Hot Mix Pavement Construction in Adverse Conditions – An Industry Survey

Analysis and Regional Breakdown

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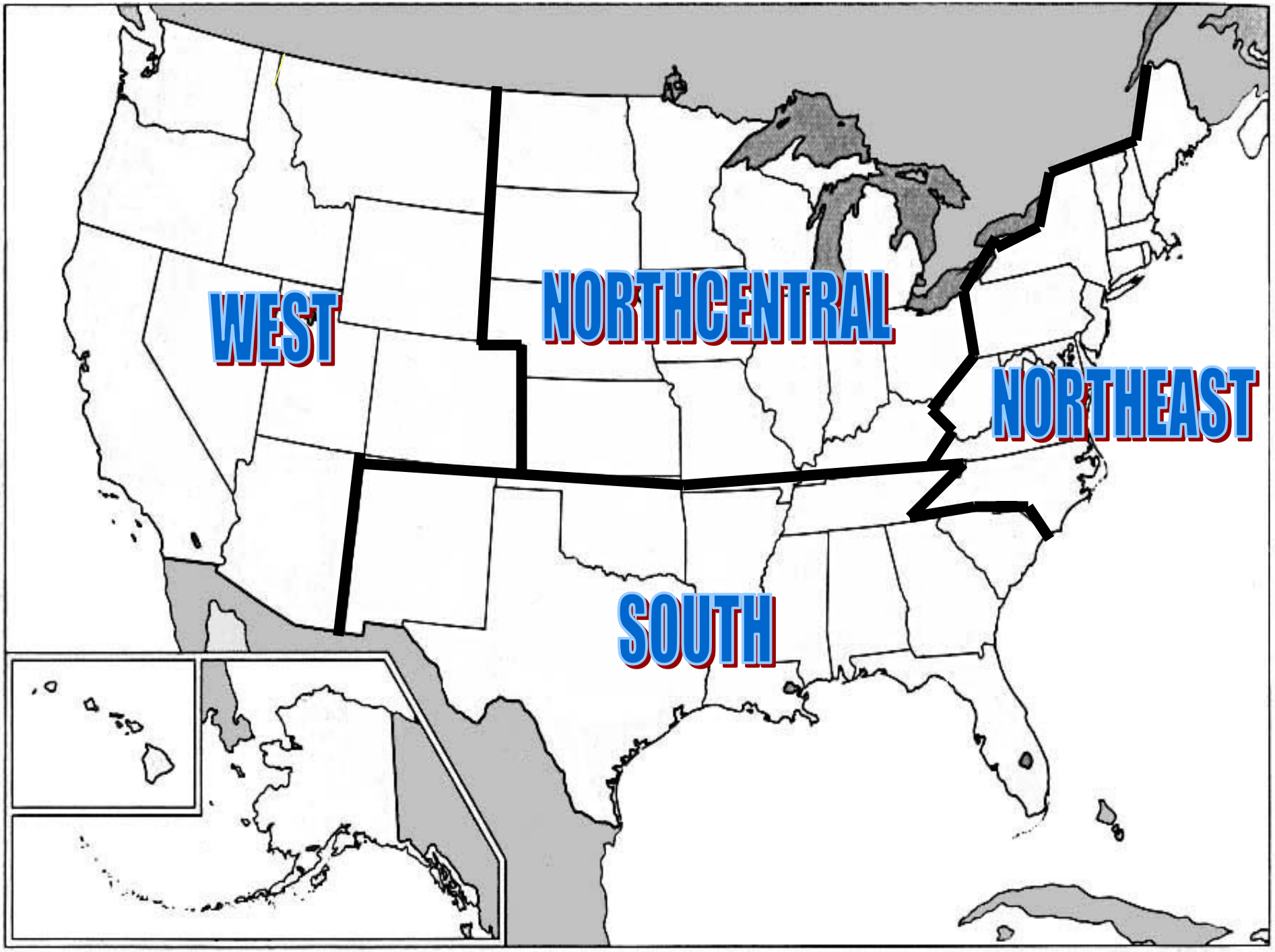
QUESTION 1

