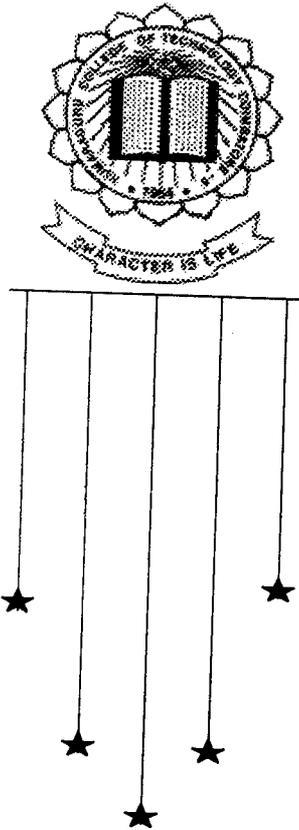


DATA LOGGER FOR A BELL ANNEALING FURNACE



P-539

PROJECT WORK

Submitted By
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Under the Guidance of
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In partial fulfillment of the requirements for the award of the degree of
**BACHELOR OF SCIENCES IN APPLIED
SCIENCES – COMPUTER TECHNOLOGY**
of the Bharathiar University, Coimbatore.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Kumaraguru College of Technology
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KUMARAGURU COLLEGE OF TECHNOLOGY

COIMBATORE - 641006



Department of Computer Science and Engineering

Certificate

This is to Certify that this Project Entitled

DATA LOGGER FOR A BELL ANEALING FURNACE

has been submitted by

Ms. SHRIVIDHYA . J. , V.C. KOMATH

in partial fulfillment of the requirements for the award of Degree of

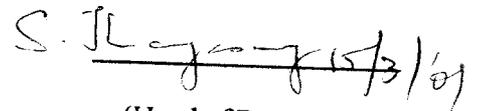
Bachelor of Science Applied Science Computer Technology

of the Bharathiar University, Coimbatore - 641046

during the academic year 2000-2001


15/3/2001

(Guide)


15/3/01
(Head of Department)

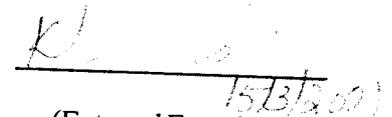
Certified that the Candidate was Examined by us in the Project Work.

Viva-Voce Examination held on 15.3.2001

University Register Number 982700165, 982700130


15/3

(Internal Examiner)


15/3/2001
(External Examiner)

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Salem 636 013. Tamil Nadu, India

Phone : 483021 Fax : 0427 - 482800

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Ref No TR-15(6)

January 27, 2001



CERTIFICATE

Certified that
**Miss Shrividhya Jayakumar &
Miss Komathi Chinnaswamy**
Third Year B.Sc (Applied Science – Computer Technology)
Student of **Kumaraguru College of Technology, Coimbatore**
has done a project on
“DATA LOGGER FOR BELL ANNEALING FURNACE”
in Electrical Department of Salem Steel Plant
from 01/12/2000 to 27/01/2001


P Murugesan
Sr Manager(HRD)

27/1

PREFACE

The Salem Steel Plant is one of the best steel plants in India. It is a model plant and is undertaken by the government of India.

It is located about 12kms to the west of Salem near Kanjamalai and was commissioned on September 13th 1981. There are about 25 departments in the plant located in an area of about 1146 hectares.

The input coil to the Salem Steel Plant is imported from Japan, Finland. All these coils will be hard and brittle and to soften these coils they have to be reduced.

The 400 series coils that cannot be reduced is softened. This process of softening is called as annealing. This process of annealing is done through the Bell Annealing Furnace.

The task of our project is to draw a graph using the temperature that is been recorded from the furnace.

We have created our project in visual basic (ActiveX CONTROLS) and data i.e., temperature from the furnace is recorded at the mounted database through the ODBC connectivity.



**DATA LOGGER FOR A
BELL ANNEALING FURNACE
SALEM STEEL PLANT,
SALEM.**

ACKNOWLEDGEMENT

An endeavour over a long period can be successful only with the advice and support and many well wishes. We take this opportunity to express our gratitude and appreciation to all of them.

We, the students of Kumaraguru College of Technology, are really proud in doing a project at Salem Steel Plant, Salem.

We are bound to express our gratitude to Dr K.K. Padmanaban Phd, Principal, Kumaraguru College of Technology, for his constant encouragement throughout our course.

We wish to thank Dr.S.Thangaswamy H.O.D of Computer Science Department for constantly encouraging us to pursue new goals and ideas.

We thank our course co-ordinator Mr.S.Andrew M.Sc, PGDPM, Mphil for guiding us throughout our project.

We admit our heartfelt thanks to our internal project guide Mr. M. Raju M.C.A., B.Ed., and senior faculty member in computer science department for being supportive throughout the tenure of our project.

We owe much to Mr. Murugesan HRD, of Salem Steel Plant, for his inspiring advice, immense help, whole hearted support and constant encouragement throughout the tenure of this project work at their esteemed organization.

We express our gratitude to the electrical department (testing lab) of Salem steel plant for giving us a project in satisfying their needs. We sincerely thank Mr. Muthu (Manager), Mr. Thiyagarajan (testing lab) of Electrical Department, for a golden opportunity in doing a project at their esteemed concern.

We wish to thank all our friends and our family members who were showing their contributions in many subtle ways and indeed instrumental in achieving final results.

SYNOPSIS

Personal computers with appropriate software tools have revolutionized scientific & engineering fields, and also now being adapted for increasingly sophisticated application.

The main objective of our project is to computerize the manual function of the bell annealing furnace unit that is an important part of steel.

The scope of the project aims at bringing the functions in the above-mentioned unit under the purview of the computerized there by recurring the burdens of manpower.

It is mainly concerned with drawing a graph for the data available in the mounted database, connected through the ODBC connectivity-using ORACLE (8.0).

More over it is cost effective and also less time consuming. Information i.e. temperature from the bell annealing furnace can be contained with ease. Data i.e. temperature can be accessed by the end user at any time round the clock. Hence no agency has to wait for any handwritten reports to repetitive and complicated computations that was erstwhile done manually, is now being done by computers in much lesser time than before.

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INTRODUCTION

PURPOSE

Salem steel plant produces cold rolled coils and sheets of various grades and thickness. The raw material for Salem Steel Plant is either stainless steel slabs or the hot rolled steel coils (black or white). The slabs are processed in hot rolling stacked mill to produce the coils of thickness 2mm to 8mm and are sent to cold rolling mill as raw material to it.

In cold rolling mill complex, hot rolled coils are rolled to reduce the thickness to meet the customer requirements, i.e., 0.3mm to 6mm with various lengths as sheets or slotted coils. The raw materials are in different grade namely Austenitic, Ferrite to meet with different end-users. The product is tested in each and every stage both chemically and mechanically.

In Cold Rolling Mill (CRM), incoming Hot rolled coils are softened and the back scales are removed from it. The coil is sent through a production line called Annealing and Pickling unit where it is sent through a furnace maintained approximately at 1100 degree centigrade for 300 series and 800 degree centigrade for 400 series. Cooling the coil in the cooling chamber then follows it. After this process is completed, the coil is sent through the acid tanks. The de-scaled coil will further be reduced by sending the strip through the cold rolling SENDZIMIR MILL (There are two cold rolling mill named as Z-Mill and Z-mill2).

In the cold rolling mill, the thickness of the coil is reduced to the required value. The coil is mounted in the pay off reel mandrel and from there it is passed to RTR (Right Tension Reel), through the work rolls.

After the first pass, the next pass is from the RTR to LTR. The next passes of reduction will be between LTR and RTR and the coil is taken out from RTR only.

The backup rolls give the pressure between the work roll. In the mill there are 20 rolls, (2 work rolls, 8 backup rolls, 6 second inter rolls and 4 first inter rolls). The strip will pass through the work rolls, which are given a pressure upto 1500 kg/sq.cm that leads to thickness reduction.

The backup rolls are made up of 7 ASU rolls, which are kept in the shaft, each can rotate separately. These ASU rolls are used to maintain the shape of the strip by manually setting their positions.

There are two non-contact thickness transducers called Gamma Ray Gauges, one is kept at the Right Tension Reel (RTR) side and the other is kept at the Left Tension Reel (LTR) side.

The actual thickness feedback of the entry side and the delivery side is obtained by the above two Gamma ray gauges which is used by the Automatic Gauge

Control system to achieve the required delivery thickness by controlling the pressure applied to the work rolls.



To achieve proper reduction in thickness, there are eleven D.C. motors, which are synchronized to run at the speed and an electro-hydraulic mechanism to control the output thickness.

After the reduction of thickness, the material will be sent to the finishing zone of the plant where the material is slit into smaller width, and cut to sheets. Also the coil is polished to give various finishes. The Industry has got a Coin Blanking Unit to produce Stainless Steel coin blanks, which are despatched to Mint.

SCOPE:

The main objective of our project is to computerize the manual function of BELL ANNEALING Furnace unit.

