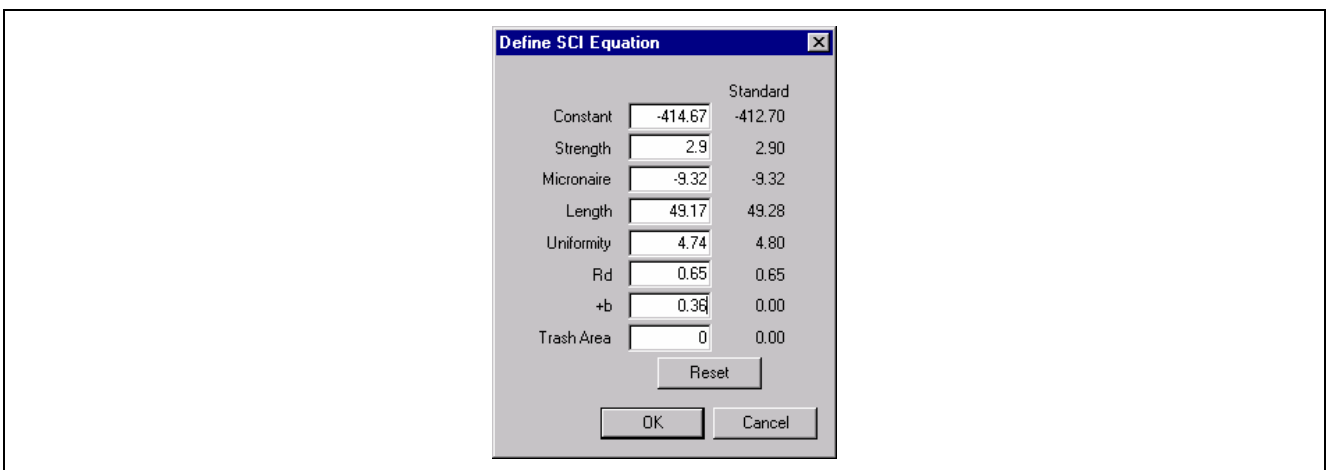


Fig. 6-71 Define SCI Coefficients Screen

**Discussion:** The Standard values are coefficients derived from extensive research by multiple regression analysis establishing the relationships of fiber properties to yarn properties and spinning performance. Data was obtained from tests of a large number of samples from many Growth Areas, many varieties, having a wide range in values approximately equal to range of the worlds short and medium length cotton. It is recommended that the Standard coefficients be used and never changed with consultation with Uster Technologies.

23.1 Select OK to return to the Bale Manager window of Fig. 6-58.

**Note:** These seven steps, 16.0-23.0, complete the software configuration to match the mills mode of operation.

## Step 2: Import data

In order to simplify the explanation of this step-by-step procedure, without having to make tests, data import is made by the use of floppy disk supplied with this Bale Manager Example (disk 3, XYZ Yarns). The disk contains Eastern Growth Area data, the other Western Growth Area data.

24.0 In the Bale Manager window of Fig. 6-58, select File then Import in the drop down menu.

24.1 The Data Import window will appear (Fig. 6-72).

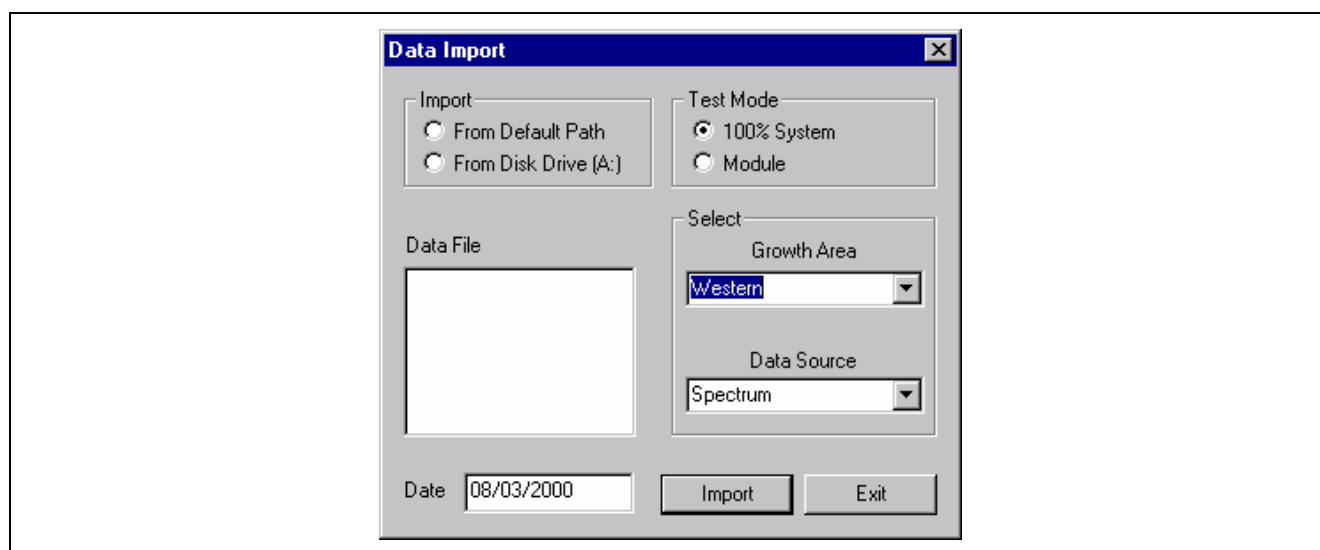


Fig. 6-72 Data Import, Screen 1

24.2 Insert Disk 3, "XYZ Yarns" in the A drive of the computer. Under Import select "From Disk Drive A" ("From Default Path" would have been selected if data had come directly from the Database). Under Test Mode select "Module", at Growth Area Select "Eastern" and at Data Source select "" (Fig. 6-73).

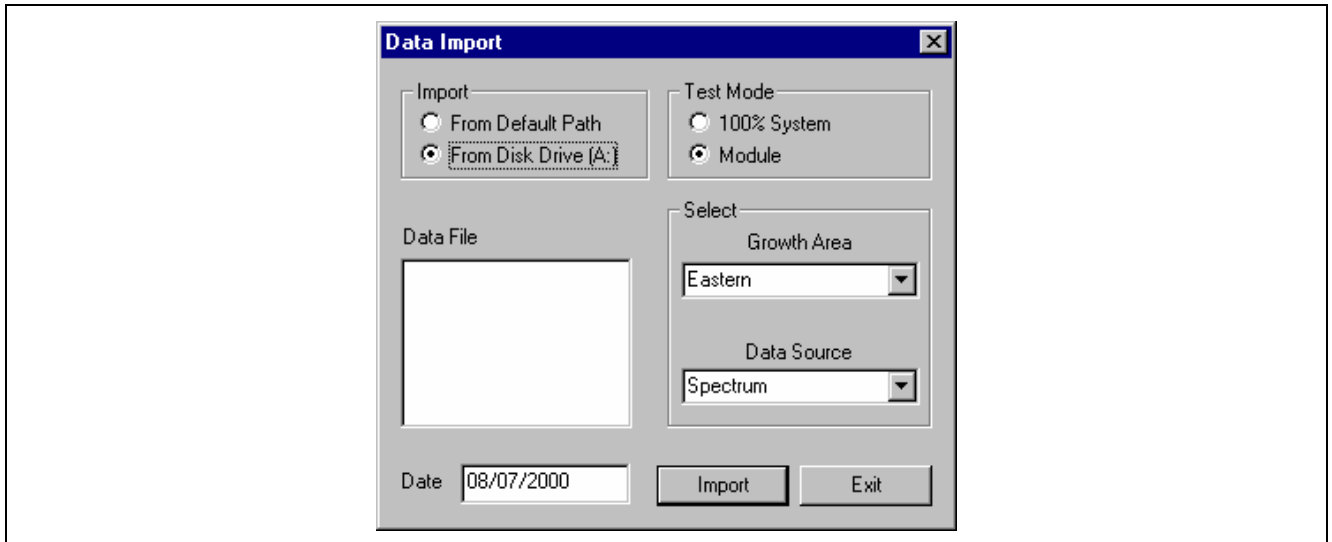


Fig. 6-73 Data Import, Screen II

**WARNING – IMPORTANT:** If Growth Area is believed to be an important parameter in Bale Management (XYZ Yarn did), at the moment of importing data the correct Growth Area must be selected for each and every Lot Identifier. Growth Areas were designated in step 21.

The XYZ Yarn data has Eastern Growth Area Lot ID's XYZA through XYZH. Western Growth Area Lot ID's are XYZJ through XYZR.

24.3 The Data Import window of Fig. 6-74 will appear showing a list of Lot ID's. (It may be necessary to select "From Data Path" then back to "From Disk Drive A" to see the list of Lot ID's under "Data File".

