

Example of Inventory Fluctuation



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Inventory Variation Example



4/4 red oak

- How much inventory is required?
 - Kiln size is 50,000 board feet per charge
 - Year round production
- Assumption:
 - Demand will be consistent for each charge
 - All lumber dried will be sold

Inventory Variation Example

Assumption: drying times in the kiln are consistent

- Provided your boiler and heating system are in good working order
- Very little material variability
 - Moisture content within the load
 - Density/specific gravity
 - Pre-existing damage
- Factor influencing drying time
 - Incoming moisture content of the lumber

Kiln Drying Times

4/4 red oak

- Green Moisture Content -74%
- Typical drying loss per day (northern red oak)
- 2 ½ % moisture content

Drying time (including equalization and conditioning)

- Green
 - 27 days drying time
- Air-dried
 - 30% moisture content – 10 days drying time
 - 25% moisture content – 8 days drying time
 - 20% moisture content – 6 days drying time

Kiln Throughput

Assumption - you can sell or use everything that you dry

- Assumption could be – you need X % of volume out of the kiln per year

➤ Green condition

- Only 13 kiln charges per year
- 650,000 board feet per year

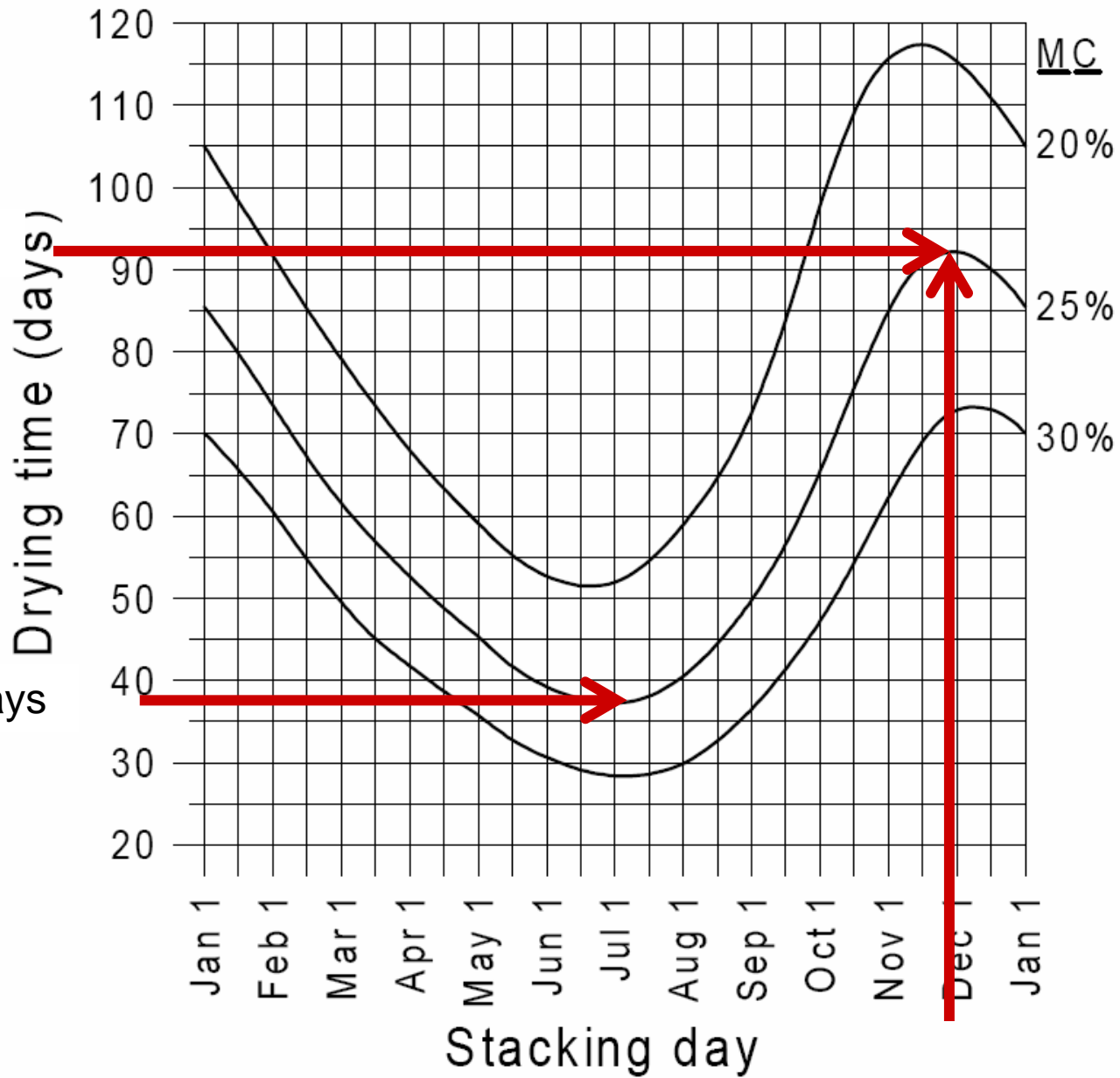
➤ 30% incoming MC

- 36 kiln charges per year
- 1,800,000 board feet per year

➤ 25% moisture content

- 45 kiln charges per year
- 2,250,000 board feet per year

4/4 Northern red oak: Roanoke, VA



93 days

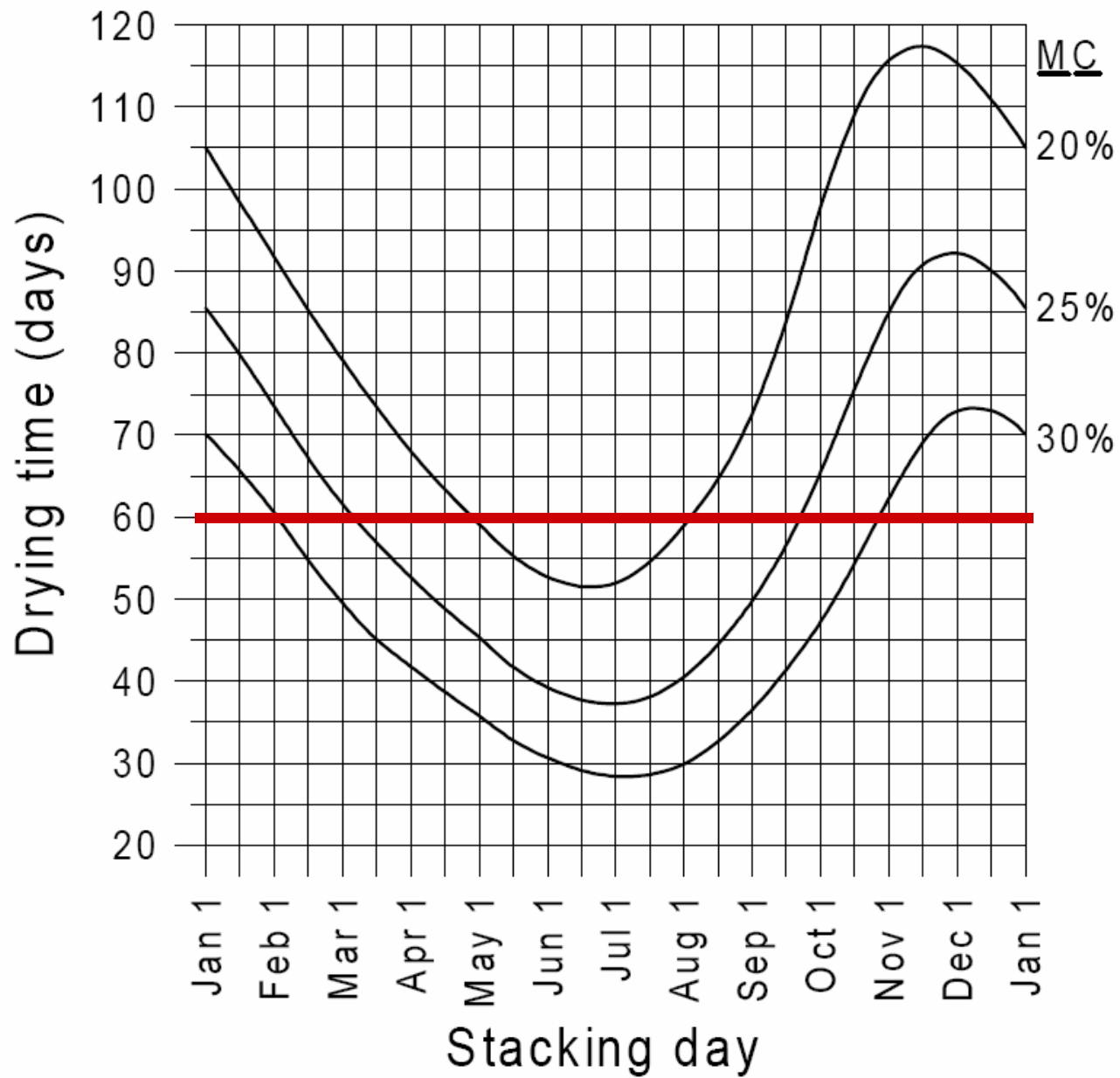
38 days