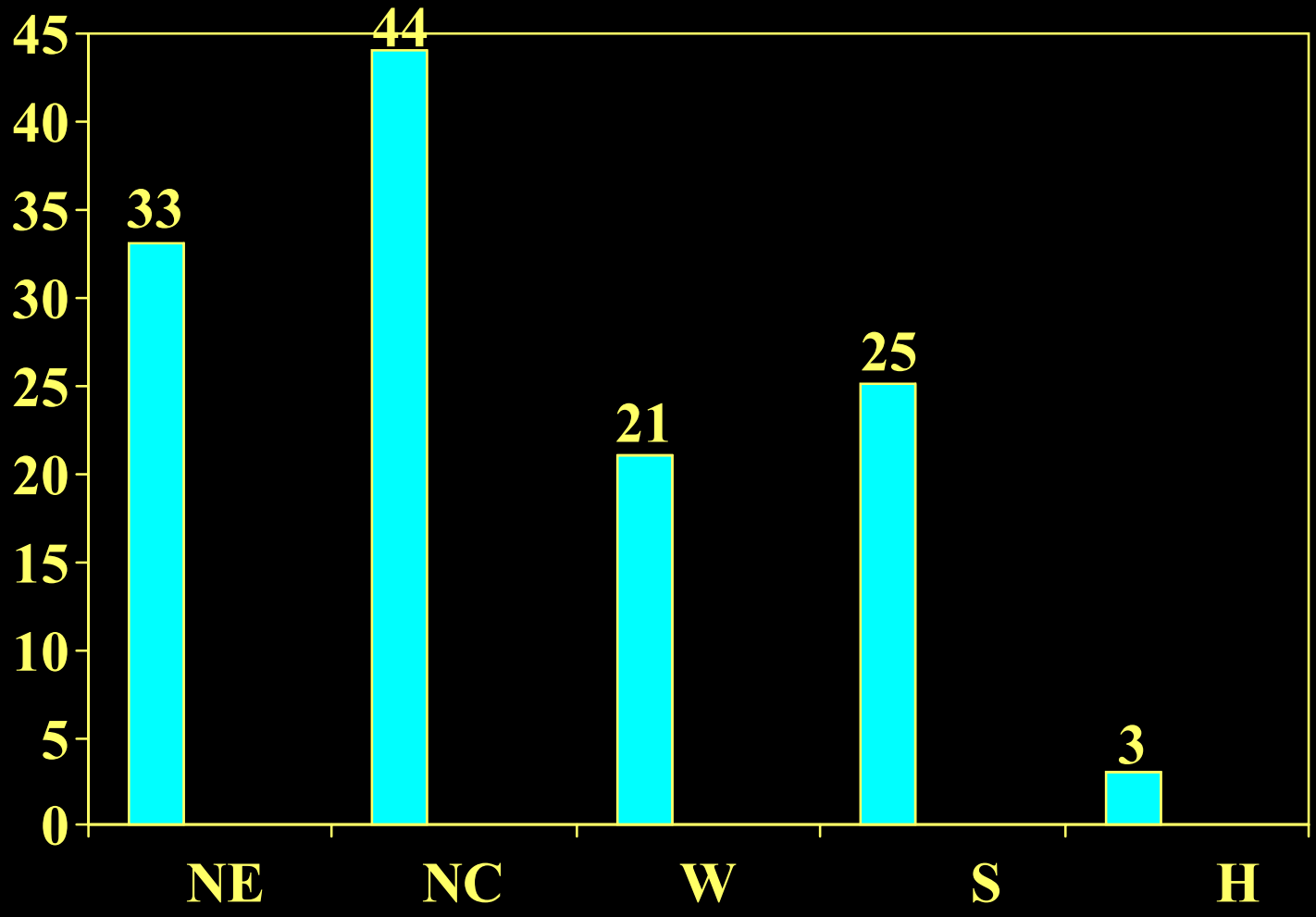
In the map below, indicate the general region where the majority of your HMA projects are constructed.


WEST
NORTHCENTRAL
NORTHEAST
SOUTH

STATES NOT REPORTING

WYOMING
NORTH DAKOTA
SOUTH DAKOTA
MINNESOTA
NEW MEXICO
ALASKA

SURVEYS RECEIVED PER REGION



QUESTION 2

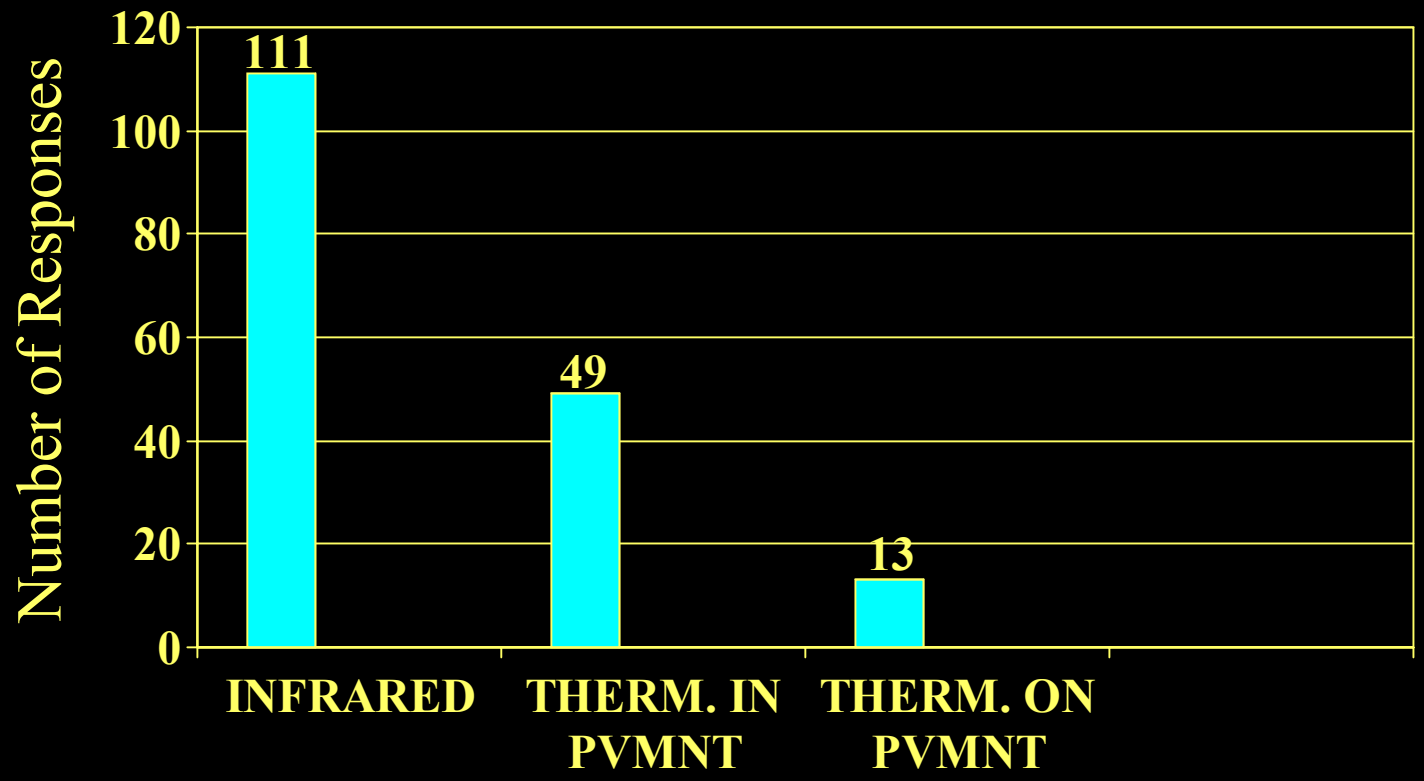
On your projects, how is the mat temperature currently monitored?