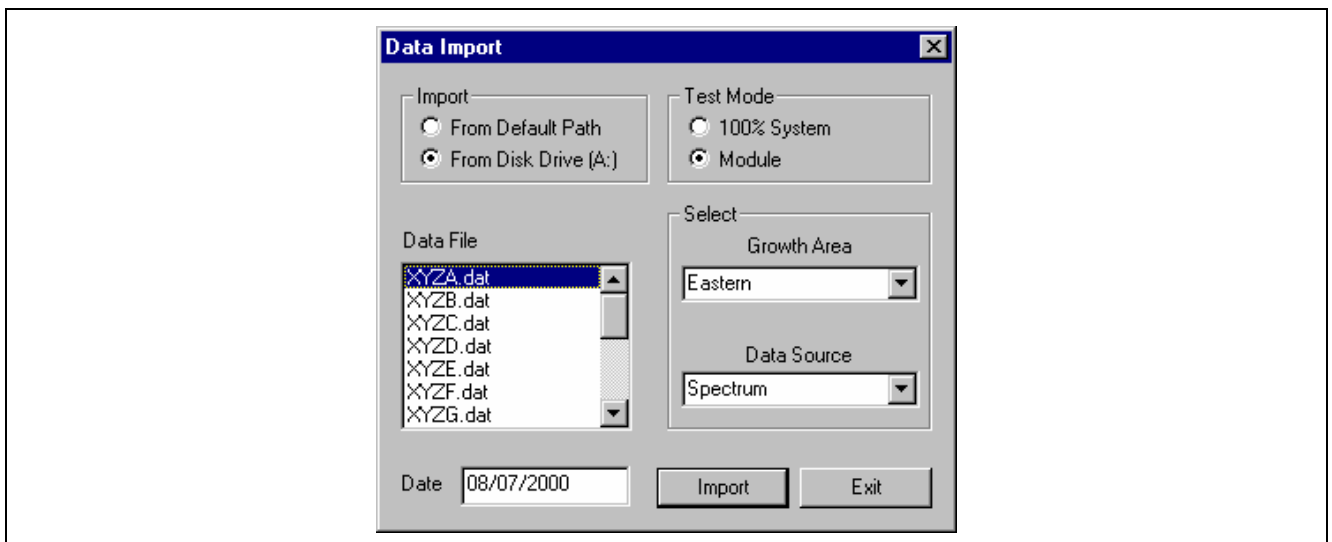


Fig. 6-74 Data Import, Screen III

24.4 Select and highlight XYZA then select Import. The data of XYZA will be imported and the Import Data From Module Testing window of Fig. 6-75 will appear.

	Mean	Std Dev	%CV
Micronaire	4.1	0	0
Length	1.1	0	0
Uniformity	82.2	0	0
Strength	26.2	0	0
Elongation	0	0	0
Rd	70.7	0	0
+b	6.2	0	0

Fig. 6-75 Import Data from Module Testing Screen

EXPLANATION: For ease of preparation of the explanation of software procedure, test data of only one bale for each Lot ID was entered at 'S Report Database.

Therefore, in Import Data From Module Testing window, the number of bales is 0 as well as Standard Deviation and %CV.

In actual Module Testing a certain percentage of bales in a Lot are sampled and tested. The average (mean) of these tests will be displayed as well as the number of bales tested, the standard deviation and the %CV.

24.5 Select Accept to see the Accept Data From Module Testing window (Fig. 6-76)

Fig. 6-76 Accept Data From Module Testing Screen I

Enter 1 for “starting bale number” and 91 for “number of bales in lot.” See the figure below and the following Explanation.

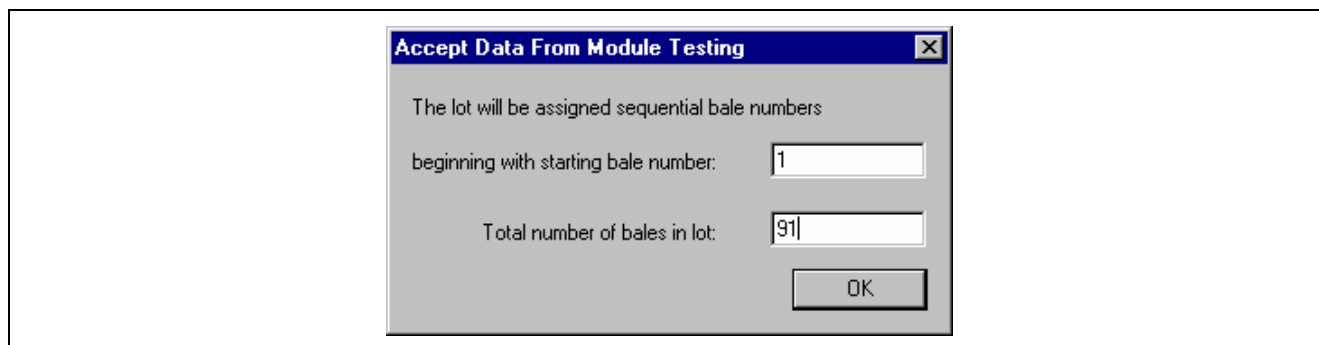


Fig. 6-77 Accept Data From Module Testing Screen II

**EXPLANATION:** In Bale Manager Software, test date must be tied to (connected to) a Bale ID number. Each lot must have its unique and different set of Bale ID's.

For this explanation of Bale Management software, the following list of Lot ID's and Bale ID's are used for each indicated Growth Area.

Lot ID	Starting Bale Number	Number of Bales	Growth Area
XYZA	1	91	Eastern
XYZB	92	93	Eastern
XYZC	186	93	Eastern
XYZD	280	93	Eastern
XYZE	374	93	Eastern
XYZF	468	89	Eastern
XYZG	558	215	Eastern
XYZH	774	215	Eastern
XYZJ	990	100	Western
XYZK	1091	100	Western
XYZL	1192	101	Western
XYZM	1294	73	Western
XYZN	1386	88	Western
XYZP	1457	89	Western
XYZQ	1547	11	Western
XYZR	1559	90	Western

Table 6-5 Module Testing – Number of Bales per Lot, Example

**IMPORTANT:** These bales will be physically stored in the warehouse in separate locations for each lot. No two bales in the Bale Manager database should have the same Bale ID number.

24.6 Select OK. After a short period of time for the computer to write Bale ID numbers, the Bale Manager window of Fig. 6-78 will appear.



Fig. 6-78 Added Data File Screen

Select OK to return to the Data Import window of Fig. 6-73.

24.7 Follow the procedure of above steps to import all of the Lot ID's using the above entries for Starting Bale Number, and Number of Bales.

**Important:** Pay close attention to Growth Area selection. (It may be necessary to select "From Default Path" then back to "From Disk Drive A" to see the list of Lot ID's under Data File. Select Exit to return to the Bale Manager window of Fig. 6-58. Remember to remove (and save) the disk from Drive A.

### Step 3: View data

One of the most important features of Bale Manager is the ability to see not only fiber property averages but also, and most important, the distributions. Maintaining consistency in distributions is the key to gaining consistency in yarn quality and processing performance. Fluctuations in distributions within and between mixes will cause spinning problems even when averages appear to be consistent. For this reason, Bale Manager data is put into Categories and viewed in the form of Histograms.

25.0 In the Window of Fig. 6-58 select and highlight View and then Inventory in the drop down menu.

25.1 The View Inventory Bale Data window of Fig. 6-79 appears. At Lot ID and Growth Area use the down arrows to select ALL and ALL respectively. Likewise NONE should be selected for Limit Property. Under View, select Histogram.