How much inventory to carry?

Maximum time to air-dry to 25% MC

- Varies based on time of year (weather conditions)
 - 38 – 93 days!
- How do you handle variation?
- Arbitrary
 - 60 days on the yard
- Variable
 - Inventory will vary based on the conditions

4/4 Northern red oak: Roanoke, VA



Arbitrary

Arbitrary

- 60 days on the yard

Drying times will vary greatly

- Anywhere from 5.5 days to 15 days
 - Each charge will take a different amount of time to dry
 - Hence each charge will have a different cost associated with it

Variable inventory?

How long will it take to dry is based on weather conditions

- These constantly change
- Our information is based on averages – how consistent has the weather been lately?
- Lumber buyer must understand fluctuations and importance of lumber inventory

How much inventory?

If every charge took 8 days

- 93 days ($93/8 = 12$) - 600,000 board feet on the yard
- 38 days ($38/8=5$) – 250,000 board feet on the yard

Inventory Value

Cash flow

- $600,000 \times 625/\text{MBF} = 375,250$
- $250,000 \times 625/\text{MBF} = 156,250$
 - 58% less !

More variability

Now add

- Lumber variability
 - Density
 - High MC variability due to poor air drying conditions
- Lumber purchasing works on different incentive system
- Accountant wants minimum inventory of the air-dry yard all the time
- Volume of dry lumber needs varies based sales fluctuations

Finally

Is an air-dry yard just inventory?

- What's happening on the yard
- Where does most degrade occur
- I would argue that air-drying is part of an operation not just inventory