The project deals with drawing a graph for the Bell Annealing Furnace, which must be maintained to achieve the upgrade quality of the steel.

There are different types of graphs like bar charts, pie chart that are used for different purposes. Bar charts are used for showing the statistical data information of any organisation in the form of bars. Pie chart is represented in form of circle, which is used for showing the percentage of work being allotted in the form of small parts divided within the circle.

In our project we have taken the graph containing two axis namely the X-axis and Y-axis. The graph is



plotted against the time on the X-axis and the Temperature (Celsius) on the Y-axis. The graph gradually rises from 0° to 820° and maintained constantly for about 5 hours called soaking temperature, then it gradually decreases from 820° to 520° .

Definitions

Steel :

Steel is an alloy of iron with usually 0.5 to 1.5% of carbon.

Stainless Steel :

There are many varieties all contain 11-22% chromium and 1-14% nickel. A thin film of chromium oxide protects the surface from corrosion. They are used for cutlery and chemical plants.

Annealing :

The steel is heated to a temperature well below red hot and then cooled slowly this process is called annealing. Annealed steel is soft.

Furnace :

An enclosed very hot place for heating metals etc.

Soaking :

Maintaining the same temperature

Data Logger:



Recording the data now and then and storing it in the memory.

Thermocouple:

An instrument used for measuring the temperature in industries.

Temperature :

Degrees of Hot or Cold

Acronyms & Abbreviations

SAIL : Steel Authority of India Limited

SSP : Salem Steel Plant

BAF : Bell Annealing Furnace

HRM : Hot Rolling Mill

CRM : Cold Rolling Mill

ODBC : Open Data Base Connectivity

DSN : Data Source Name

REFERENCES

The head of the Electrical department Mr.Muthu allotted us the project and directed us to our guide in Salem Steel Plant

The Electrical engineer Mr.Thayagarajan gave us information about the functioning of the Bell Annealing Furnace. The employees of the Bell Annealing Furnace guided us with the already existing recorded temperature in the Salem Steel Plant.

Our internal guide Mr.Raju M.C.A, helped us by sharing his ideas and views of developing an Activex control using Visual Basic.

Overview of the Document

We have undertaken a project at Salem Steel Plant, Salem, "Data Logger for Bell Annealing Furnace". The input coils to the plant are being imported from Germany, Finland & Japan. Usually the coil will have to soften before they are sent to his requirements.

And this process of softening the steel coil is called as Annealing. This annealing process is being done at the Bell Annealing Furnace. This forms a main part of SAIL. The target of our project is to draw a graph for the data i.e., temperature being collected from the Bell Annealing Furnace, the task of drawing this graph was done manually, is to be computerized and we have taken this job of computerizing the manual functions of the plotting the graph for Bell Annealing Furnace.

INTRODUCTION

In our project, monitoring the temperature of the Bell Annealing Furnace evolves the task of drawing the graph from the data available from the mounted database through the ODBC driver.

We have included two more modules for monitoring the temperature of the furnace unit.

A thermometer function just likes that of the ordinary thermometer. The input data i.e. the temperature that is stored in the mounted database is fed automatically. The temperature in the thermometer raises gradually from 0° degree and it raises till 820° degree and remains constantly for about 5 hours and it decreases to 520° degree. We have given special color effects at each stage for better understanding.

Meter gauge, which deflects as and when the temperature from the mounted database is fed to it.

In all 3 controls a beep sound arises and a red light glows when the temperature increases beyond 820 degrees as an indication of danger.

We have created these user controls in visual basic (ACTIVEX CONTROLS) that is very user friendly.

GENERAL DESCRIPTION



PRODUCT PERSPECTIVE:

This project of monitoring the temperature for the BELL ANNEALING FURNACE has involved the task of plotting the temperature of the input coil against the time in hours required for heating the coil.

The task of our project deals with two more formats of representing the target in the form of user controls created in Activex controls (Visual Basic 6.0).

One of the user controls is the thermometer. We have created it to function just like that of the ordinary thermometer, which is used for showing the increase in the temperature.

Other user control is in the form of the meter gauge used in the industries for the deflection of speed. We have created this control, so that the needle will show a deflection, as and when the temperature changes.

All these three user controls are used in the project in a very successful way. These three user controls give a better understanding for the users who handle the project in a very easy way just by noting the changes shown by these user controls. We have added the colour effects for all the controls, which help the end users in understanding the project in a better way.

PRODUCT FUNCTIONS

BELL ANNEALING FURNACE of Salem Steel Plant, Salem deals with the process of softening the steel.

Usually almost all the input steels for the plant are reduced for their thickness. Only 400 series coils cannot be reduced and hence it has to be softened and this process of softening called annealing is done through the Bell Annealing Furnace.

The Bell Annealing Furnace is divided in to 3 zones as zone1, zone2, and zone3. Zone1 forms the topmost and Zone3 as the bottommost.

The coils that are to be softened are placed here so that the heat is transformed uniformly throughout the coil.

There a thermocouple kept at each zone of the Bell Annealing Furnace for measuring the temperature. And this temperature from the thermocouple is connected to the computer's database through a hardware setup

connected to the system through the communication port.

The temperature from the thermocouple is being measured for each and every hour and this process continues for about 28 hours. The temperature that is recorded is transferred to the mounted database automatically through the ODBC connectivity.

For the temperature that is recorded for 28 hours, a graph is drawn.

USER CHARACTERISTICS

Temperature monitoring in a Bell Annealing Furnace was done manually. The input for the graph i.e., the temperature was measured manually using a device called Thermocouple.

Once after recording the temperature of all the 3 zones, the graphs for all the 3 zones are drawn.

But the process prolongs for about 28 hours and it involves day and night shift. This develops a communication gap between the employees.

Our project reduces this manual work. Till this time graph was drawn manually. Using the data that has been stored at the mounted database and connected through the ODBC driver, the process of drawing the graph is computerized.

The maximum temperature for the particular coil that is to be processed can be changed for each and every time i.e., in our project the maximum temperature

is set to be as 820° degree and it is this temperature that can be changed depending upon the coil.

We have taken this module of generating the graph automatically as a main task.

On seeing the other two user controls, thermometer and the meter gauge the workers will understand the raise in temperature. Since it is in the pictorial representation it can be easily understood by all the grades of people like the employee, administrator, controller.

GENERAL CONSTRAINTS



In Salem Steel Plant, BELL ANNEALING FURNACE plays a vital role in softening the input steel.

In this bell annealing furnace unit has got totally 8 bases. Only 2 bases can be used at a time.

There are three zones for each base. Graph is drawn for all the three zones in each base with temperature along the y-axis and time along the x-axis.

The maximum temperature reached is 820 degree (Celsius) and if the temperature rises beyond 820 degree (Celsius) then a beep sound arises and a red light glows which indicates a warning to the employees, that the bell furnace has to be stopped and they carry out that process.

The cooling starts there after the constant temperature has been reached.

SPECIFIC REQUIREMENTS

FUNCTIONAL REQUIREMENTS

The company has got two phases. In the first phase, to reduce the thickness of 300 & 400 series coils, they are sent through the annealing and pickling line.

Those 400 series coils that cannot be reduced to the required thickness are only sent to the Bell Annealing furnace.

After the reduction of the thickness, the coils will be sent to finishing zone of the plant according to the requirements needed.

INTRODUCTION

In our project, monitoring the temperature of the Bell Annealing Furnace evolves the task of drawing the graph from the data available from the mounted database through the ODBC driver.

We have included two more modules for monitoring the temperature of the furnace unit.

A thermometer function just likes that of the ordinary thermometer. The input data i.e. the temperature that is stored in the mounted database is fed automatically. The temperature in the thermometer raises gradually from 0° degree and it raises till 820° degree and remains constantly for about 5 hours and it decreases to 520° degree. We have given special color effects at each stage for better understanding.

Meter gauge, which deflects as and when the temperature from the mounted database is fed to it.

In all 3 controls a beep sound arises and a red light glows when the temperature increases beyond 820 degrees as an indication of danger.

We have created these user controls in visual basic (ACTIVEX CONTROLS) that is very user friendly.

Lists of Inputs

Mainly the project has 8 zones. All 8 zones database are created in Oracle 8 like tables. All the tables are created in Numeric data type.

Information Processing Required

The input for the Bell annealing furnace is the form of temperature in degrees (i.e. e.g. 171.1°C) and this forms the decimal integer.

The graph is plotted taking the temperature along the Y-axis and the time along the X-axis. The temperature is plotted for about 900° degrees at an interval of 100

degrees and the time is taken for every one hour and it measures for about 24 hours.

Generally the graph is plotted from 0° degree and it gradually increases and reaches a maximum temperature of about 820° degrees and there it remains constantly for about 5 hours called the soaking temperature and it slowly decreases to 520° degrees.

This is same for all the zones.

Performance Requirements

Security

The project is developed in visual basic (ACTIVEX CONTROLS) can be accessed only by the user who is familiar with the project. Only the user, with the ODBC login password can enter in to it.