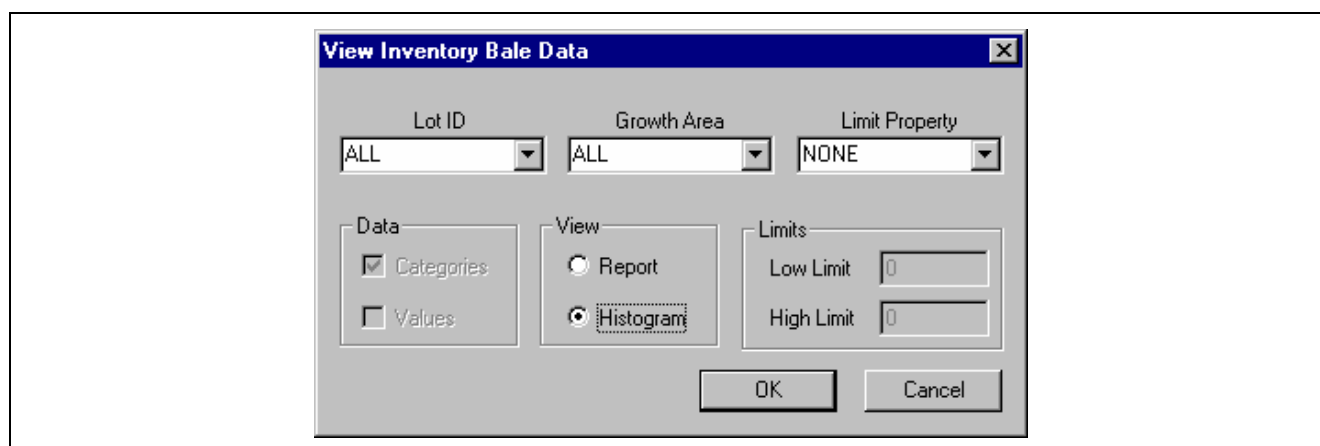


Fig. 6-79 View Inventory Bale Data Screen



25.2 Select OK and the View Histogram window of Fig. 6-80 appears.



Fig. 6-80 View Inventory Histogram Data

25.3 Use the pull down arrow at Property to highlight and select SCI (Fig. 6-81).

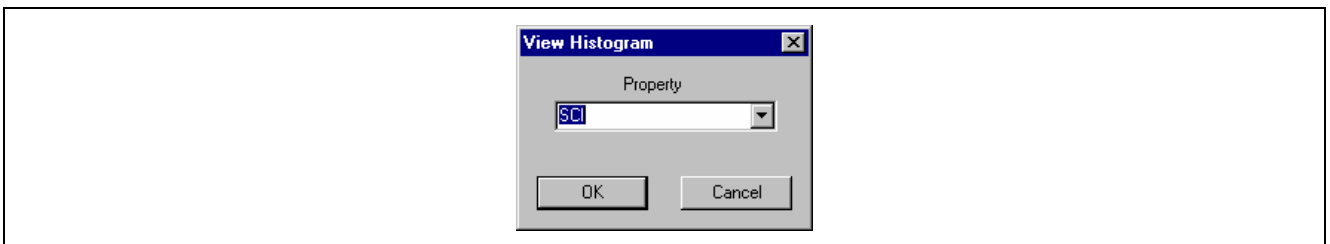


Fig. 6-81 View Inventory Histogram Data

25.4 Select OK and the Histogram of the distributions of SCI appears. Bale Count will be shown in the upper right hand side. Also shown are the Category numbers, average value for each Category, and the number of Bales in each Category. Select the Printer Icon in the upper left-hand corner to print the SCI Histogram (Fig. 6-82), which used the Initial 101-2-30 Category Definition of Fig. 6-62. Exit by use of the upper right hand corner X to return to Fig. 6-58.

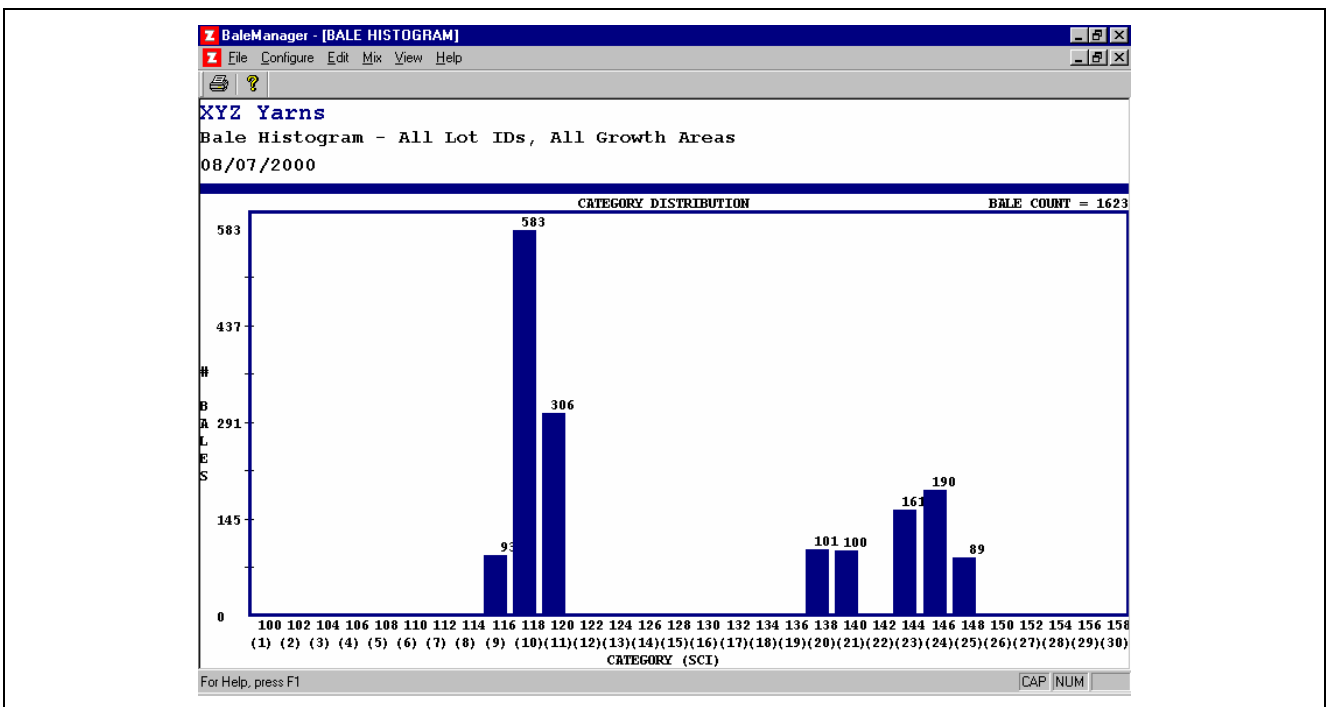


Fig. 6-82 SCI Histogram, All Lot Ids; Initial Category Definition

25.5 Follow the steps under “View Data” (25.1, 25.2, and 25.3) but instead of SCI select Micronaire to view, and then print the Micronaire Histogram (Fig. 6-83 which uses the temporary Initial 3.25-0.1-20 Category Definition of Table 6-4.

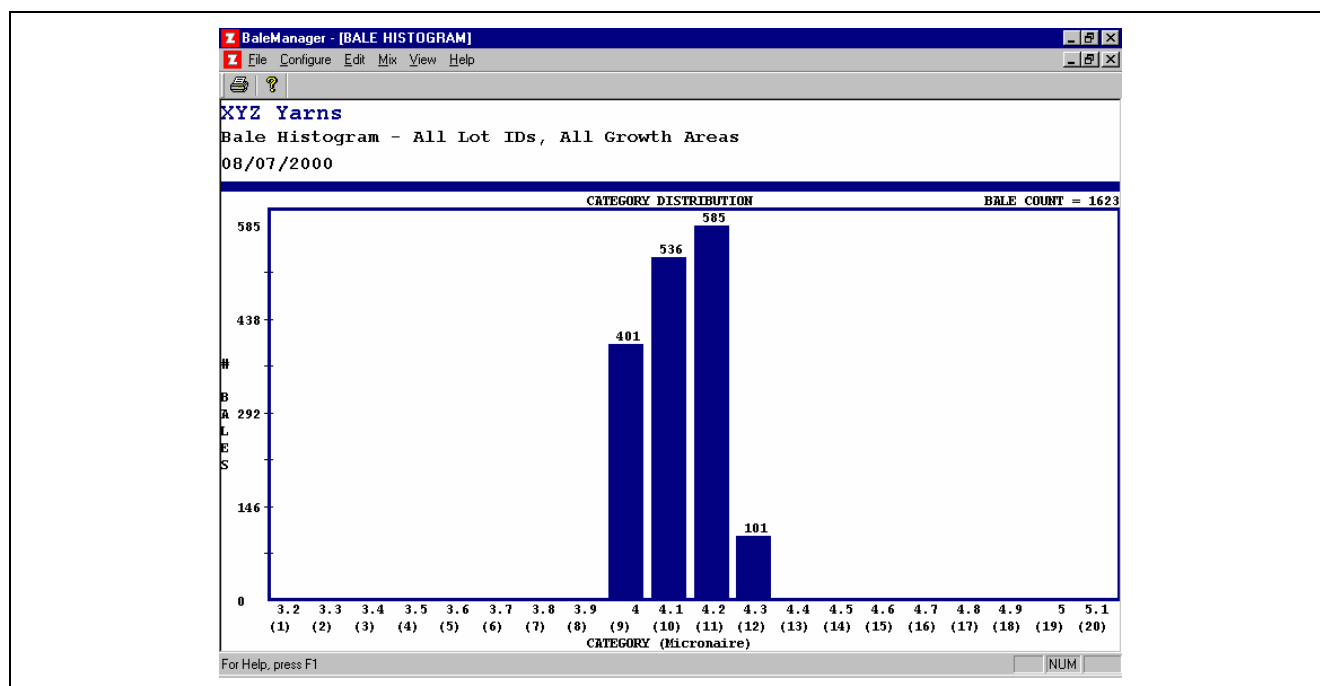


Fig. 6-83 Micronaire Histogram, All Lot Ids; Initial Category Definition

As seen in the window of Fig. 6-79, data can be viewed by Categories or by Value. Reports can be by Report (listing data) or by Histogram. Portions of data can be viewed by entering Low and High Limits after selecting a Property in the pull down menu at Limit Property.