A. Thermometer placed on the pavement surface
B. Thermometer inserted in the pavement
C. With an infrared device
D. It is not monitored during construction
E. Other

MAT TEMPERATURE DURING CONSTRUCTION

- Primary Device: Infrared
- Secondary Measure: Thermometer inserted in pavement
- 3 responses did not monitor temperature during construction.

TEMPERATURE MONITORING METHODS



QUESTION 3

Do you have a temperature requirement for compaction? NO YES

If yes, how are the requirements specified?

-By air temperature from _____^{O}F and rising.

-By surface temperature from _____^{O}F and rising.

-By paving date from (month/day)____/____ to ____/____.

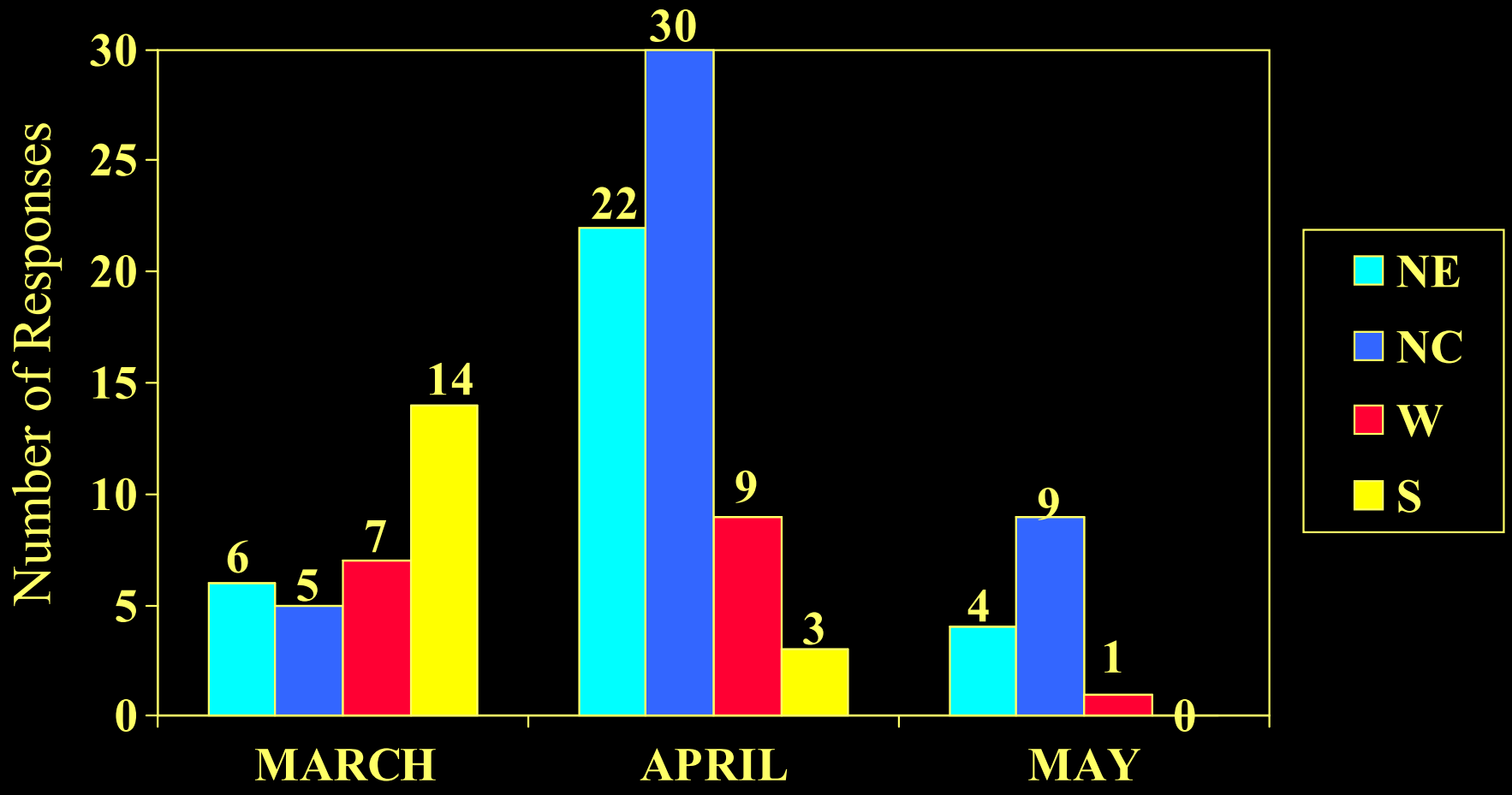
MAT TEMPERATURE REQUIREMENT FOR COMPACTION

- 75% temperature requirement
- Based on air and surface temperature
- Requirements do not fluctuate with climate
- Typically 40-50^{o}F and rising for air and surface
- Mix temperatures typically at 225^{o}F