Since our project involves the updating of the data, which is stored in the mounted database at the backend (Oracle). This backend is connected to the front end (VB 6.0 - ActiveX controls) through ODBC connectivity; it provides high security by providing a password for the DSN, in the ODBC. Only through this password any user can access the database.

We have given sample inputs of data in the form of temperature that is mounted at the

backend. Suppose if there is any change in the temperature in future it can be changed only by supervisor of the plant or by the source code developer.

Availability

This project deals with the constant values and no input is being received from the user during the runtime and we have stored the raw inputs at the mounted database oracle, which is connected to the design time module through the ODBC driver. The input is stored in the tables. There are about 8 tables in our project concerned about the zone 1, zone2, zone3, temperature & time.

There are about 24 input boxes, 3 zones common for all the 8 bases and to these input boxes the data i.e., temperature is taken from the database. The graph is drawn as and when the data gets updated in the backend.

Mainly the project contains two type of process. First process involves the mounting of the backend database. The next involves the design & run time

(front end) of the project. In our projects we maintain the backend as Oracle 8 and we have chosen front end as Visual Basic 6 (ACTIVE X controls) to design and code our project, for accessing the backend mounted database. In the visual basic we have used the latest user control technique called Active-X Controls.

The main advantages are,

- The user can create our own controls according to the needs of the project.**
- Reusability of code-different clients can use the same code component again and again.**
- Easy to make updating-only the code components need to be changed and changes will be reflected in all the clients.**
- Standard interface-the code component exposes its functionality through properties, methods & events. To get the details of any interface of code components users can use the object browser.**

Open Database Connectivity

Open database connectivity(ODBC) is a windows technology that lets a database client application connect to a external database .To use ODBC the database vendor must provide an ODBC driver for data access. once this driver is available, the client machine should be configured with this driver. The destination of the database ,login id and password is also to be configured on every client machine.this is called as a Data source.The user can configure multiple data sources with same or different drivers on the same machine. Thus using ODBC, it is possible to access heterogeneous data from any client .The ODBC composed of three parts. They are a driver manager, one or more drivers and one or more data sources.

Capacity:

The BELL ANNEALING FURNACE of Salem Steel Plant, Salem is used for removing the mechanical stress of the input coils and the material hardness.

BELL ANNEALING FURNACE is electrically heated. It is gradually heated and is kept constantly for about 5 hours under constant pressure and it cooled gradually.

This furnace is divided in to 3-furnace unit, which in turn is divided into three zones and a converter plate is placed between every zone for uniform spreading of heat.

The temperature gradually rises from 0 degree and gradually increases upto 820 and there it is maintained constantly for about 5 hours called the soaking temperature. Then it is gradually decreases from 820 to 520 degrees.

DESIGN CONSTRAINTS

STANDARD COMPLIANCE

The plotting of graph for the Bell Annealing Furnace was done manually. And due to communication gap, recording of the temperature by the workers at the plant may go wrong at times i.e., for example if the worker have recorded the temperature for 5th hour instead of 7th hour the graph cannot be plotted correctly.

By computerizing this manual task of plotting the graph all the above-mentioned compliance have been overcommmed.

HARDWARE LIMITATIONS

This is the hardware configuration of the plant

- 1. PROCESSOR : CELERON 566MHZ**
- 2. RAM : 32 MB**
- 3. KEYBOARD : STANDARD 104 KEYS**
- 4. FLOPPY DRIVE : 1.44 FDD & 1.2 FDD**
- 5. HARD DISK : 1.2 GB HDD**
- 6. OPERATING SYSTEM : WINDOWS'98**

EXTERNAL INTERFACE

REQUIREMENTS

Temperature of the coil at each zone in the Bell Annealing furnace is measured using the Thermocouple. The output of the thermocouple is connected to the computer's communication ports by means of a Hardware setup.

The hardware is designed using the printed circuit board. It consists of 24 Leds each marks a channel for each zone i.e. for 8 bases. The temperature of the zone1 is recorded after one complete cycle of 24 channels is finished. In this way temperature for 8 bases are recorded.

This hardware setup is connected to the system's port through the System Network Architecture (SNA). This technique is used for the interface of the temperature that has been recorded in the form of heat in to digital signals. It is linked to the system through the System Network Architecture (SNA) Link.

This technique is used since no temperature can be recorded in the form of heat can be recorded directly. It is made possible only through the thermocouple, to the hardware setup and through the SNA technique.



SCREEN FORMATS

DATABASE INCLUDED IN OUR PROJECTS

We created and used 11 tables in our projects. The table description is given below.

Table 1 : Base 1

Sl.no	Field name	Data Type
1	Zone 1	Number(4)
2	Zone 2	Number(4)
3	Zone 3	Number(4)
4	Time	Varchar2(10)

Table 1 : Base 2

Sl.no	Field name	Data Type
1	Zone 1	Number(4)
2	Zone 2	Number(4)
3	Zone 3	Number(4)
4	Time	Varchar2(10)

Table 1 : Base 3

Sl.no	Field name	Data Type
1	Zone 1	Number(4)
2	Zone 2	Number(4)
3	Zone 3	Number(4)
4	Time	Varchar2(10)

Table 1 : Base 4

Sl.no	Field name	Data Type
1	Zone 1	Number(4)
2	Zone 2	Number(4)
3	Zone 3	Number(4)
4	Time	Varchar2(10)

Table 1 : Base 5

Sl.no	Field name	Data Type
1	Zone 1	Number(4)
2	Zone 2	Number(4)
3	Zone 3	Number(4)
4	Time	Varchar2(10)

Table 1 : Base 6

Sl.no	Field name	Data Type
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2	Zone 2	Number(4)
3	Zone 3	Number(4)
4	Time	Varchar2(10)

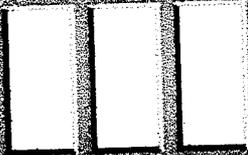
Table 1 : Base 7

Sl.no	Field name	Data Type
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2	Zone 2	Number(4)
3	Zone 3	Number(4)
4	Time	Varchar2(10)

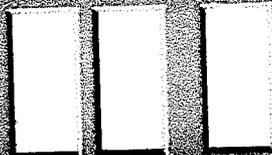
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2	Zone 2	Number(4)
3	Zone 3	Number(4)
4	Time	Varchar2(10)

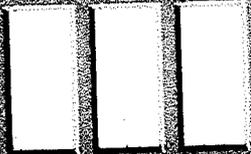
BASE 4



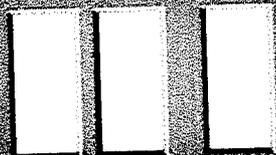
BASE 8



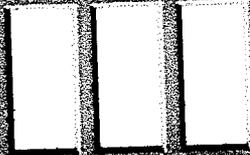
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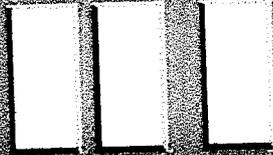
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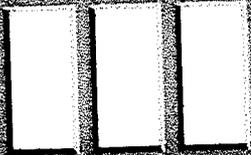
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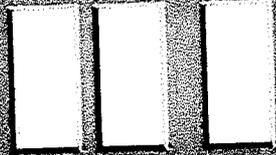
BASE 6