25.6 Select the upper right hand corner X to return to the Bale Manager window of Fig. 6-58.

#### Step 4: Inventory archive

Ultimately, the Bale Manager software will advise how many bales of each Category Number for each mix (laydown) should be taken from the warehouse. Upon Data Import (see steps 24.1 – 24.5 above) Bale ID numbers were automatically assigned to all bales by the computer’s Bale Management software. By having a print, at the computer, of all bales in inventory, needed Bale ID’s can be manually selected and marked as consumed after bales have been selected for mixes and removed from the warehouse. After the Import of each Lot ID, a print should be made and all prints stored at the computer location for future reference.

26.0 In the Bale Manager window of Fig. 6-58, select View then Inventory in the drop down menu. In the View Inventory Bale Data window of Fig. 6-79, use the down arrow to select XYZC under Lot ID and select Eastern under Growth Area. None should be selected at Limit Property. Under Data select Categories and also Values. Under View select Report. Low and High Limits should both be 0 as seen in Fig. 6-84.

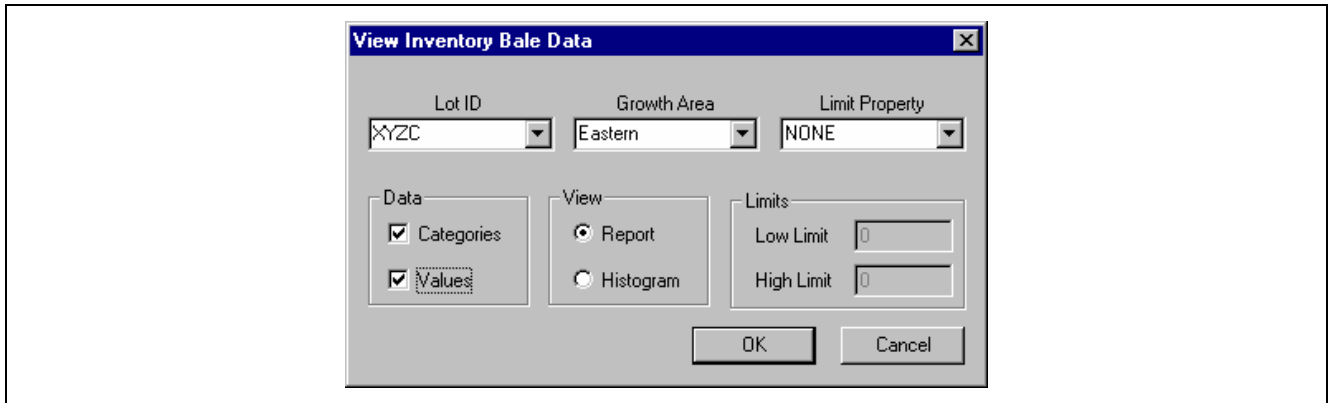


Fig. 6-84 View Inventory Bale Data Screen

Select OK to see the data similar to Fig. 6-58

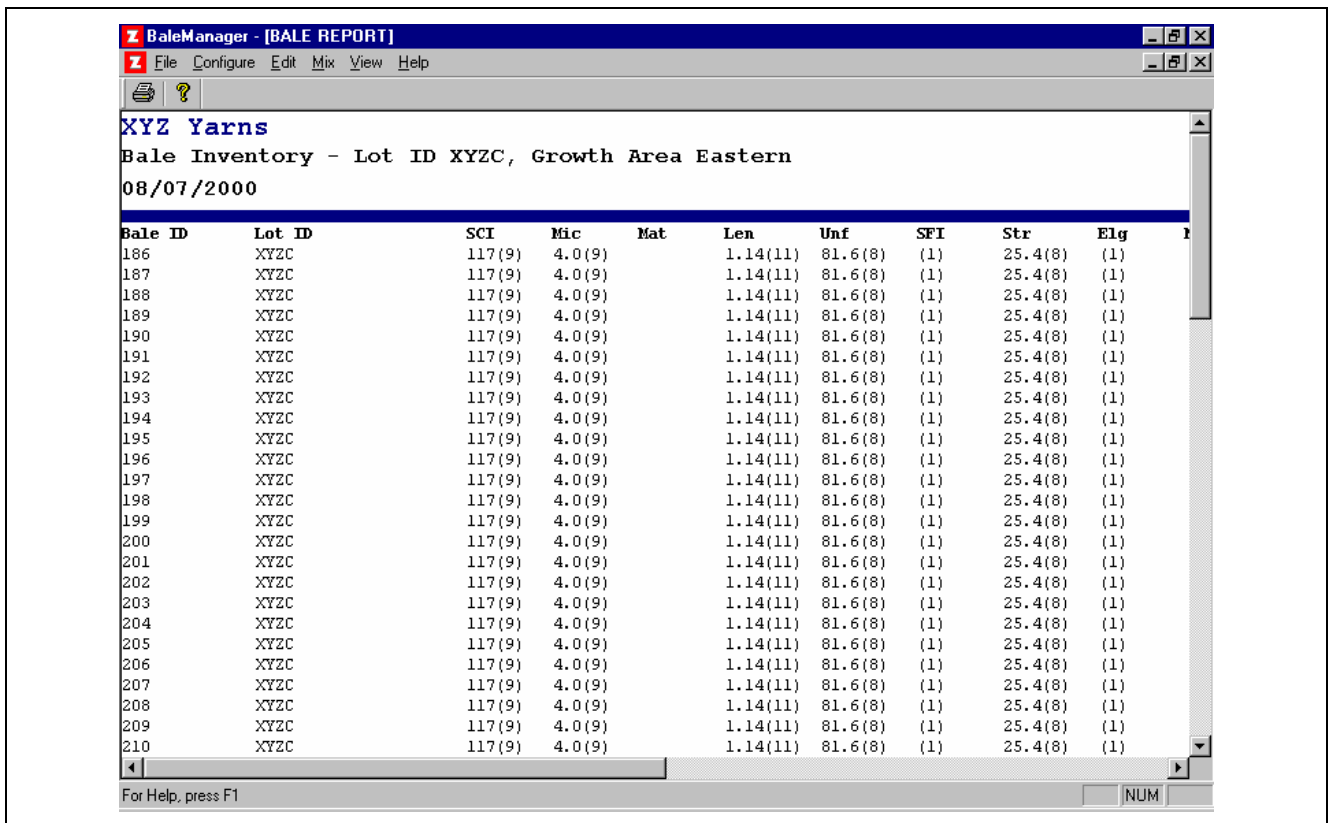


Fig. 6-85 Bale Inventory Report Screen (LOT XYZC; Growth Area Eastern)

26.1 Follow the above procedures to select and make prints of all Lot ID's being careful to observe when a change in Growth Area is necessary (see step 24.5 and table 5.4 above).

26.2 Select the upper right hand corner X to return to the Bale Manager window of Fig. 6-58.

**Step 5: Make a mix**

27.0 In the Bale Manager window of Fig. 6-58, select Mix.

27.1 Select Make and the Make a Mix window will appear.

**Note:** Each time a mix is made, the software will automatically sequence the Mix Number. Keeping Mixes in numerical order is desired for later viewing in Mix History. The Mix Mode was selected as “proportional” at Step 18.4 above.

Enter the Number of Bales in the mix. At Mix Name use the pull down arrow to select 1-RSMIX (Fig. 6-86).

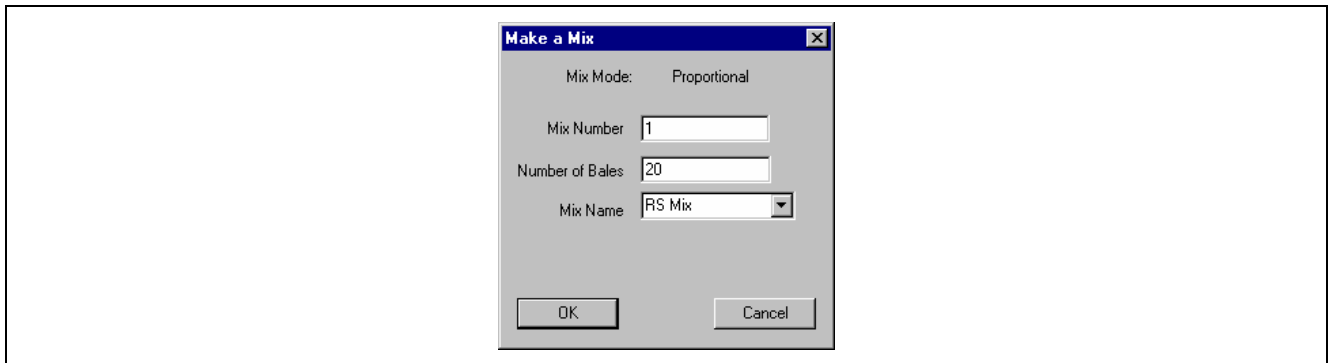


Fig. 6-86 Make-a-Mix Screen

27.2 Select OK and the window Bale Manager – (Mix Report) will appear showing information required for use in selecting bales from the warehouse (Fig. 6-87).