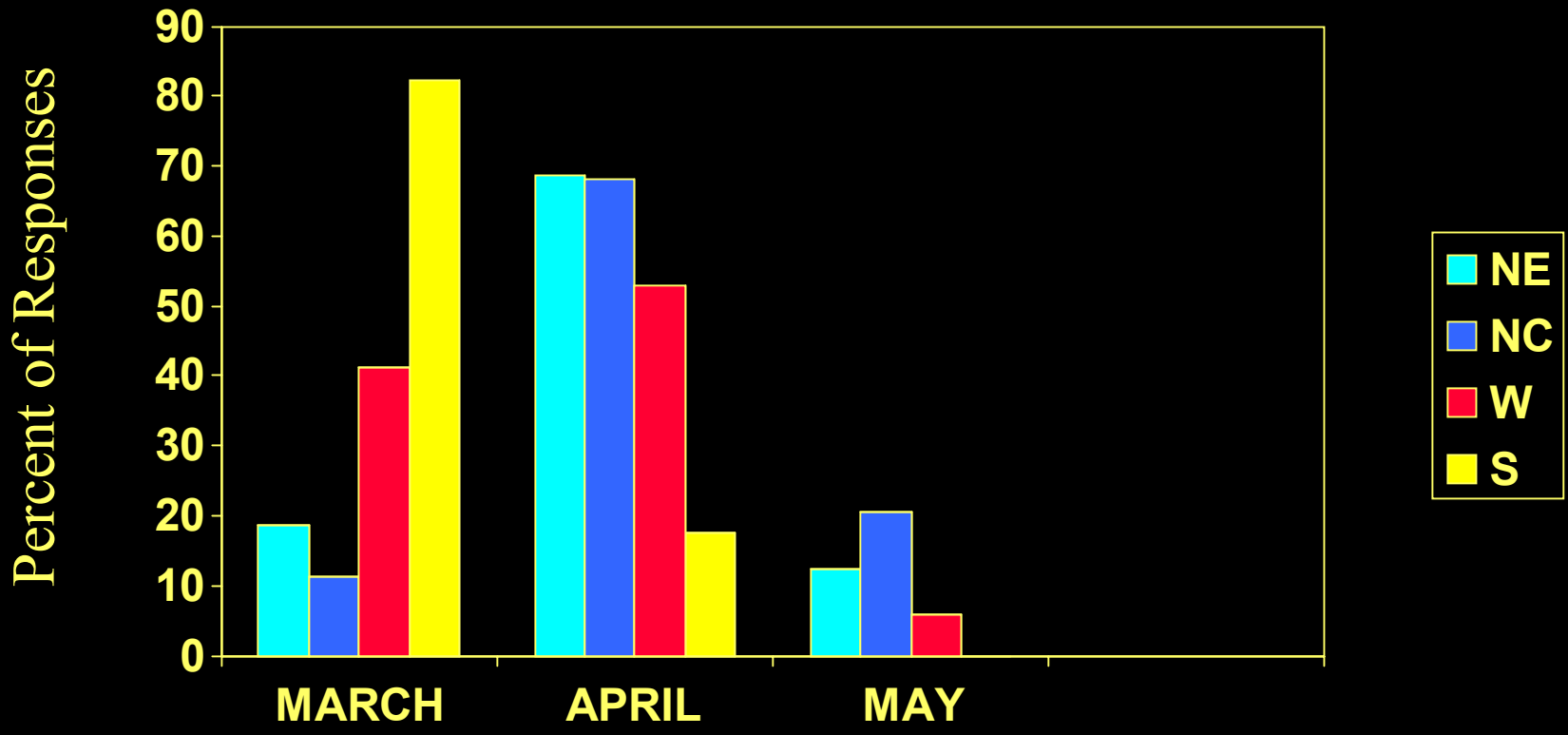
QUESTION 4

In your region, indicate the months you typically consider as the start and the end of your regular or ‘normal’ paving season.

