# LS15 Data for Stan

For each test log: \* Stress Wave Velocity \* SED, LED, Length \* Sweep \* Principal \* Orthogonal \* % heartwood \* Large end \* Small end \* Taper and “waist from a quadratic fit to polygonal area” (not sure what that waist parameter is)

library(RODBC)  
ch = odbcConnect('LS15')  
sql = "select   
 logs.ScionLogNumber,   
 Forest,   
 velocity\_4900 as SWV,   
 yardLED as LED,   
 yardSED as SED,   
 yardLength as Length,   
 m\_sweep1 as SweepPrincipal,   
 m\_sweep2 as SweepOrthogonal,   
 L.h as LEheartPercent,   
 S.h as SEheartPercent,   
 m\_taper as Taper,   
 m\_waist as Waist,   
 m\_whorliness as Whorliness,   
 stemVelocity as StemSWV  
from   
 logs   
left join   
 (select   
 ScionLogNumber,   
 avg(Aheart\_mm2/A\_mm2\*100) as h   
 from LogEndDigitizations   
 where logEnd='large' group by ScionLogNumber) as L  
on L.ScionLogNumber=logs.ScionLogNumber  
left join  
 (select   
 ScionLogNumber,   
 avg(Aheart\_mm2/A\_mm2\*100) as h   
 from LogEndDigitizations   
 where logEnd='small' group by ScionLogNumber) as S  
on S.ScionLogNumber=logs.ScionLogNumber  
"  
L = sqlQuery(ch,sql)  
#  
ch=odbcConnect("KPPSWI","sa","password12")  
sql = "select   
 ScionLogNumber,   
 recFracGoodSWV\*100 as StemGoodLogSWVPercent,   
 avgLogSWV as StemAvgLogSWV,   
 stems.stemLength as StemLength,   
 stems.stemVolume as StemVolume,   
 stemSED as StemSED,   
 stemLED as StemLED from Phase2   
left join stems on stems.id=Phase2.stemID   
where ScionLogNumber is not null"  
S = sqlQuery(ch,sql)  
#  
write.csv(merge(L,S,by="ScionLogNumber"), row.names=FALSE, quote=FALSE, file="/home/harrinjj/Desktop/Dropbox/4stan/logs.csv")

If is the (polygonal) area at position along the log length, then taper is and waist is where

is the least-squares best-fit to . Whorliness is

$$\Sum\_i \left(A\_i - (a\_2 z\_i^2 + a\_1 z\_1 + a0)\right)^2$$

* Shape data every 6” along the length (scanner resolution)
* Diameter (polygonal)
* Eliptical shape
  + Major diameter
  + Minor diameter
  + Orientation of major diameter (degrees) relative to a fixed coordinate system
* Whorl-i-ness
* Ovality

For each piece of lumber sawn from the log \* log id \* Length \* Width \* Thickness \* Warp (signed twist, crook, bow) \* MOE \* Density \* Visual Grade \* Whether inner or outer \* MC at time warp data obtained

library(RODBC)  
ch = odbcConnect('LS15')  
sql = "select   
 b.id, s.scantime,  
 logNumber as ScionLogNumber,   
 s.length\_fromData\_mm/1000. as `Length`,  
 bow.value as `Bow`,  
 crook.value as `Crook`,   
 sin(twist.value/180\*3.141592654)\*100. as `Twist`,   
 s.weight\_kg/(s.volume\_cm3/1.e6) as Density,  
 power(2\*s.resonance\_Hz\*s.length\_fromData\_mm/1000.,2)\*s.weight\_kg/(s.volume\_cm3/1.e6)/1.e9 as MOE,  
 c.R as DistanceFromPith,  
 w.MC  
from   
 LS15.boards as b   
left join joe90.scans as s on b.barcode=s.barcode  
left join (select scanId, value from joe90.warp where postMethod='Joescan3\_rev.107' and measure='bow.xref\_mm') as bow on bow.scanId=s.id  
left join (select scanId, value from joe90.warp where postMethod='Joescan3\_rev.107' and measure='crook.xref\_mm') as crook on crook.scanId=s.id  
left join (select scanId, value from joe90.warp where postMethod='Joescan3\_rev.107' and measure='twist.xref\_deg') as twist on twist.scanId=s.id  
left join (select boardId, avg(sqrt(x\*x+y\*y)) as R from logEndBarcodes group by boardId) as c on b.id=c.boardId  
left join (select barcode, avg(mc) as MC from boardMCs group by barcode) as w on w.barcode=b.barcode  
where  
 b.logNumber is not null  
 and s.project='LS15'  
 and s.scantime<'2014-02-19'  
 and s.`ignore`<>1  
order by b.id, s.scantime  
"  
write.csv(sqlQuery(ch,sql), row.names=FALSE, quote=FALSE, file="/home/harrinjj/Desktop/Dropbox/4stan/boards.csv")