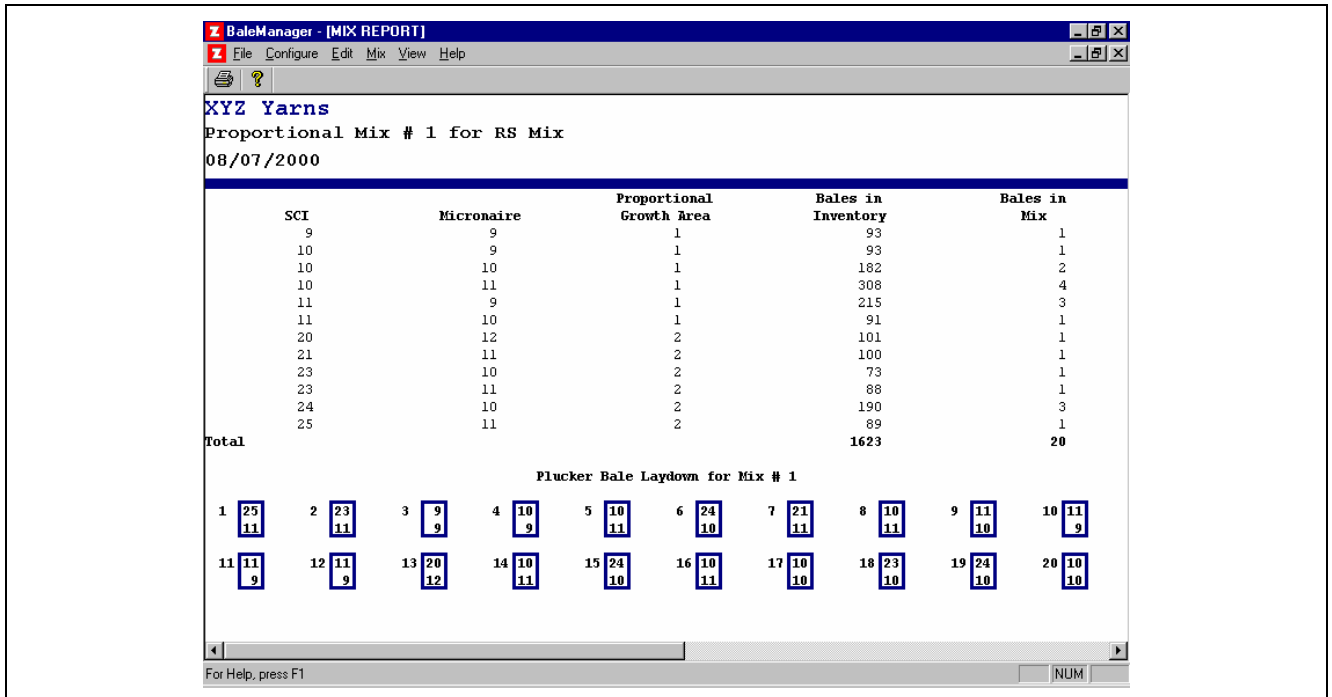


Fig. 6-87 Mix Report Screen

27.3 Make a print of the Bale Manager – (Mix Report). The right hand column, Bales in Mix, shows the number of bales to be selected for the Bale Category Numbers listed in the first 3 left hand columns.

**Note:** Growth Areas were assigned Category Numbers in sequential order by the software as Categories were entered in steps 21.1 – 21.4 above. In this illustration, Eastern was assigned Category 1 and Western Category 2.

The Category Number and position of placement of each bale on the Opening Room Floor is shown.

According to the listed Category numbers, refer to the Bale Inventory prints made in steps 26.0 to 26.1 above, and with pen or pencil, make a list of Lot ID's from which bales will be selected and taken from the warehouse (similar to Fig. 6-88).

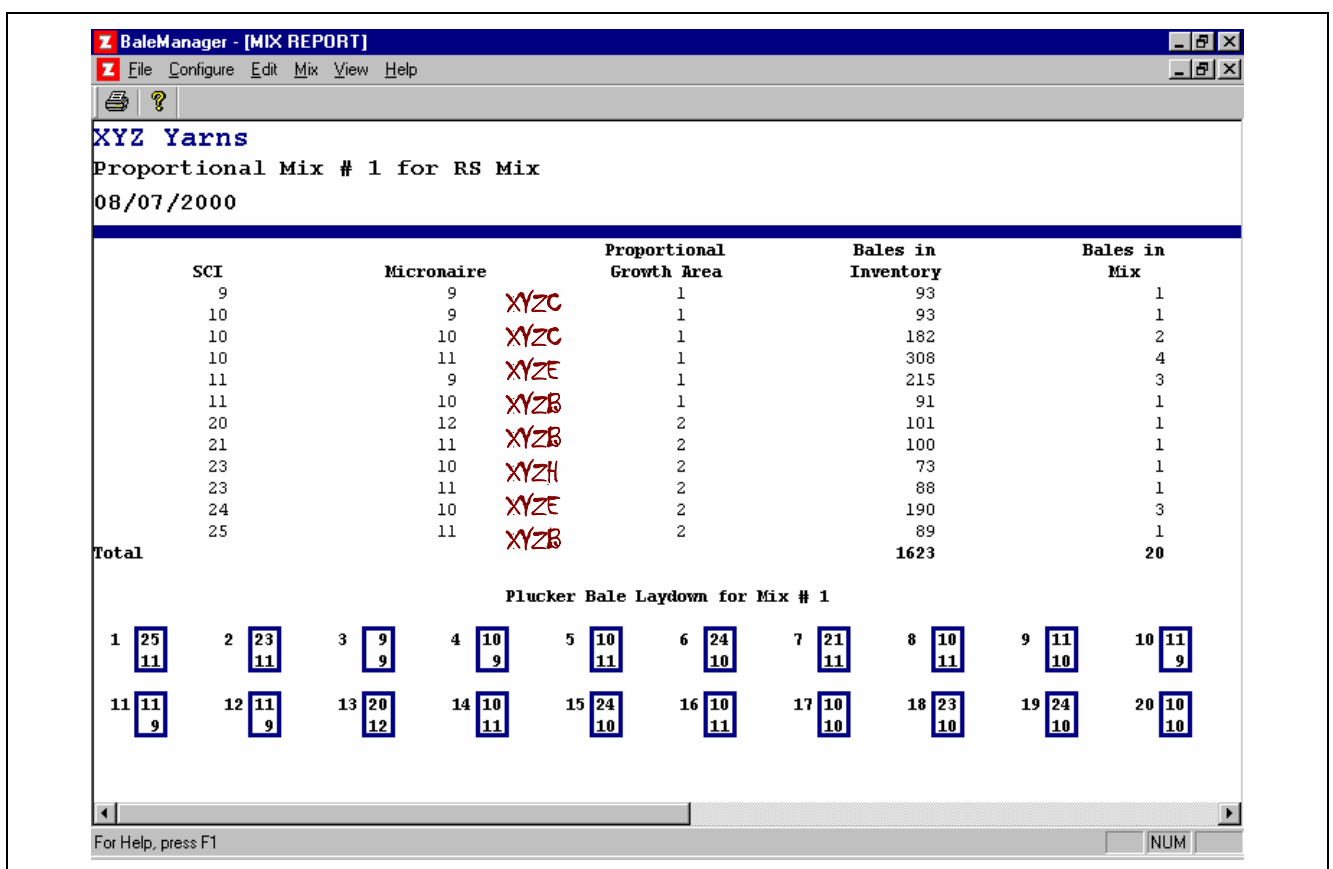


Fig. 6-88 Mix Report Screen – Added Lot IDs

27.4 Select the upper right hand corner X of the Bale Manager – (Mix Report) window to return to the Bale Manager window of Fig. 6-58.

27.5 When the Bale Manager – (Mix Report) of Fig. 6-88 is returned, indicating that bales have been removed from the warehouse, select Mix in the Bale Manager window of Fig. 6-58, then select Preview/Accept to see the Preview/Accept Mix window. Use the pull down arrow to select 1-RSMIX (Fig. 6-89).