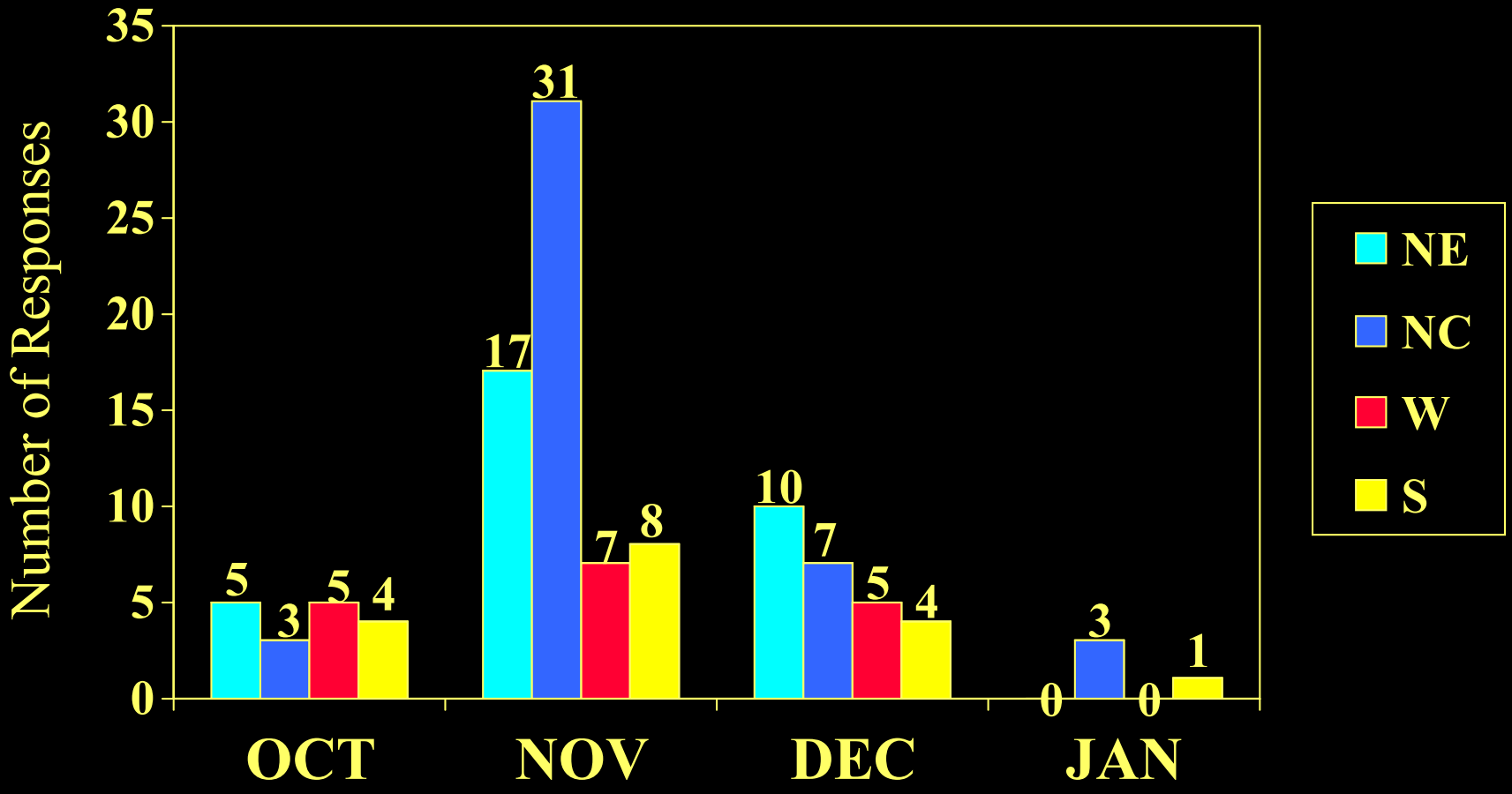
TYPICAL PAVING SEASON START MONTHS



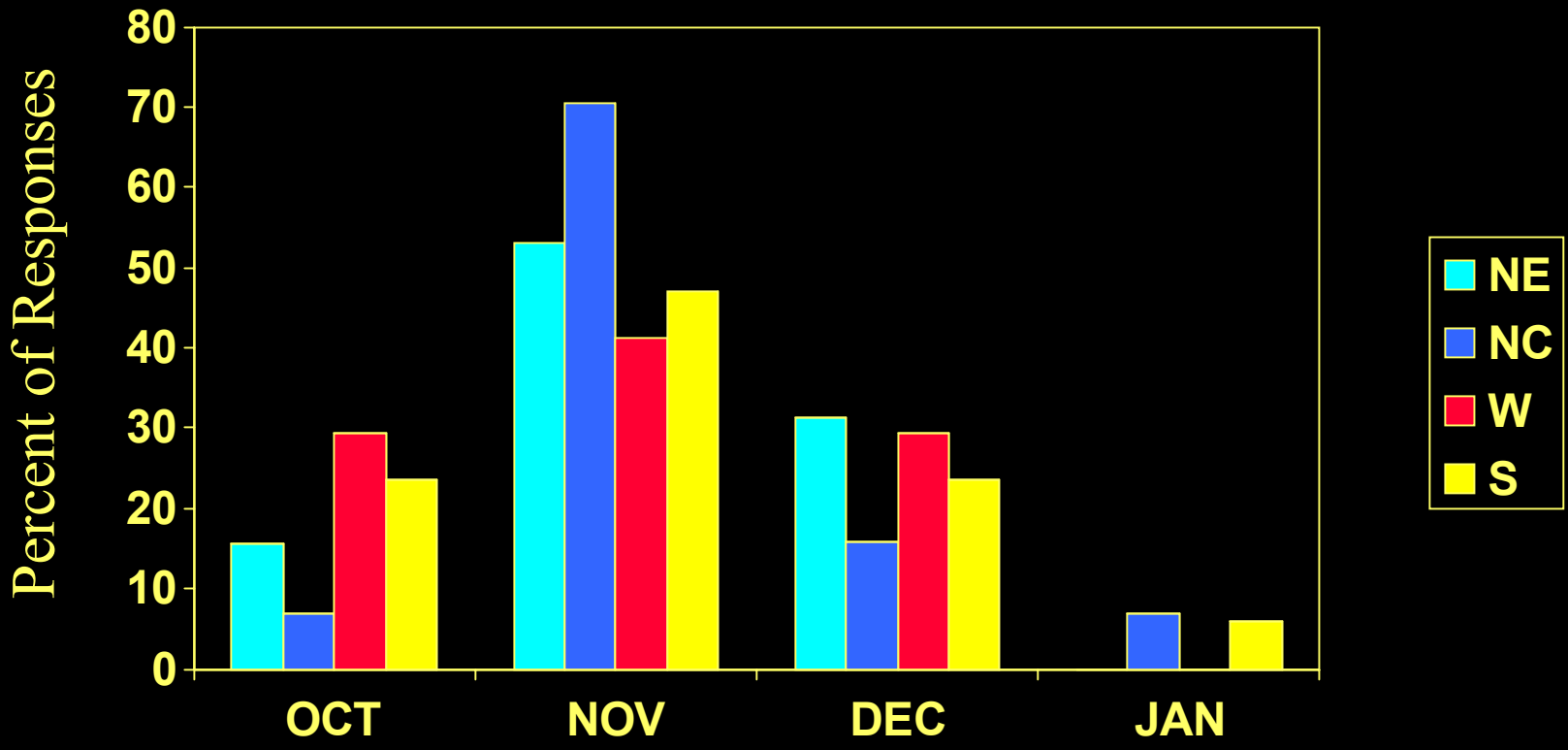
TYPICAL PAVING SEASON START MONTHS (by percentage)



