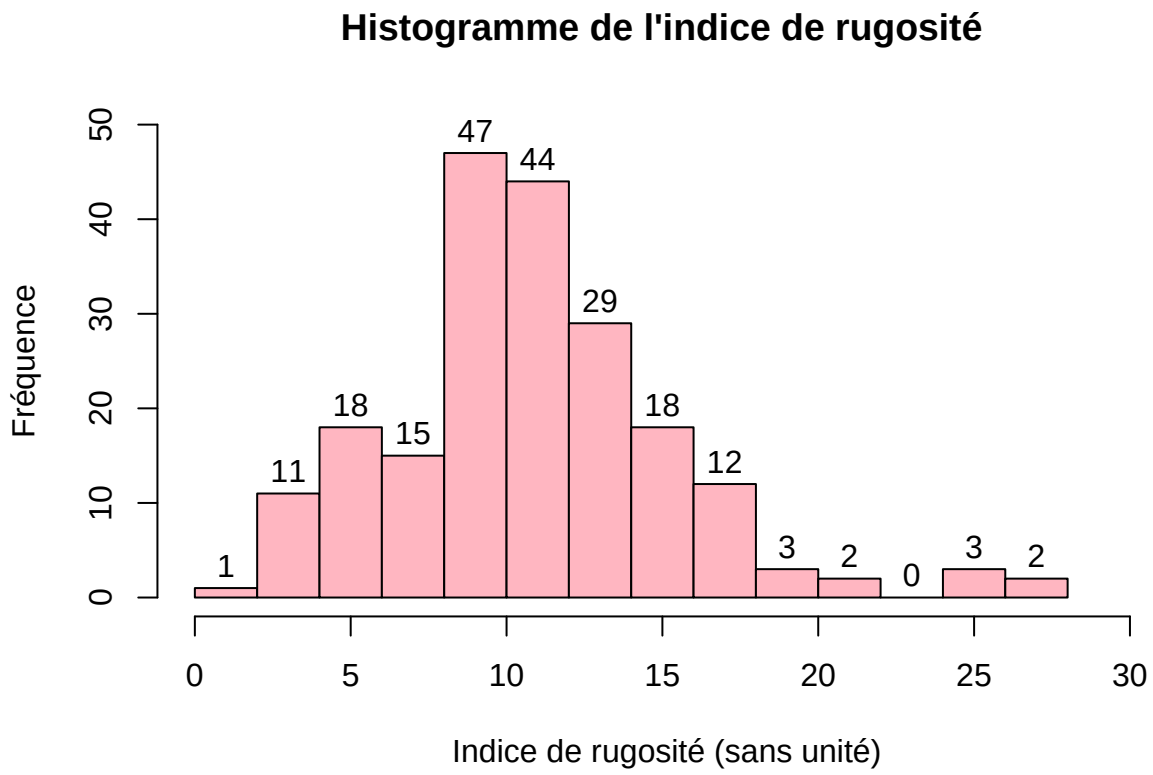
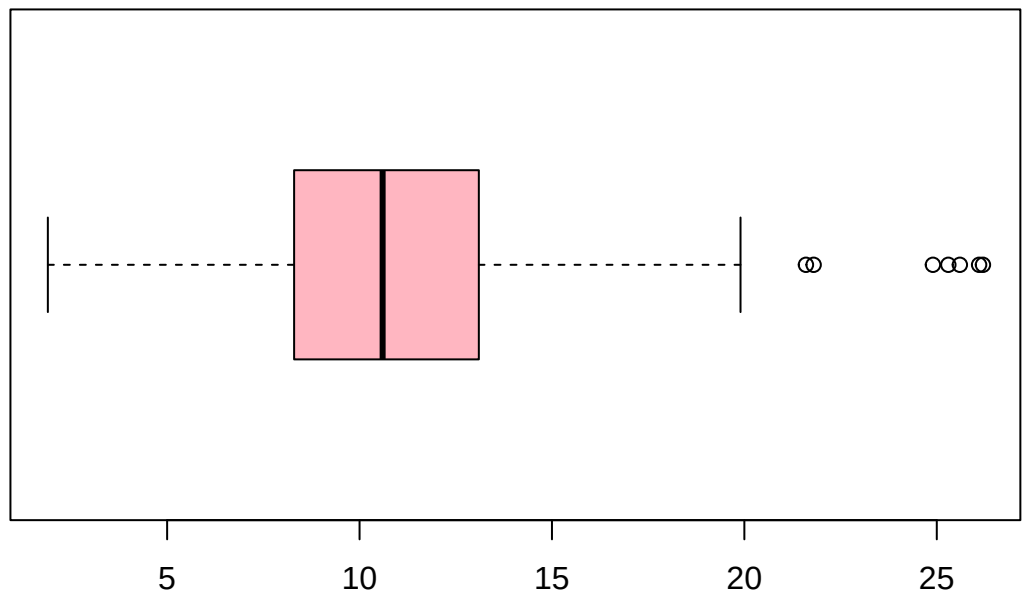
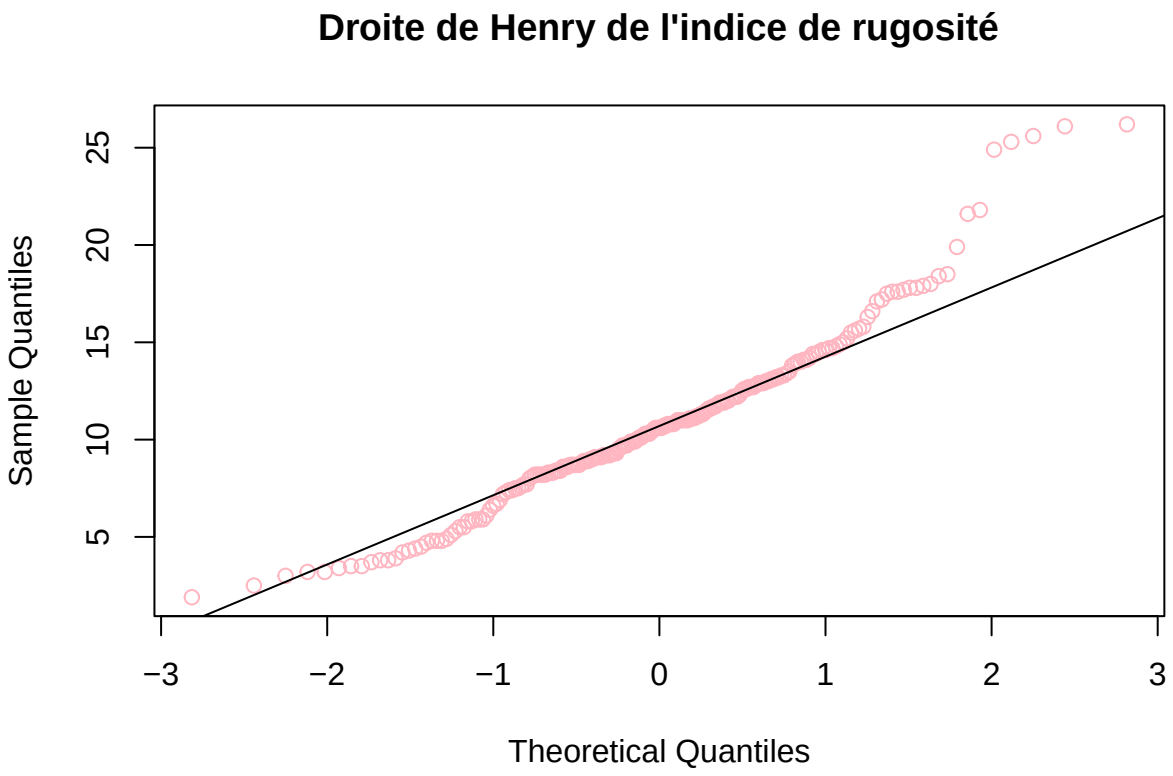
```r
#initialisation
source("charger.R")
mondata <- charger(2212435)

####Partie a)

#Histogramme
h <-hist(mondata$IR, main = paste("Histogramme de l'indice de rugosité"), col = "lightpink", xlab = " I
text(h$mids,h$counts,labels=h$counts, adj=c(0.5, -0.5))
```




```r
#tukey
boxplot(mondata$IR,    main=paste("Diagramme de tukey de l'indice de rugosité"),    horizontal=T, xlab =
```




```r
#droite de Henry
qqnorm(mondata$IR, col= "lightpink", main = paste("Droite de Henry de l'indice de rugosité"))
qqline(mondata$IR)
```




```
#Shapiro
shapiro.test(mondata$IR)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  mondata$IR
## W = 0.95471, p-value = 4.275e-06
```

```
#tableau statistiques descriptives

conf_int <- t.test(mondata$IR)$conf.int
Interval_Confiance_Min = conf_int[1]
  Interval_Confiance_Max = conf_int[2]
q1 <- quantile(mondata$IR, 0.25)
q2 <- quantile(mondata$IR, 0.5)
q3 <- quantile(mondata$IR, 0.75)
moyenne <- mean(mondata$IR)
ecart_type <- sd(mondata$IR)

dataframe1 <- data.frame(
  moyenne,
  q1,
  q2,
  q3,
```

```
  ecart_type,
  Interval_Confiance_Min,
  Interval_Confiance_Max

)

knitr::kable(head(dataframe1),caption="Tableau des statistiques descriptives sur l'indice de rugosité")
```