BASE 1



BASE 5



ZONE 1

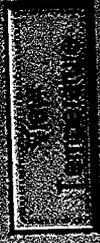
ZONE 2

ZONE 3

ZONE 4

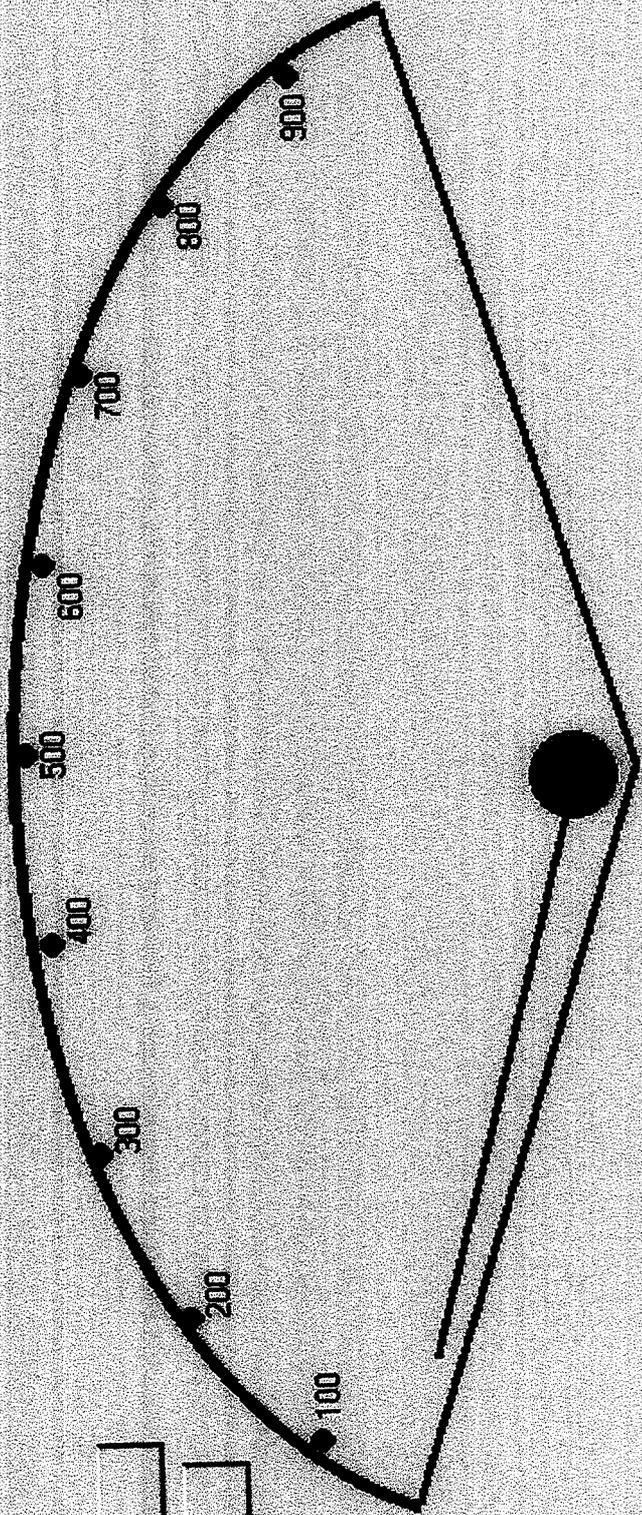
ZONE 5

ZONE 3



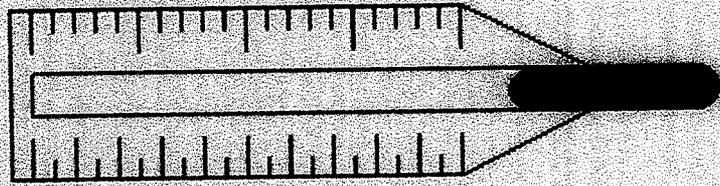
Start

Flexet



Zone1 Zone2 Zone3

135 138 141



Celsius

135

138

141

Zone1

Zone2

Zone3

Fahrenheit

275

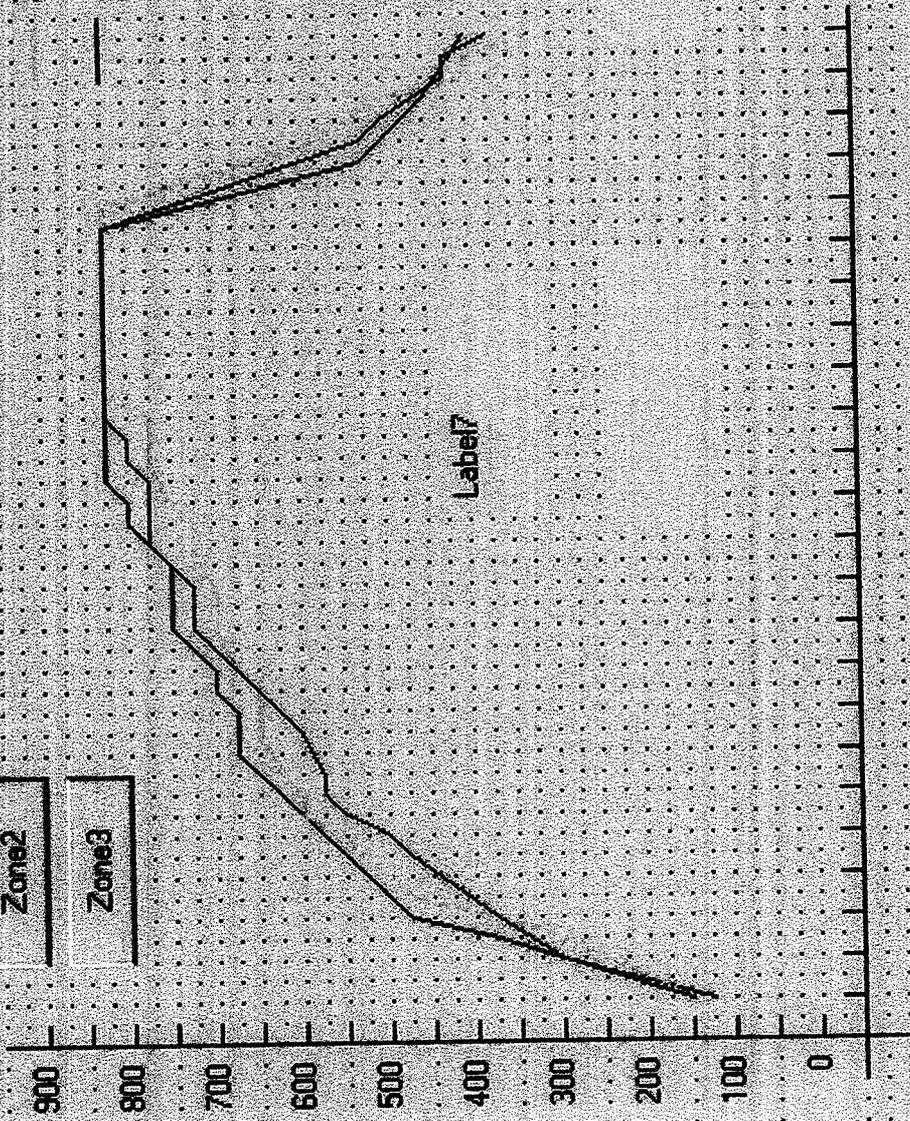
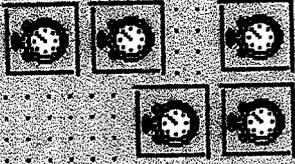
Zone1 135