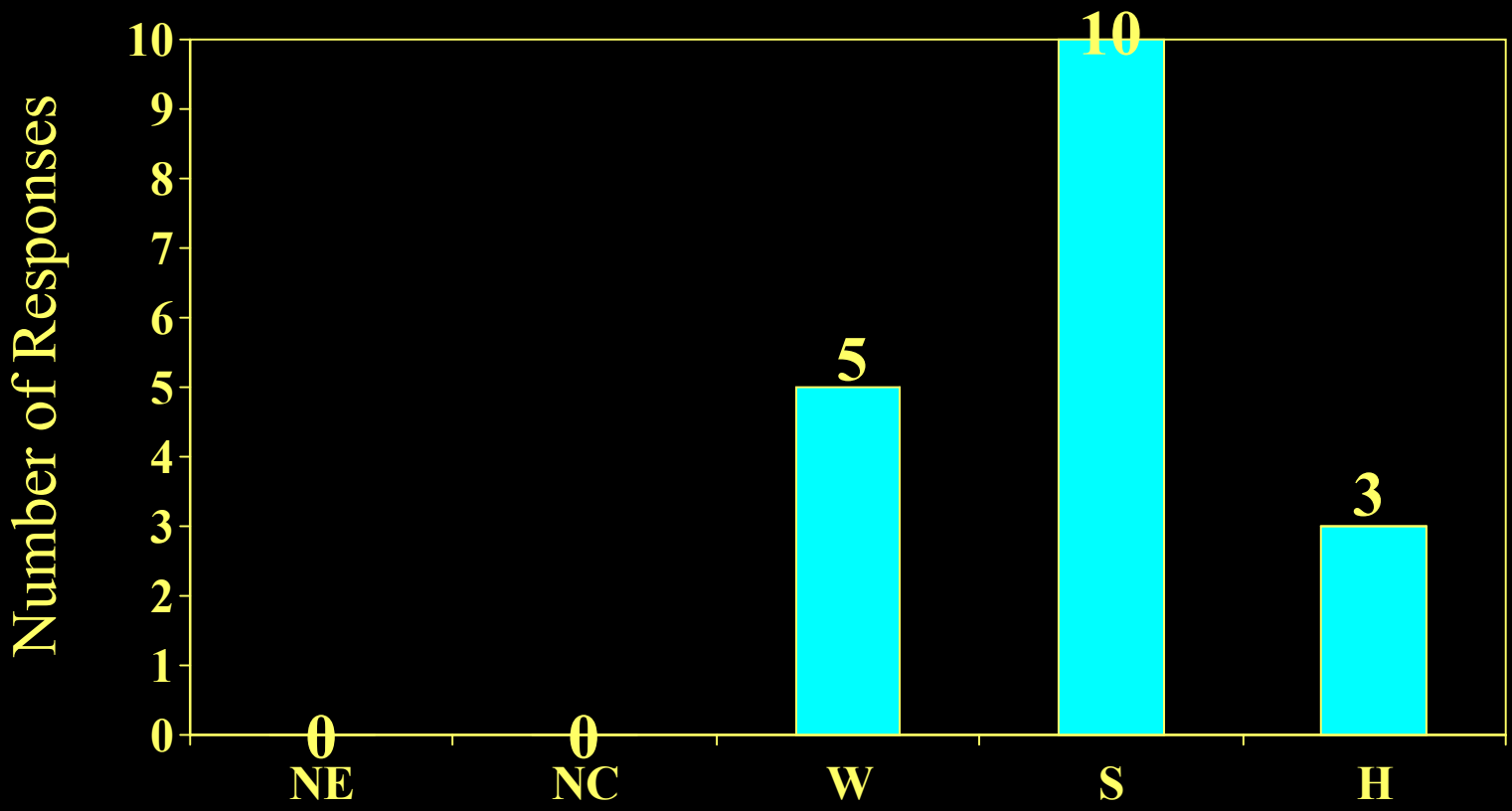
TYPICAL PAVING SEASON END MONTHS



TYPICAL PAVING SEASON END MONTHS (by percentage)