Fig. 6-89 Preview/ Accept Mix Screen

27.6 Select OK. A larger Preview/Accept A Mix window will appear.

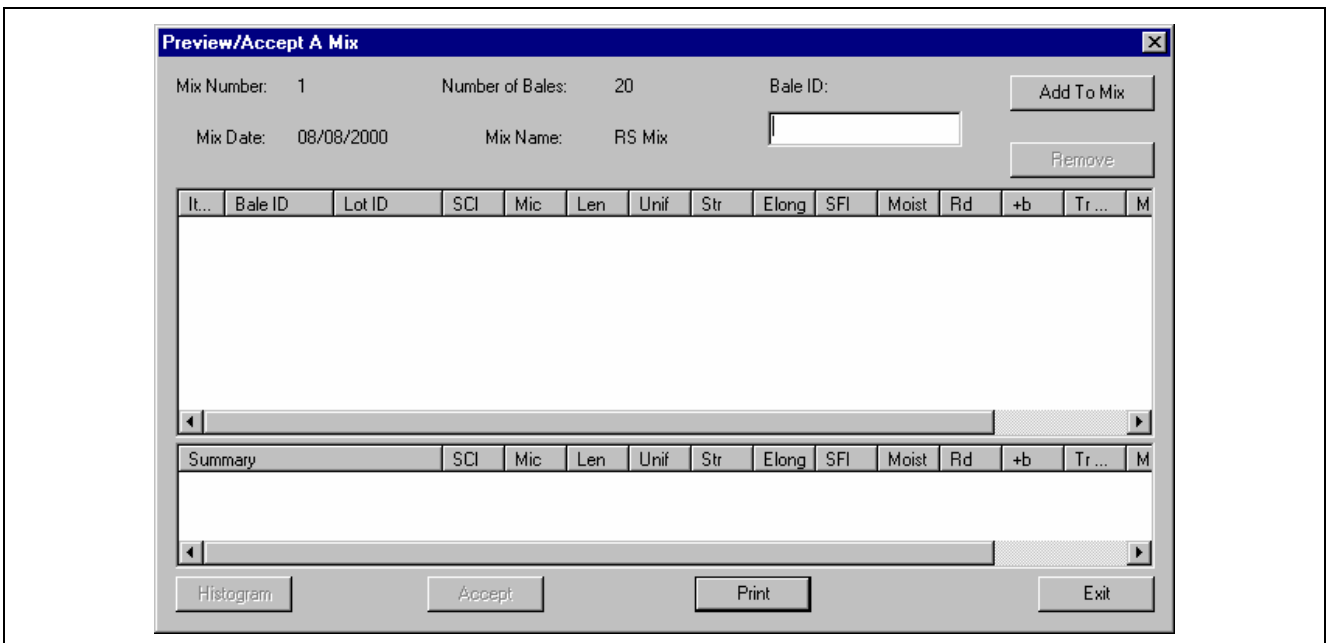


Fig. 6-90 Preview/ Accept A Mix Screen I

For each of the Lot ID's listed on the returned Bale Manager – Mix Report, refer to the Bale Inventory prints made for each Lot ID. Select appropriate Bale ID's.

For instance (see Fig. 6-88), one bale of category 9-9-1 had been selected form Lot ID XYZC. The Bale Inventory print of Lot XYZC shows Bale ID 186 can be declared removed from Warehouse and used for entry into the Preview/Accept A Mix window.

At Bale ID enter 186 then select Add to Mix. The Bale ID, Lot ID and test values will appear (Fig. 6-91).

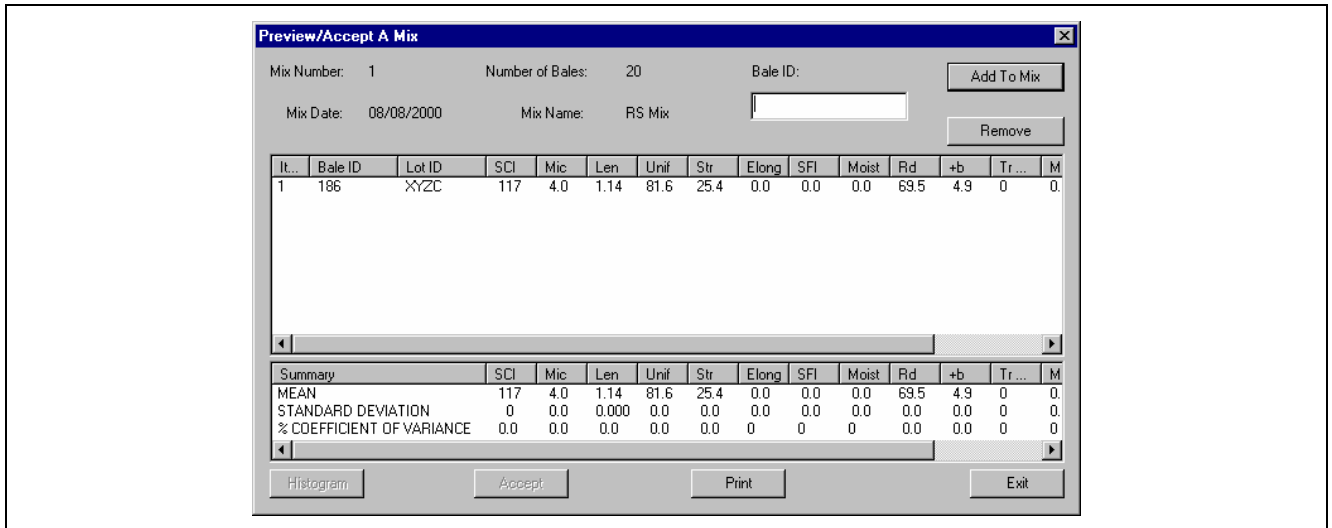


Fig. 6-91 Preview / Accept A Mix Screen II

27.7 Complete the Preview/Accept A Mix window by entering Bale ID numbers for the remaining 19 bales (Fig. 6-92).

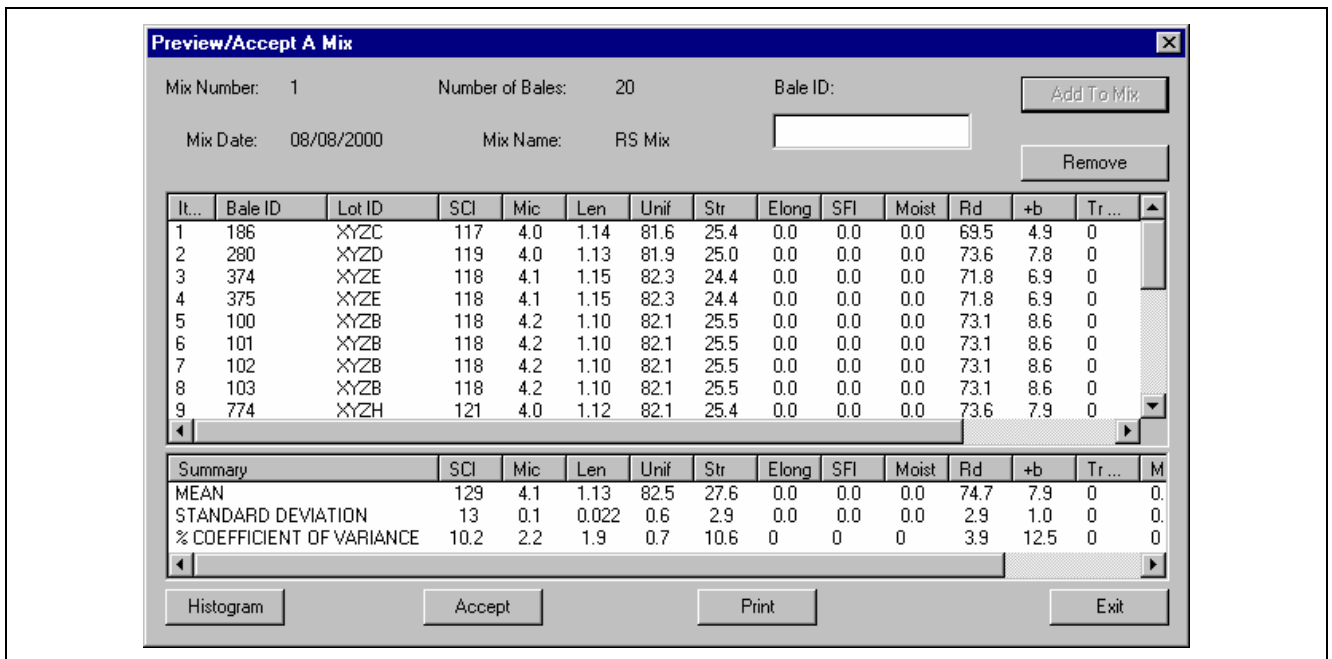


Fig. 6-92 Preview / Accept A Mix Screen III

**Note:** As seen on the computer monitor, the vertical space is not large enough to see all 20 bales.

**Discussion:** Bales have been removed from the Warehouse Inventory. Now they must be removed from the Bale Manager inventory. However it may be desirable to see (preview) the mix before removing the bale from Bale Manager inventory.