Zone1
Zone2
Zone3

Zone1
Zone2
Zone3

LabelB

Label7



BASE 1

135
501
602

ZONE 1
ZONE 2
ZONE 3

BASE 2

300
539
620

BASE 4

475
583
663

BASE 3

390
560
644

BASE 5

685
751
790

ZONE 1
ZONE 2
ZONE 3

BASE 6

694
766
798

BASE 8

731
785
820

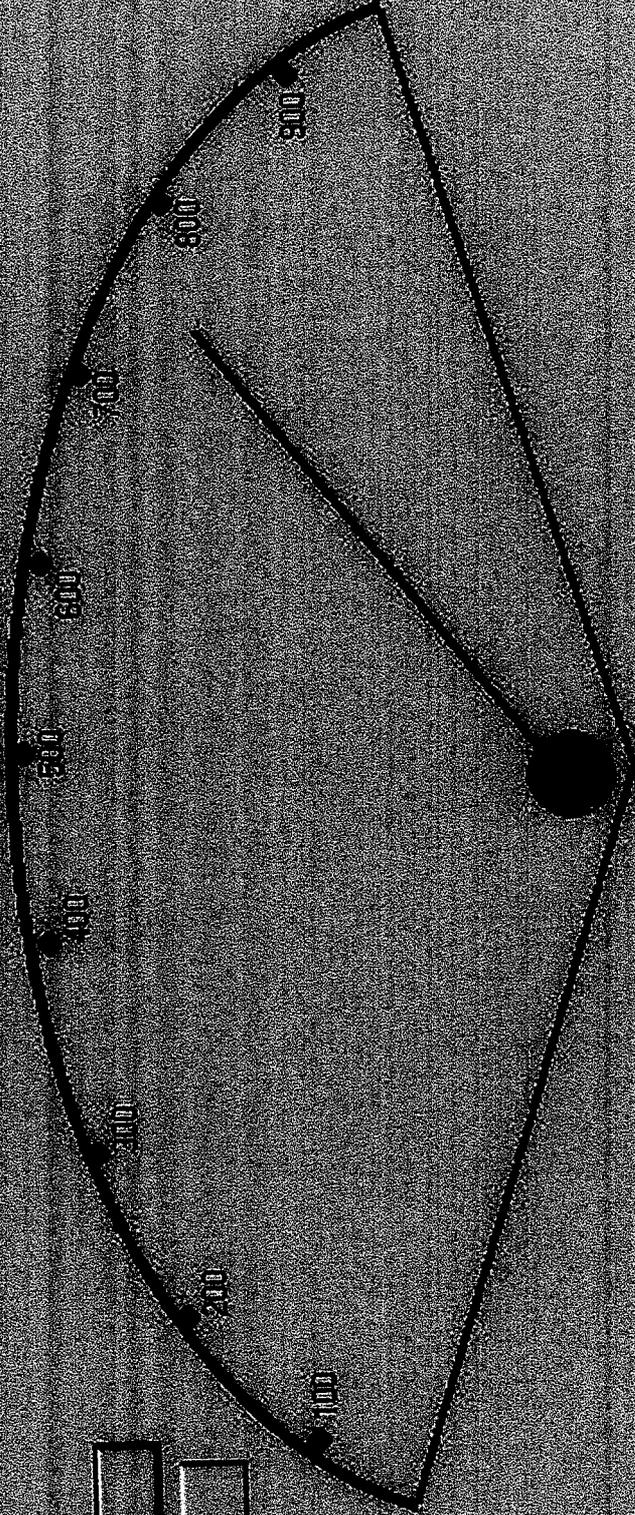
BASE 7

714
776
812

View
Temperature

Start

Reset



Zone1 Zone2 Zone3

0

0

795

Basiss

300

138

141

Zone1

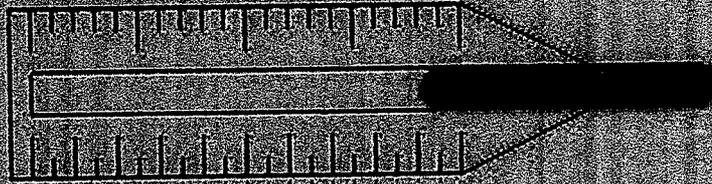
Zone2

Zone3

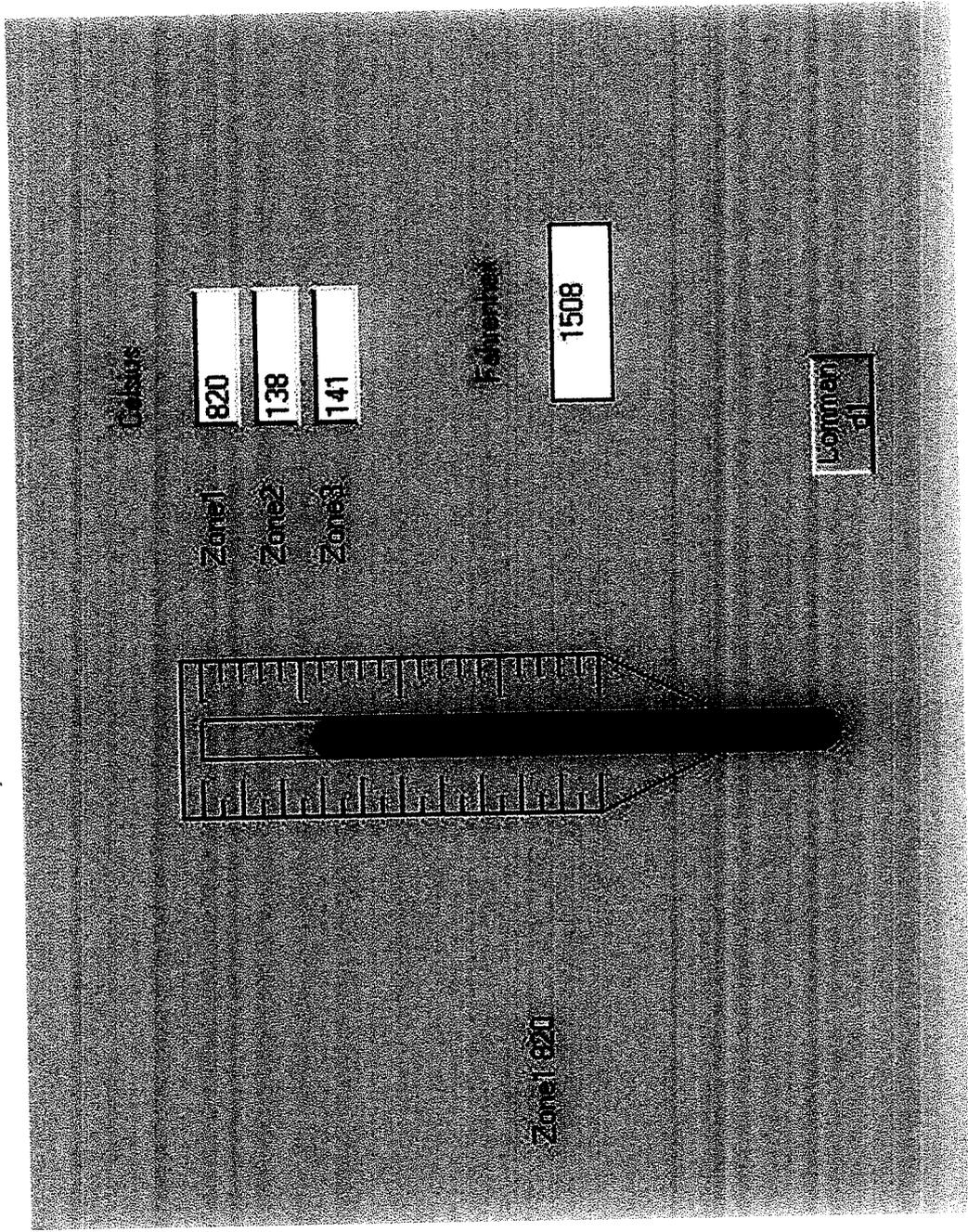
Fahrerzeit

572

Kommen
di



Zone1 300



Falsch

820
138
141

Zone1
Zone2
Zone3

Falschheit

1508

kommen
di



Zone1 (820)