YEAR-ROUND PAVING



TYPICAL PAVING SEASONS

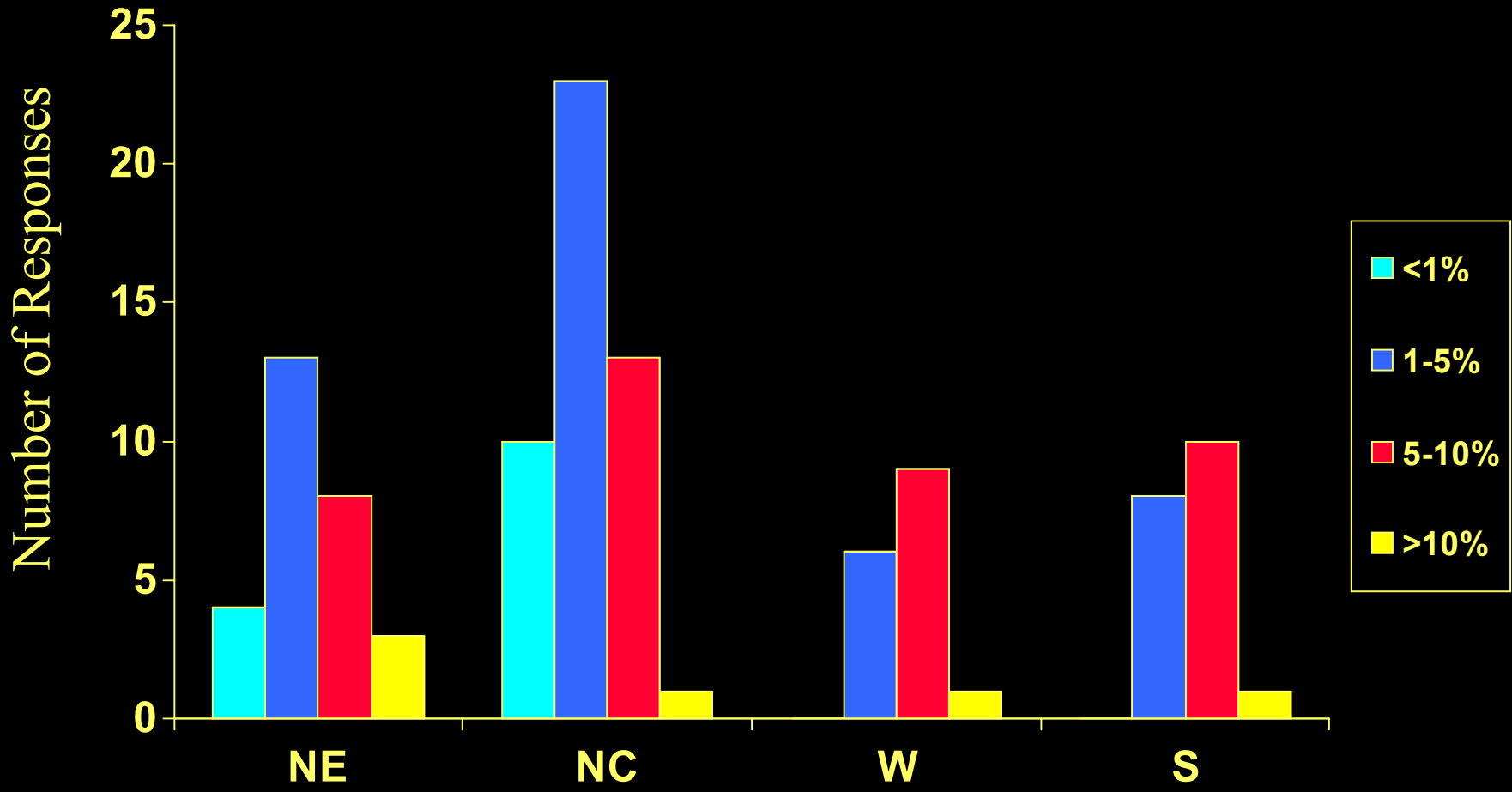
- Northeast region: April to November
- Northcentral region: April to November
- West region: March/April to November
- South Region: March to November
- Hawaii: Year round paving season

QUESTION 5

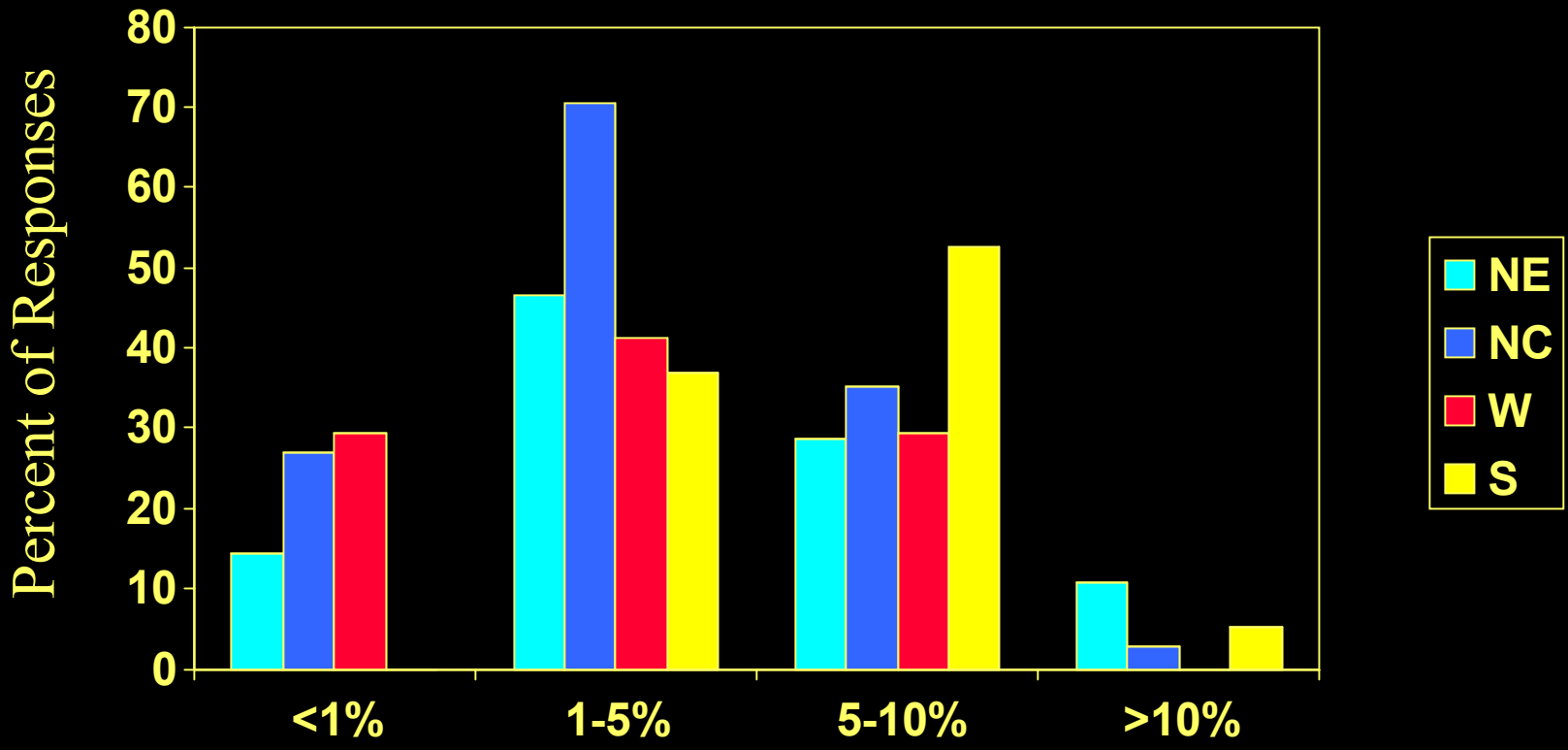
What percent of your HMA projects have been constructed outside of what you would consider the regular paving season?