## Warning: closing unused RODBC handle 2 Warning: closing unused RODBC  
## handle 1

The board data is from the initial set of measurements done in January and February 2014.

Warp was assessed only for nominal 100x40 boards (some of which had varying amounts of wane).

Visual grade was never assessed. I've not labelled boards inner or outer, but have included distance from the pith. Distance from the pith was only assessed on large end, and since all the logs in the study are butt logs, the pith wander near the large end characteristic of such logs probably limits the representativeness of these distances.

Moisture content was measured on only a few boards using an electrical resistance device at 3 locations and 2 pin depths. I've only provided an average value.

Data associated with the Stand the log came from (if available) \* Age \* Average DBH (or stem LED) i.e. any way of knowing whether the stem associated with a test log was above or below average size for the stand

Currently, except for the 'Forest' variable (included in the log data), we do not have this information, although Timberlands may well be able to pull it from their database. If they do still have it, and are willing to supply it, my guess it will take some effort but not major.

Did you collect any acoustic or shape data on the stem from which the test log was taken – or from any of the upper logs taken from the same stem? If so, some summary statistics would be helpful.

The processing facility we used (KPP) did measure stem velocity, but we've since determined that the instrument produces works poorly, with around 30% of the results being essentially random numbers. I've included it in the log dataset (StemSWV), but my best advice is to throw this data away without looking at it.

There is also an estimate of stem velocity based on the velocity of all logs recovered for which reasonable log SWV's were obtained (StemAvgLogSWV). StemGoodLogSWVPercent is the fraction of the stem length represented by logs included in the StemAvgLogSWV computation. I've also included a few other stem parameters (StemSED, StemLED, StemVolume). Remember that the log shape data is actually collected as stem shape. So far I've not looked at all at relationships between overall stem shape and board properties, just log shape.

I would also like to see the end photos if you have a convenient way of sending that large data set.

I've uploaded the log end imagery collected in the yard into the dropbox logend folder.

library(RODBC)  
ch = odbcConnect('LS15')  
sql = "select \* from LogEndImages where imageType='yard'"  
I = sqlQuery(ch, sql)  
for (i in 1:nrow(I)) {  
 cmd = sprintf("cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/%s' /home/harrinjj/Desktop/Dropbox/4stan/logend/%i\_%s.jpg", I[i,"filename"], I[i,"ScionLogNumber"], substr(I[i,"logEnd"],1,1))  
 print(cmd)  
 #system(cmd)  
}

## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1111.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/501\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1112.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/501\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1113.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/502\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1114.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/502\_s.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1127.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/511\_s.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1129.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/509\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1130.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/508\_s.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1133.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/505\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1134.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/504\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1135.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/513\_l.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1236.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/567\_l.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1239.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/565\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1240.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/564\_s.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1242.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/562\_s.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1266.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/574\_l.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1269.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/577\_l.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1286.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/581\_l.jpg"  
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## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1202.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/546\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1203.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/547\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1204.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/548\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1205.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/549\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1206.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/550\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1207.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/551\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1208.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/552\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1209.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/552\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1210.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/551\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1211.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/550\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1212.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/549\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1213.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/548\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1214.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/547\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1215.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/546\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1216.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/553\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1217.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/554\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1218.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/555\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1219.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/556\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1220.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/557\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1221.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/558\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1222.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/558\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1223.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/557\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1224.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/556\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1225.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/555\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1226.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/554\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1227.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/553\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1228.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/559\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1231.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/562\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1232.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/563\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1272.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/575\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1275.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/572\_s.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1297.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/587\_l.jpg"  
## [1] "cp '/media/Q/SWI/LogsAndStems/Predicting performance of appearance/Phase 2/Results/KPP Trial 20-22Nov13/yard logend photos/IMGP1300.JPG' /home/harrinjj/Desktop/Dropbox/4stan/logend/590\_l.jpg"