900

900

138

141

Zona 1

Zona 2

Zona 3

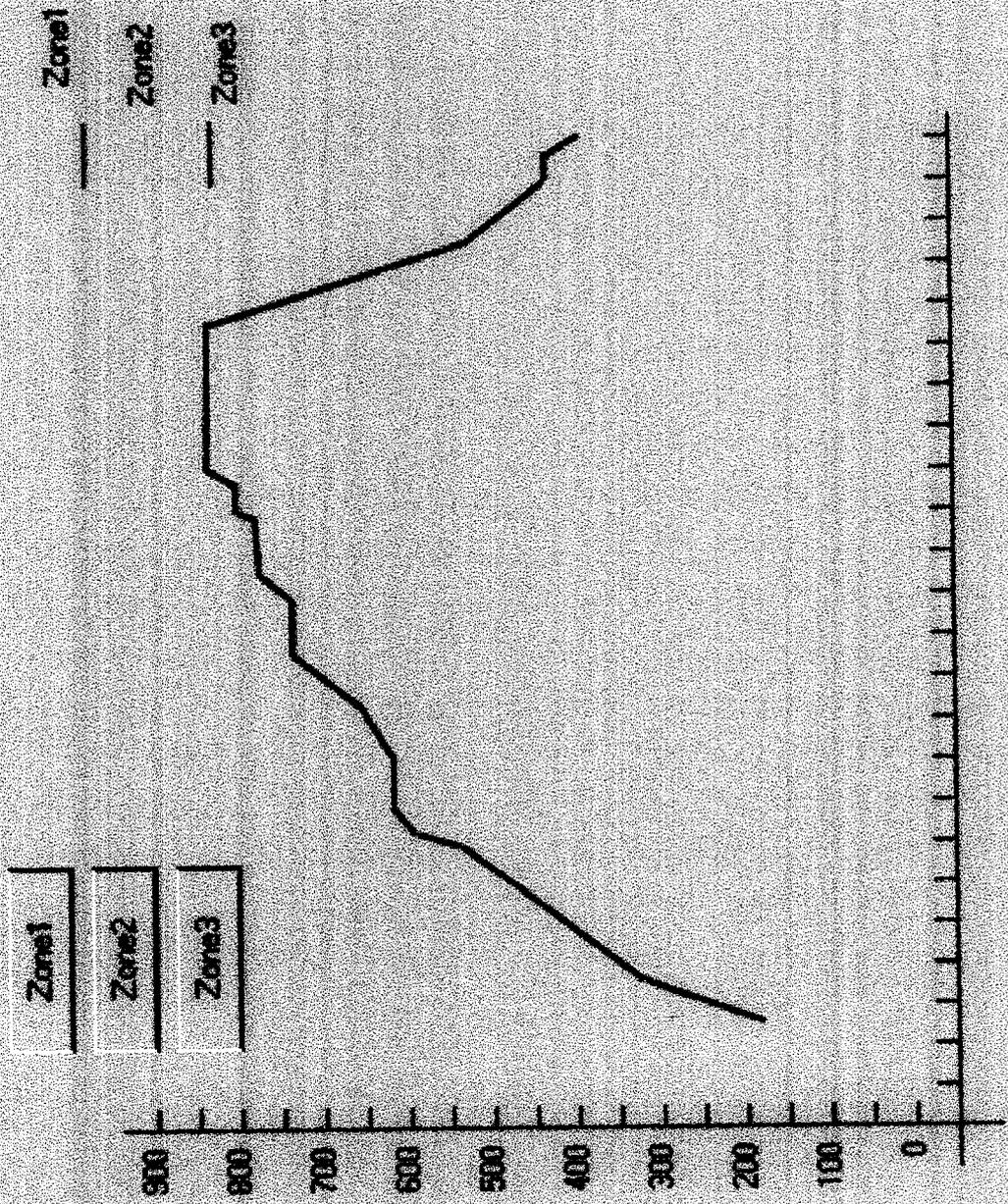
Fabrika

2034

2034

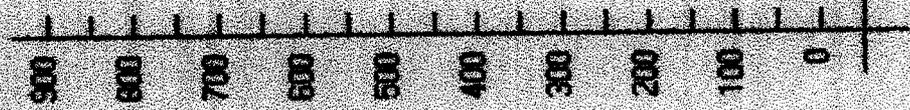


2034



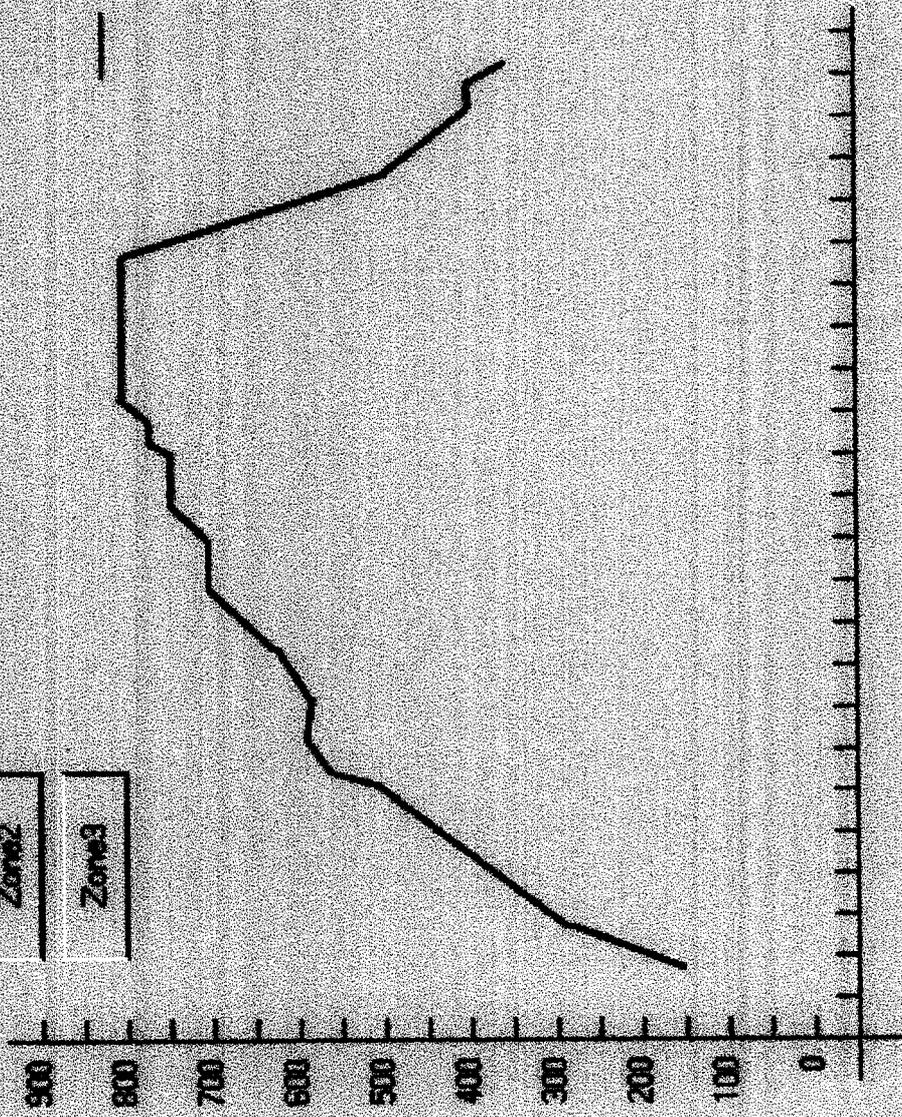
Zone1
Zone2
Zone3

Zone1
Zone2
Zone3



Zone1
Zone2
Zone3

Zone1
Zone2
Zone3



Source coding of Monitor

```
Dim db As Database
Dim rs As Recordset
Dim mm(40), mm1(40), mm2(40) As Integer
Dim k As Integer
```

```
Private Sub Command1_Click()
Timer1.Interval = 500
End Sub
```

```
Private Sub Command2_Click()
Line3.x2 = 2040
Line3.y2 = 3120
End Sub
```

```
Private Sub Timer1_Timer()
Static i As Integer
k = mm(i)
assign (k)
Text1 = k
If i = 33 Then
    i = 0
    Timer1.Interval = 0
    Timer2.Interval = 500
End If
```

```
i = i + 1
```

```
End Sub
```

```
Private Sub Timer2_Timer()
Static i As Integer
k = mm1(i)
assign (k)
Text2 = k
If i = 33 Then
    i = 0
    Timer2.Interval = 0
    Timer3.Interval = 500
End If
```

```
i = i + 1
```

```
End Sub
```

```
Private Sub Timer3_Timer()
Static i As Integer
k = mm2(i)
assign (k)
Text3 = k
If i = 33 Then
    i = 0
    Timer3.Interval = 0
End If
```

```

Private Sub UserControl_Initialize()
Dim i As Integer
Set db = OpenDatabase("c:\subbu\main\temp.mdb")
Set rs = db.OpenRecordset("base1", dbOpenDynaset)
Text1 = rs(0)
Text2 = rs(1)
Text3 = rs(2)
rs.MoveFirst
Do While rs.EOF = False
    mm(i) = rs(0)
    mm1(i) = rs(1)
    mm2(i) = rs(2)
    i = i + 1
    rs.MoveNext
Loop
rs.MoveFirst
Line3.x2 = 2040
Line3.y2 = 3120
End Sub
Public Sub assign(h As Integer)
If h > 0 And h <= 100 Then
    Line3.x2 = 2160
    Line3.y2 = 2760
ElseIf h > 100 And h <= 150 Then
    If h > 100 And h >= 125 Then
        Line3.x2 = 2280
        Line3.y2 = 2640
    Else
        Line3.x2 = 2400
        Line3.y2 = 2520
    End If
ElseIf h > 150 And h <= 200 Then
    If h > 150 And h <= 175 Then
        Line3.x2 = 2640
        Line3.y2 = 2400
    Else
        Line3.x2 = 2880
        Line3.y2 = 2280
    End If
ElseIf h > 200 And h <= 250 Then
    If h > 200 And h <= 225 Then
        Line3.x2 = 3000
        Line3.y2 = 2160
    Else
        Line3.x2 = 3120
        Line3.y2 = 2040
    End If
ElseIf h > 250 And h <= 300 Then
    If h > 250 And h <= 275 Then
        Line3.x2 = 3360
        Line3.y2 = 1920
    Else
        . . . . .

```

```
End If
ElseIf h > 300 And h <= 350 Then
  If h > 300 And h <= 325 Then
    Line3.x2 = 3840
    Line3.y2 = 1680
  Else
    Line3.x2 = 1080
    Line3.y2 = 1560
  End If
ElseIf h > 350 And h <= 400 Then
  If h > 350 And h <= 375 Then
    Line3.x2 = 4320
    Line3.y2 = 1440
  Else
    Line3.x2 = 4560
    Line3.y2 = 1440
  End If
ElseIf h > 400 And h <= 450 Then
  If h > 400 And h <= 425 Then
    Line3.x2 = 4800
    Line3.y2 = 1440
  Else
    Line3.x2 = 5040
    Line3.y2 = 1440
  End If
ElseIf h > 450 And h <= 500 Then
  If h > 450 And h <= 475 Then
    Line3.x2 = 5280
    Line3.y2 = 1440
  Else
    Line3.x2 = 5520
    Line3.y2 = 1440
  End If
ElseIf h > 500 And h <= 550 Then
  If h > 500 And h < 525 Then
    Line3.x2 = 5760
    Line3.y2 = 1440
  Else
    Line3.x2 = 6000
    Line3.y2 = 1440
  End If
ElseIf h > 550 And h <= 600 Then
  If h > 550 And h < 575 Then
    Line3.x2 = 6240
    Line3.y2 = 1440
  Else
    Line3.x2 = 6480
    Line3.y2 = 1440
  End If
ElseIf h > 600 And h <= 650 Then
  If h > 600 And h <= 610 Then
    Line3.x2 = 6650
    Line3.y2 = 1440
```



```

ElseIf h > 610 And h <= 625 Then
    Line3.x2 = 6800
    Line3.y2 = 1560
ElseIf h > 625 And h <= 640 Then
    Line3.x2 = 6840
    Line3.y2 = 1560
Else
    Line3.x2 = 6960
    Line3.y2 = 1560
End If
ElseIf h > 650 And h <= 700 Then
    If h > 650 And h <= 675 Then
        Line3.x2 = 7080
        Line3.y2 = 1600
    ElseIf h > 675 And h <= 680 Then
        Line3.x2 = 7100
        Line3.y2 = 1625
    ElseIf h > 680 And h <= 690 Then
        Line3.x2 = 7150
        Line3.y2 = 1650
    Else
        Line3.x2 = 7200
        Line3.y2 = 1675
    End If
ElseIf h > 700 And h <= 750 Then
    If h < 700 And h >= 710 Then
        Line3.x2 = 7250
        Line3.y2 = 1700
    ElseIf h > 710 And h <= 725 Then
        Line3.x2 = 7300
        Line3.y2 = 1750
    ElseIf h > 725 And h <= 740 Then
        Line3.x2 = 7375
        Line3.y2 = 1800
    ElseIf h > 740 And h <= 750 Then
        Line3.x2 = 7560
        Line3.y2 = 1920
    End If
ElseIf h > 750 And h <= 800 Then
    If h > 750 And h <= 760 Then
        Line3.x2 = 7800
        Line3.y2 = 1920
    ElseIf h > 760 And h <= 775 Then
        Line3.x2 = 7820
        Line3.y2 = 1920
    ElseIf h > 775 And h <= 780 Then
        Line3.x2 = 7850
        Line3.y2 = 1920
    ElseIf h > 780 And h <= 785 Then
        Line3.x2 = 7875
        Line3.y2 = 1920
    ElseIf h > 785 And h < 790 Then
        Line3.x2 = 7900