27.8 In the Preview/Accept A Mix window of Fig. 6-90, select Histogram to see the Mix Preview Histogram window. Use the pull down arrow at Property to select SCI (Fig. 6-93), then select OK.



Fig. 6-93 Mix Preview Histogram Screen

27.9 The 20 Bale ID SCI for Mix 1 will appear (Fig. 6-94)

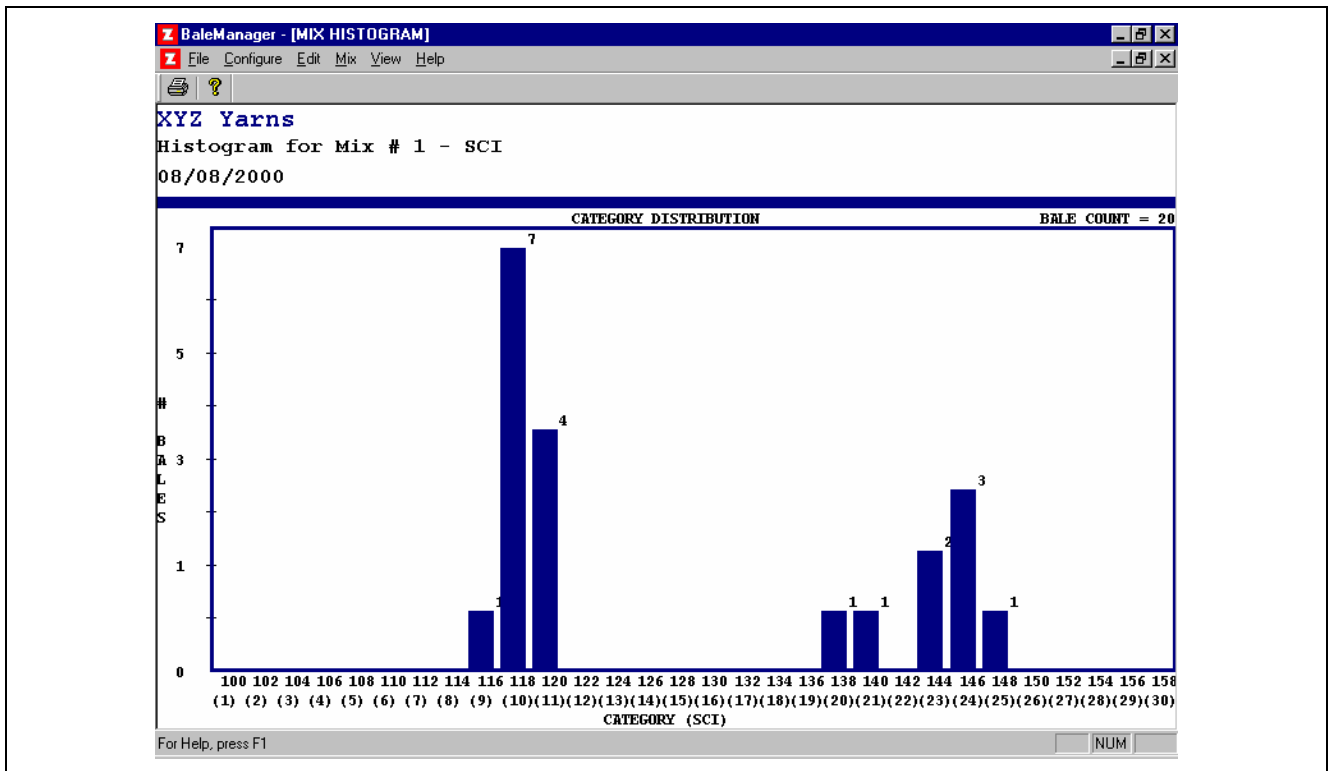


Fig. 6-94 Mix Histogram, Mix no. 1 - SCI

Since Proportional had been specified for Mix Mode the resemblance to the SCI Histogram of the 1623 Bale Inventory can be seen. The Histogram of all fiber properties can be seen by selection in the Mix Preview Histogram. Exit the window by using the upper right hand corner X to return to the Bale Manager window of Fig. 6-58.

27.10 In the Bale Manager window of Fig. 6-58, select Mix then Preview/Accept to see the Preview/Accept A Mix window. Use the pull down arrow to select 1-RS Mix, and then OK to see the Preview Accept A Mix window of Fig. 6-90.

27.11 Select Accept. At this moment, all bales of 1-RS MIX will be removed from Bale Manager inventory (they had been removed from warehouse inventory) and transferred automatically to Mix History database. The window of Fig. 6-58 will re-appear.



**Step 6: Mix history**

28.0 From the window of Fig. 6-58, select View, then History.

28.1 Select Mix History and the window of Fig. 6-95 appears listing all of the previous 20 mixes. Exit by using the upper right hand corner X to return to the Bale Manager window of Fig. 6-58.

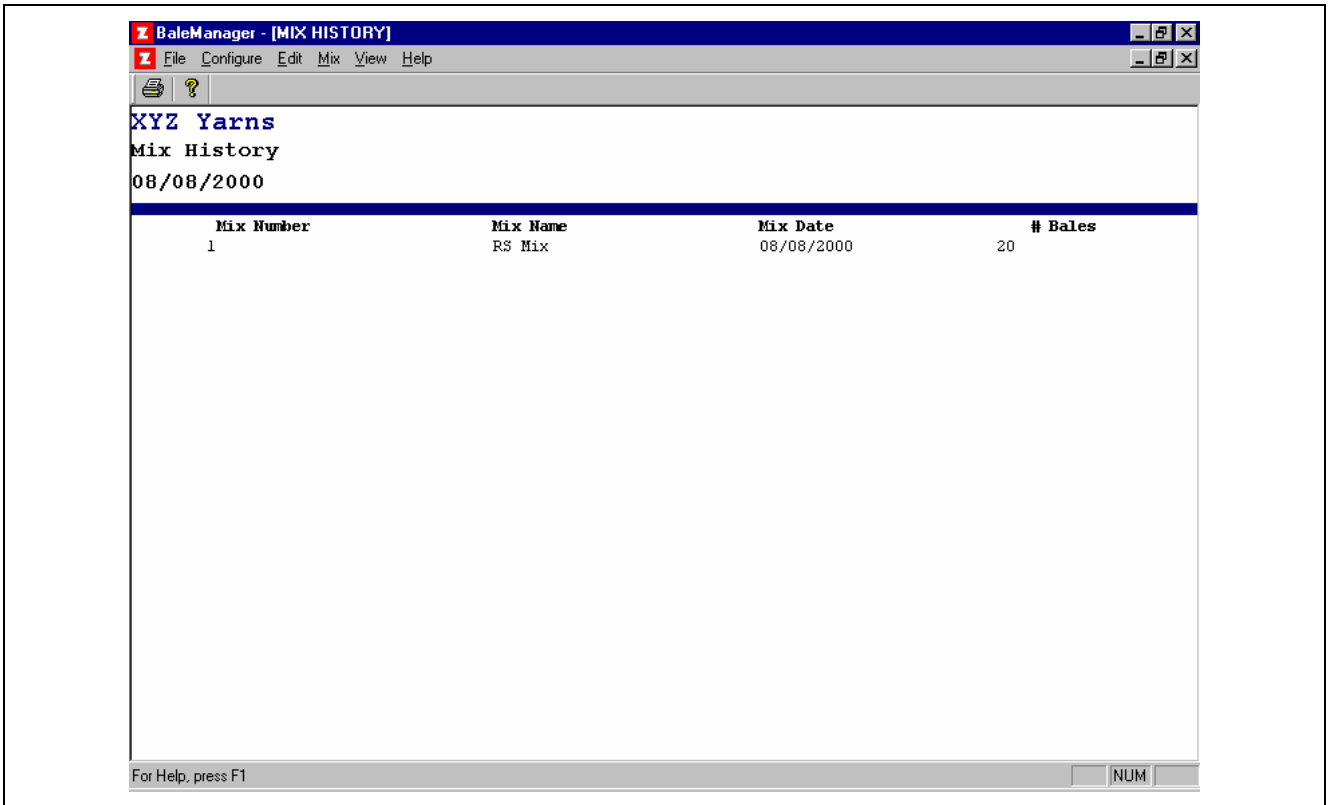


Fig. 6-95 Mix History Screen

28.2 From the window of Fig. 6-58, select View, then History and then select Histograms to see the window Mix History Histograms. Under Mix Number use the down arrow to select 1-RS MIX and under Property use the down arrow to select a fiber property. This time select Micronaire for a change (Fig. 6-96).