Table 1: Tableau des statistiques descriptives sur l'indice de rugosité

	moyenne	q1	q2	q3	ecart_type	Interval_Confiance_Min	Interval_Confiance_Max
25%	10.85854	8.3	10.6	13.1	4.517969	10.23638	11.48069

Explications:

```
###partie b)
# sous elements pour les types de M
matiere_A <- subset(mondata, M == 0)
matiere_B <- subset(mondata, M == 1)


layout(matrix(c(1, 2), 2, 1, byrow = TRUE), heights = c(1.5, 1))

hist(matiere_A$IR, col = rgb(0, 0, 1, 0.35), freq = FALSE, border = TRUE,
     main = "Histogramme de l'IR selon le type de matériau",
     xlab = "Indice de rugosité", ylab = "Densité")
hist(matiere_B$IR, col = rgb(1, 0, 0, 0.35), freq = FALSE, add = TRUE, border = TRUE)
legend("topright",    inset=0,    title="Type de matériau",
c("Type 0","Type 1"),    fill=c(rgb(0,0,1,0.35),    rgb(1,0,0,0.35)),    cex    =    0.7)
par(mar = c(5, 4, 4, 2) + 0.1)




#####faire le dropbox qui ne fonctionne pas :(

#boxplot(matiere_A$IR,matiere_B$IR,
#horizontal= T, col= c(rgb(0,0,1,0.35),rgb(1,0,0,0.35)),
#main = "Diagramme de Turey de l'IR selon le materiau", xlab="IR")




###### faire le tableau des statistiques descriptives par groupe :((



##### Test d'hypothese
```

```r
shapiro.test(matiere_A$IR)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  matiere_A$IR
## W = 0.95848, p-value = 0.003767
```

```r
shapiro.test(matiere_B$IR)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  matiere_B$IR
## W = 0.93804, p-value = 7.851e-05
```

```r
n1=length(matiere_A$IR)
n2=length(matiere_B$IR)
cat("n_1=",n1,    "\nn_2=",n2)
```

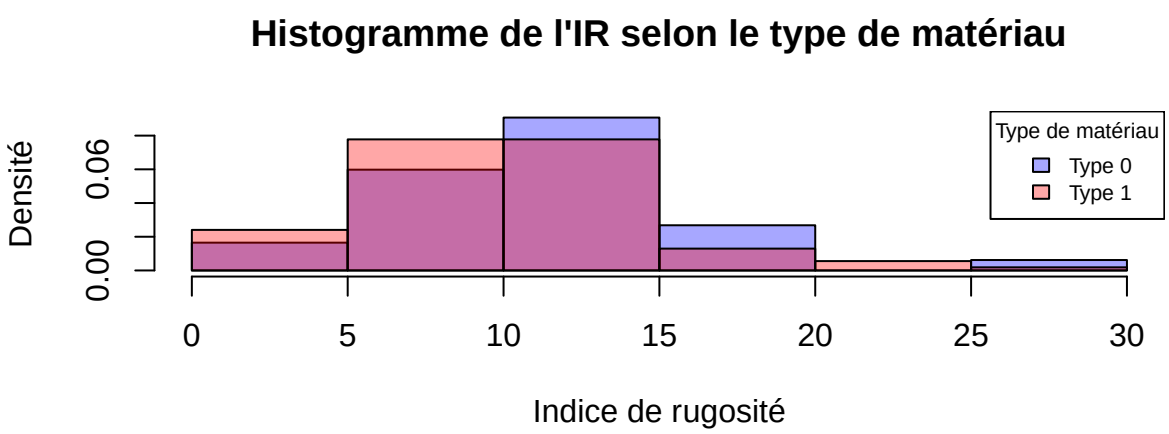
```
## n_1= 97
## n_2= 108
```

```r
##### test d'hypothese:
V1=var(matiere_A$IR)
V2=var(matiere_B$IR)
Sp=sqrt(((n1-1)*V1+(n2-1)*V2)/(n1+n2-2))
Z0=(sqrt(V1)-sqrt(V2))/(Sp*sqrt((1/(2*n1))+(1/(2*n2))))
cat("\nZ0=",Z0,"\nZalpha/2=",qnorm(0.05/2,    lower.tail    =    F))
```

```
##
## Z0= 0.4734922
## Zalpha/2= 1.959964
```

```r
Z1=(mean(matiere_A$IR)-mean(matiere_B$IR))/sqrt((V1/n1)+(V2/n2))
cat("\nZ0=",Z1,"\nZalpha/2=",qnorm(0.05/2, lower.tail = F))
```

```
##
## Z0= 1.915663
## Zalpha/2= 1.959964
```


Histogramme de l'IR selon le type de matériau
Densité
0.00
0.06
0
5
10
15
20
25
30
Indice de rugosité
Type de matériau
Type 0
Type 1