```

```
TheLine3.x2 = 7910
  Line3.y2 = 1920
  ElseIf h >= 795 And h <= 800 Then
    Line3.x2 = 7950
    Line3.y2 = 1920
  End If
ElseIf h > 800 And h <= 850 Then
  If h > 800 And h <= 810 Then
    Line3.x2 = 8040
    Line3.y2 = 2040
  ElseIf h > 810 And h < 820 Then
    Line3.x2 = 8160
    Line3.y2 = 2160
  ElseIf h >= 820 And h <= 830 Then
    Line3.x2 = 8165
    Line3.y2 = 2160
  ElseIf h >= 830 And h <= 840 Then
    Line3.x2 = 8165
    Line3.y2 = 2160
  ElseIf h >= 840 And h <= 850 Then
    Line3.x2 = 8165
    Line3.y2 = 2160
  End If
End If
End Sub
```

Source Coding of Bell Furnance

```
Dim db As Database
```

```
Dim rs As Recordset
```

```
Private Sub Command1_Click()
```

```
Dim s As Integer
```

```
For i = 0 To 23
```

```
Text1(i) = rs(0)
```

```
If Not rs.EOF Then
```

```
rs.MoveNext
```

```
Else
```

```
rs.Close
```

```
End If
```

```
Next
```

```
End Sub
```

```
Private Sub UserControl_Initialize()
```

```
Set db = OpenDatabase("c:\subbu\main\temp.mdb")
```

```
Set rs = db.OpenRecordset("base1", dbOpenDynaset)
```

```
End Sub
```

Source Coding of Temperature

```
Dim db As Database
Dim rs As Recordset
Dim va, k, mval As Integer
Dim bo As Boolean
Dim mm(50), mm1(50), mm2(50) As Integer
Private Sub Command1_Click()
Line1.y1 = Line1.y1 - 10
If Line1.y1 = 3840 Then
Line1.BorderColor = vbGreen
End If
End Sub
```

```
Private Sub Command2_Click()
'Line1.Y1 = Line1.Y1 + 10
Timer1.Interval = 1000
End Sub
```

```
Private Sub Command3_Click()
rs.MoveNext
Text1 = rs(0)
Text2 = rs(1)
Text3 = rs(2)
End Sub
```

```
Private Sub Timer1_Timer()
Line1.y1 = Line1.y1 - 10
If k > 820 Then
Line1.BorderColor = vbRed
End If
If Line1.y1 = va Then
Line1.BorderColor = vbGreen
Timer1.Interval = 0
If mval = 1 Then
Timer3.Interval = 1000
ElseIf mval = 2 Then
Timer4.Interval = 1000
ElseIf mval = 3 Then
Timer5.Interval = 1000
End If
'Timer2.Interval = 100
'Timer4.Interval = 1000
End If
End Sub
```

```
Private Sub Timer2_Timer()
Line1.BorderColor = vbBlue
If k = 820 Then
Timer2.Interval = 0
If mval = 1 Then
Timer3.Interval = 1000
ElseIf mval = 2 Then
```

```

    Timer5.Interval = 1000
End If
Else
    Line1.y1 = Line1.y1 + 10
    If Line1.y1 = va Then
        Timer2.Interval = 0
        If mval = 1 Then
            Timer3.Interval = 1000
        ElseIf mval = 2 Then
            Timer4.Interval = 1000
        ElseIf mval = 3 Then
            Timer5.Interval = 1000
        End If
    End If
End If
End Sub

```



```

Private Sub Timer3_Timer()
    Static i As Integer
    mval = 1
    k = mm(i)
    assign (k)
    Text1 = k
    Text4 = (k * 1.8) + 32
    Label4.Caption = "Zone1" & " " & k
    If k = 820 Then
        Timer2.Interval = 100
        Timer3.Interval = 0
    End If
    If i > 25 Then
        bo = True
    End If
    If i = 33 Then
        i = 0
        bo = False
        Timer1.Interval = 0
        Timer2.Interval = 0
        Timer3.Interval = 0
        Timer4.Interval = 1000
        Line1.BorderColor = vbBlack
        Line1.y1 = 4320
    End If
    i = i + 1
End Sub

```

```

Private Sub Timer4_Timer()
    Static i As Integer
    mval = 2
    k = mm1(i)
    assign (k)
    Text2 = k
    Text4 = (k * 1.8) + 32
    Label4.Caption = "Zone2" & " " & k
    ---

```

```

Timer2.Interval = 100
Timer4.Interval = 0
End If
If i > 25 Then
    bo = True
End If
If i = 33 Then
    i = 0
    bo = False
    Timer1.Interval = 0
    Timer2.Interval = 0
    Timer4.Interval = 0
    Timer5.Interval = 1000
    Line1.BorderColor = vbBlack
    Line1.y1 = 4320
End If
i = i + 1
End Sub

```

```

Private Sub Timer5_Timer()
Static i As Integer
mval = 3
k = mm2(i)
assign(k)
Text3 = k
Text4 = (k * 1.8) + 32
Label4.Caption = "Zone3" & " " & k
If k = 820 Then
    Timer2.Interval = 100
    Timer5.Interval = 0
End If
If i > 25 Then
    bo = True
End If
If i = 33 Then
    i = 0
    bo = False
    Timer1.Interval = 0
    Timer2.Interval = 0
    Timer5.Interval = 0
End If
i = i + 1
End Sub

```

```

Private Sub Timer6_Timer()
Beep
End Sub

```

```

Private Sub UserControl_Initialize()
Dim i As Integer
Set db = OpenDatabase("c:\subbu\main\sample.mdb")
Set rs = db.OpenRecordset("sample", dbOpenDynaset)
Text1 = rs(0)

```

```

Timer2.Interval = 100
Timer4.Interval = 0
End If
If i > 25 Then
    bo = True
End If
If i = 33 Then
    i = 0
    bo = False
    Timer1.Interval = 0
    Timer2.Interval = 0
    Timer4.Interval = 0
    Timer5.Interval = 1000
    Line1.BorderColor = vbBlack
    Line1.y1 = 4320
End If
i = i + 1
End Sub

```

```

Private Sub Timer5_Timer()
Static i As Integer
mval = 3
k = mm2(i)
assign (k)
Text3 = k
Text4 = (k * 1.8) + 32
Label4.Caption = "Zone3" & " " & k
If k = 820 Then
    Timer2.Interval = 100
    Timer5.Interval = 0
End If
If i > 25 Then
    bo = True
End If
If i = 33 Then
    i = 0
    bo = False
    Timer1.Interval = 0
    Timer2.Interval = 0
    Timer5.Interval = 0
End If
i = i + 1
End Sub

```

```

Private Sub Timer6_Timer()
Beep
End Sub

```

```

Private Sub UserControl_Initialize()
Dim i As Integer
Set db = OpenDatabase("c:\subbu\main\sample.mdb")
Set rs = db.OpenRecordset("sample", dbOpenDynaset)
Text1 = rs(0)

```



```
    va = 2700
Else
    va = 2640
End If
ElseIf h > 600 And h <= 650 Then
    If h > 600 And h <= 610 Then
        va = 2610
    ElseIf h > 610 And h <= 625 Then
        va = 2580
    ElseIf h > 625 And h <= 640 Then
        va = 2550
    Else
        va = 2520
    End If
ElseIf h > 650 And h <= 700 Then
    If h > 650 And h <= 675 Then
        va = 2470
    ElseIf h > 675 And h <= 680 Then
        va = 2450
    ElseIf h > 680 And h <= 690 Then
        va = 2430
    Else
        va = 2400
    End If
ElseIf h > 700 And h <= 750 Then
    If h < 700 And h >= 710 Then
        va = 2360
    ElseIf h > 710 And h <= 725 Then
        va = 2340
    ElseIf h > 725 And h <= 740 Then
        va = 2320
    Else
        va = 2280
    End If
    ElseIf h > 750 And h <= 800 Then
    If h > 750 And h <= 760 Then
        va = 2250
    ElseIf h > 760 And h <= 775 Then
        va = 2230
    ElseIf h > 775 And h <= 780 Then
        va = 2200
    ElseIf h > 780 And h <= 785 Then
        va = 2190
    ElseIf h > 785 And h < 790 Then
        va = 2180
    ElseIf h >= 790 And h <= 795 Then
        va = 2170
    Else
        va = 2160
    End If
    ElseIf h > 800 And h <= 850 Then
    If h > 800 And h <= 810 Then
        va = 2140
```

```
ElseIf h >= 820 And h <= 780 Then
    va = 2080
Else
    va = 2040
End If
ElseIf h > 850 And h <= 900 Then
    va = 1950
End If
If k = 820 Or bo = True Then
    Timer1.Interval = 0
    Timer2.Interval = 100
Else
    Timer1.Interval = 100
End If
End Sub
```