I would like to know the warp limits for the 7 grade rules you applied

For 100x40 boards the limits used were:

|  |  |  |  |
| --- | --- | --- | --- |
| set | bow.mid (mm) | crook.mid (mm) | twist.tot (mm) |
| nzs3631 | 85 | 35 | 15 |
| scaled | 42 | 17 | 7 |
| anti.crook | 85 | 10 | 15 |
| japan | 5 | 5 | 5 |
| customer.A | 37 | 10 | 25 |
| wwpa.CSelect | 75 | 25 | 3 |

The seventh set (scaled.with.moe) included an MOE limit of 6 GPa, but was otherwise the same as the scaled set.

Can you show me how the distributions of the AV and shape parameters of your 100 log sample set compared to the AV and shape parameters of all the butt logs processed during that 3 day sample period?

Logs were selected to cover the observed range, rather than to mimic the, joint or individual, distributions. I think the plot below is the most useful way to get a broad overview of how the selected logs compare with the population. You might disagree, in which case, tell me a bit more about what you want and I'll see what I can do.

library(RODBC)  
library(lattice)

## Warning: closing unused RODBC handle 3

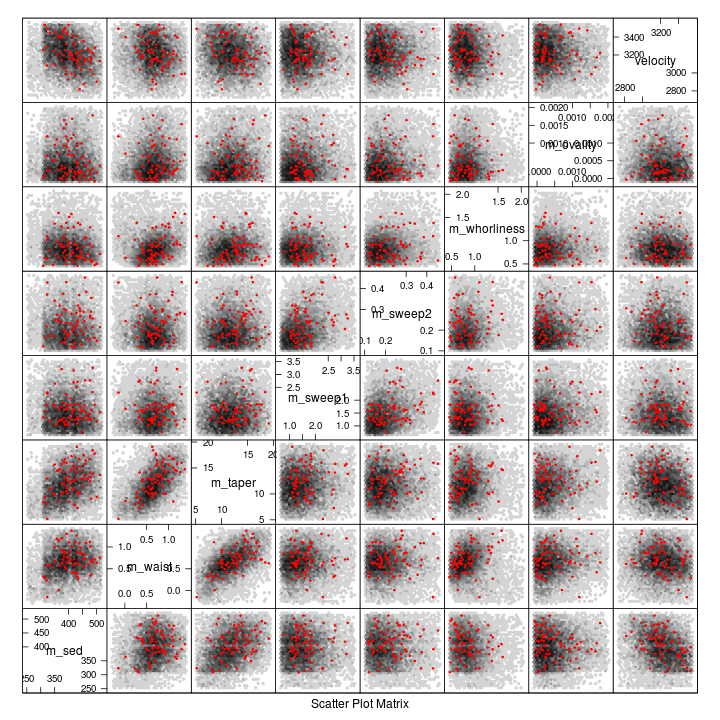
library(hexbin)

## Loading required package: grid

ch=odbcConnect('KPPSWI','sa','password12')  
L=sqlQuery(ch, "select \* from Phase2 where m\_nslices is not null and grade like '%P%' and velocity>2200")#" and m\_sweep1<10 and m\_ovality<0.02")

## Warning: closing unused RODBC handle 4

pvars=c("m\_sed", "m\_waist", "m\_taper", "m\_sweep1", "m\_sweep2", "m\_whorliness", "m\_ovality","velocity")  
ii=1:nrow(L)  
for (p in pvars) {  
 q=0.05  
 ii=intersect(ii,c(1:nrow(L))[L[,p]>quantile(L[,p],q,na.rm=TRUE) & L[,p]<quantile(L[,p],1-q,na.rm=TRUE)])  
}  
splom(L[ii,pvars], panel=function(x, y, ...) {  
 panel.hexbinplot(x,y)  
 isel=!is.na(L$ScionLogNumber[ii])  
 panel.xyplot(x[isel],y[isel],pch=19,col='red',cex=0.3)  
})



plot of chunk unnamed-chunk-4

Displaying most typical 50.0902% of 18844 pruned logs in the database.

Red points are the 100 selected logs. Grey scale denotes probability of finding given characteristics in the population (black = high probability).