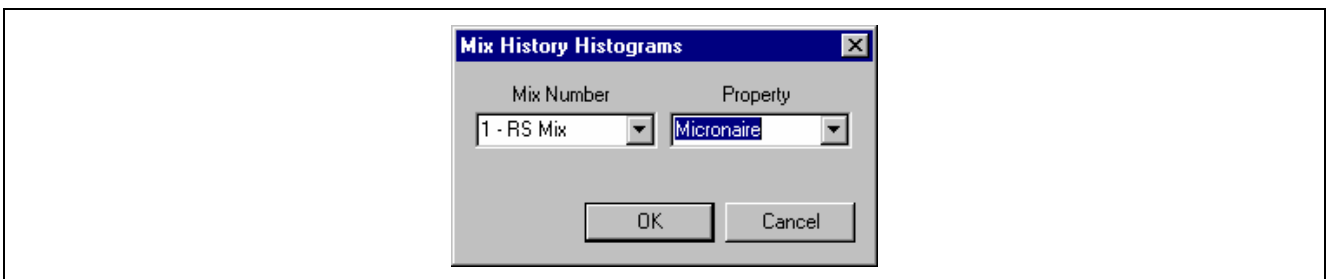


Fig. 6-96 Mix History Property Screen

28.2 Select OK and the Micronaire Histogram of Mix no. 1 appears (Fig. 6-97).

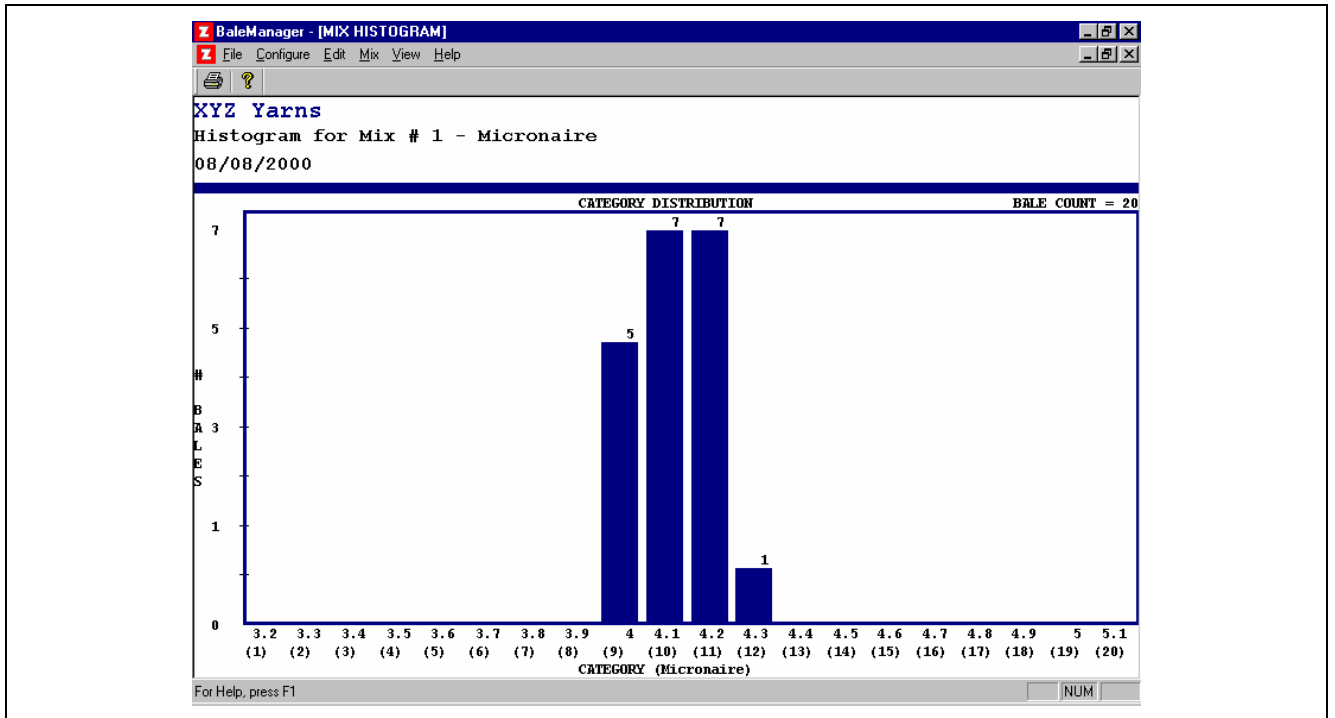


Fig. 6-97 Mix History Histogram, Mix no. 1 - Micronaire

Exit the window by using the upper right hand corner X.

Computer program space in Mix History allows the viewing any and all Fiber Property Histograms for up to 20 of the most recently made mixes.

**Step 7: Edit data**

It is very important that the Bale Manager inventory of Bales be identical to the actual bale inventory in the Warehouse. Perhaps for some reason warehoused bales may be removed and not used for Mix Selection; therefore, they must be removed, by Bale ID Number from Bale Manager software inventory.

29.0 In the window of Fig. 6-58, select Edit.

29.1 Select Bale Data to see the Bale Data window of Fig. 6-98.

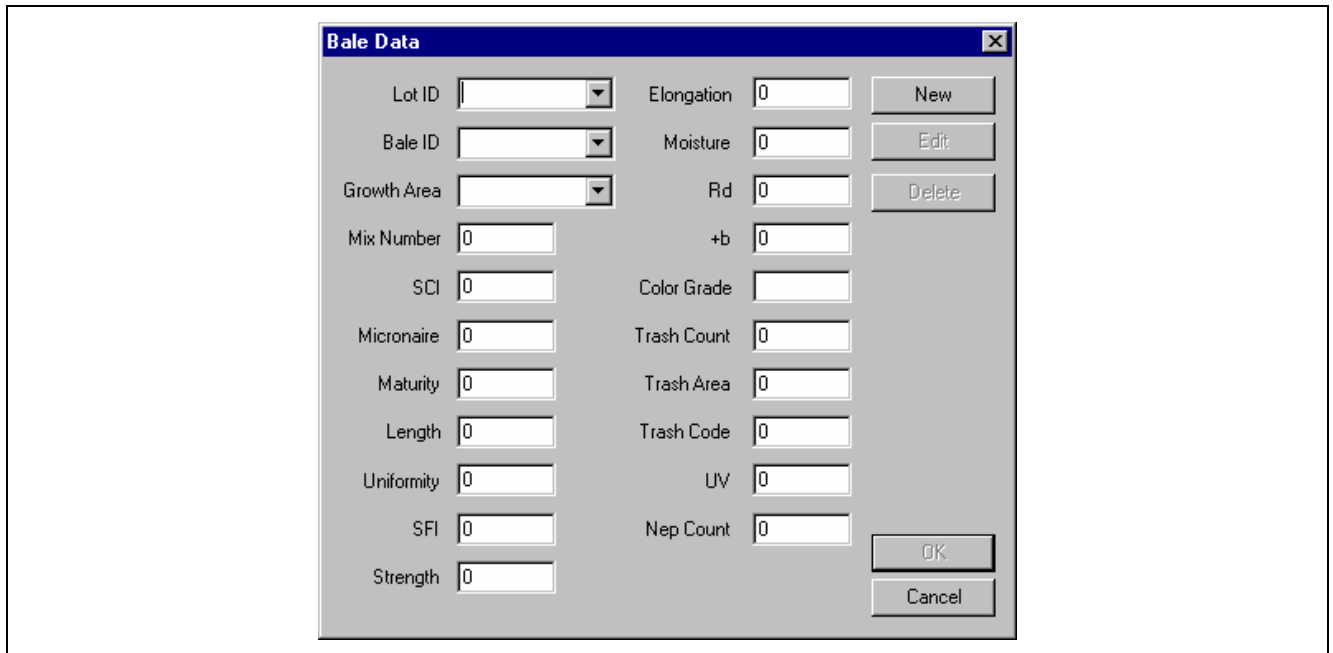


Fig. 6-98 Edit Bale Data Screen

After using the down arrow at Lot ID, a list of Lot ID's will appear. After selecting a Lot ID number and after using the down arrow at Bale ID, a list of Bale ID numbers will appear. Select the desired Bale ID number and the measured values for that Bale will appear.

The Growth Area for Bale can be changed. Measured values can be changed by selecting Edit. The bale can be deleted from inventory by selecting the Delete button. If when data was imported the appropriate Growth Area was not selected, a change in Growth Area for selected Lot ID's can be made by selecting Change Growth Area in the pull down menu under Edit.