Source Coding for Map

```
Dim db As Database
Dim rs As Recordset
Dim k, m, r, opt As Integer
Dim mm(40), mm1(40), mm2(40) As Integer
Dim x1(100), y1(100), x2(100), y2(100) As Integer
Private t As Integer
Private Sub Command1_Click()
'Timer1.Interval = 1000
m = 2
t = 0
zone1
End Sub
Private Sub Command2_Click()
m = 2
t = 0
zone2
End Sub
Private Sub Command3_Click()
m = 2
t = 0
zone3
End Sub

Private Sub Timer1_Timer()
Static i As Integer
k = mm(i)
Text1 = k
If i = 33 Then
    i = 0
    t = 0
    Timer1.Interval = 0
    'Timer3.Interval = 1000
End If
Call draw
i = i + 1
Label7 = "timer1 " & " " & i
"Call zone1
End Sub

Private Sub Timer2_Timer()
Static mo, n As Integer
Label5 = "timer2" & mo
mo = mo + 1

If n = 32 And opt = 1 Then
Timer2.Interval = 0
MsgBox t
n = 0
    Timer1.Interval = 1000
End If
```

```
If n = 27 And opt = 2 Then
    Timer2.Interval = 0
    MsgBox t
    n = 0
    Timer4.Interval = 1000
End If
```

```
If n = 31 And opt = 3 Then
    Timer2.Interval = 0
    MsgBox t
    n = 0
    Timer5.Interval = 1000
End If
```

```
If mo = 2 Then
    n = n + 1
    Label8 = n
    Timer2.Interval = 0
    'Timer3.Interval = 1000
    "Timer1.Interval = 100
    If opt = 1 Then
        zone1
    ElseIf opt = 2 Then
        zone2
    ElseIf opt = 3 Then
        zone3
    End If
    mo = 0
End If
```

```
End Sub
```

```
Private Sub Timer3_Timer()
    'MsgBox t
    DrawWidth = 3
    If t = -1 Then t = 0
```

```
If t = 0 Then
    Timer3.Interval = 0
```

```
End If
```

```
If opt = 1 Then
    Line (x1(t), y1(t))-(x2(t), y2(t)), vbRed
ElseIf opt = 2 Then
    Line (x1(t), y1(t))-(x2(t), y2(t)), &H80FF80
ElseIf opt = 3 Then
    Line (x1(t), y1(t))-(x2(t), y2(t)), vbBlue
End If
t = t - 1
End Sub
```

```
Private Sub Timer4_Timer()
```

```
Static i As Integer
```

```
k = mm1(i)
```

```
Text2 = k
```

```
If i = 33 Then
```

```
    i = 0
```

```
    t = 0
```

```
    Timer4.Interval = 0
```

```
    'Timer3.Interval = 1000
```

```
End If
```

```
Call draw
```

```
i = i + 1
```

```
Label7 = "timer4 " & " " & i
```

```
End Sub
```

```
Private Sub Timer5_Timer()
```

```
Static i As Integer
```

```
k = mm2(i)
```

```
Text2 = k
```

```
If i = 33 Then
```

```
    i = 0
```

```
    t = 0
```

```
    Timer5.Interval = 0
```

```
    'Timer3.Interval = 1000
```

```
End If
```

```
Call draw
```

```
i = i + 1
```

```
Label7 = "timer5 " & " " & i
```

```
End Sub
```

```
Private Sub UserControl_Initialize()
```

```
Dim i As Integer
```

```
Set db = OpenDatabase("c:\subbu\main\temp.mdb")
```

```
Set rs = db.OpenRecordset("base1", dbOpenDynaset)
```

```
Text1 = rs(0)
```

```
Text2 = rs(1)
```

```
rs.MoveFirst
```

```
Text3 = rs(2)
```

```
Do While rs.EOF = False
```

```
    mm(i) = rs(0)
```

```
    mm1(i) = rs(1)
```

```
    mm2(i) = rs(2)
```

```
    i = i + 1
```

```
    rs.MoveNext
```

```
Loop
```

```
rs.MoveFirst
```

```
End Sub
```

```

Public Sub zone1()
Static r As Integer
opt = 1
Timer1.Interval = 0
For Each Source In UserControl
    If TypeOf Source Is Line Then
        If Source.BorderColor = vbRed Then
            Label6 = Source.x1 & " " & Source.y1
            x1(t) = Source.x1
            y1(t) = Source.y1
            x2(t) = Source.x2
            y2(t) = Source.y2

            If m = r Then
                'Timer1.Interval = 1000
                Timer2.Interval = 10
                m = r + 1
                r = 0
                t = t + 1
                'MsgBox t
                'Timer1.Interval = 1000
                Exit For

            End If
            r = r + 1
        End If
    End If
Next
End Sub

```

```

Public Sub draw()
DrawWidth = 3
If t = -1 Then t = 0
If opt = 1 Then
    Line (x1(t), y1(t)-(x2(t), y2(t)), vbRed
ElseIf opt = 2 Then
    Line (x1(t), y1(t)-(x2(t), y2(t)), &H80FF80
ElseIf opt = 3 Then
    Line (x1(t), y1(t)-(x2(t), y2(t)), vbBlue

End If
If t = 0 Then
    Timer1.Interval = 0
    'Timer3.Interval = 0
End If
t = t - 1
End Sub

```

```

Public Sub zone2()
Static r As Integer
opt = 2

```

```

If TypeOf Source Is Line Then
    If Source.BorderColor = &H80FF80 Then
        Label6 = Source.x1 & " " & Source.y1 & " " & "green"
        x1(t) = Source.x1
        y1(t) = Source.y1
        x2(t) = Source.x2
        y2(t) = Source.y2
        If m = r Then
            'Timer1.Interval = 1000
            Timer2.Interval = 10
            m = r + 1
            r = 0
            t = t + 1
            'MsgBox t
            'Timer1.Interval = 1000
            Exit For
        End If
        r = r + 1
    End If

End If

Next
End Sub
Public Sub zone3()
    Static r As Integer
    opt = 3
    Timer1.Interval = 0
    For Each Source In UserControl
        If TypeOf Source Is Line Then
            If Source.BorderColor = vbBlue Then
                Label6 = Source.x1 & " " & Source.y1
                x1(t) = Source.x1
                y1(t) = Source.y1
                x2(t) = Source.x2
                y2(t) = Source.y2
                If m = r Then
                    'Timer1.Interval = 1000
                    Timer2.Interval = 10
                    m = r + 1
                    r = 0
                    t = t + 1
                    'MsgBox t
                    'Timer1.Interval = 1000
                    Exit For
                End If
                r = r + 1
            End If
        End If
    Next
End Sub

```

OTHER REQUIREMENTS

SITE ADAPTATION REQUIREMENTS



1. PROCESSOR :INTEL
PENTIMUM III 766 MHZ
2. RAM : 128 MB
3. KEYBOARD : MULTIMEDIA
KEYBOARD
4. FLOPPY DRIVE : 1.44 FDD & 1.2
FDD
5. HARD DISK : 20 GB HDD
6. OPERATING SYSTEM : ALL WINDOWS
PLATFORM.

Here we have specified the hard ware configuration required to run our project.

The main requirement for our project is that, it can run only in the WINDOWS platform.

Since our project is based on the GUI (Graphical User Interface) mouse is required.

We need Pentium processor, as because in celeron it has got Internet Explorer 2 and we require 5 or 4 since our project is Internet based project.

TESTING

The user controls created for Bell Annealing Furnace using Activex controls (Visual Basic) has been successfully tested in the Electrical department of Salem Steel Plant,Salem.

The manual function of Bell Annealing Furnace is now being computerized and the furnace is successfully controlled after the implementation of our project in the plant.

The electrical engineers have tested our project for all types of temperature and it was found satisfactory.

FUTURE ENHANCEMENT



We here by conclude that we have completed our project “Data Logger For Bell Annealing Furnace” at Salem Steel Plant,Salem to the fulfillment of their requirements.

We are proud that our project has been successfully implemented in the plant .It can be further enhanced by developing a web page in future that would suit the modern trends.

Reference:

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4. Visual Basic 6.0 Programming Secrets

- **Harold Davis, Comdex publishing**

5. Visual Basic 6.0 Black Book

- **Comdex Publishing**

6. Oracle 8

-Tech-media Publishing