A. <1%
B. 1-5%
C. 5-10%
D. >10%

CONSTRUCTION OUTSIDE REGULAR PAVING SEASON



CONSTRUCTION OUTSIDE REGULAR PAVING SEASON (by percentage)



PERCENTAGE OF HMA PROJECTS CONSTRUCTED OUTSIDE OF REGULAR PAVING SEASON

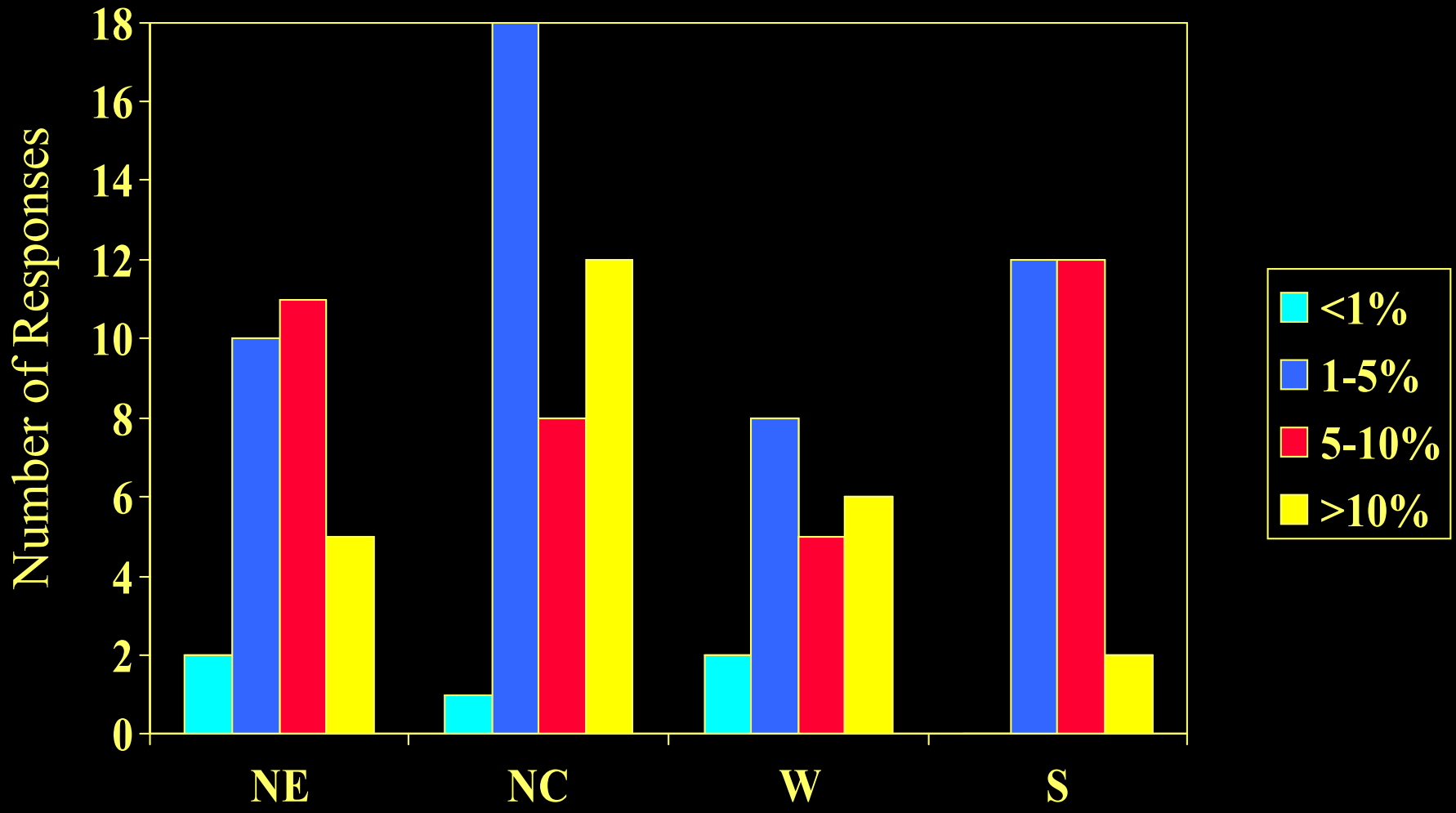
- Northeast region: 1-5%
- Northcentral region: 1-5%
- West region: 5-10%
- South region: 5-10%

QUESTION 6

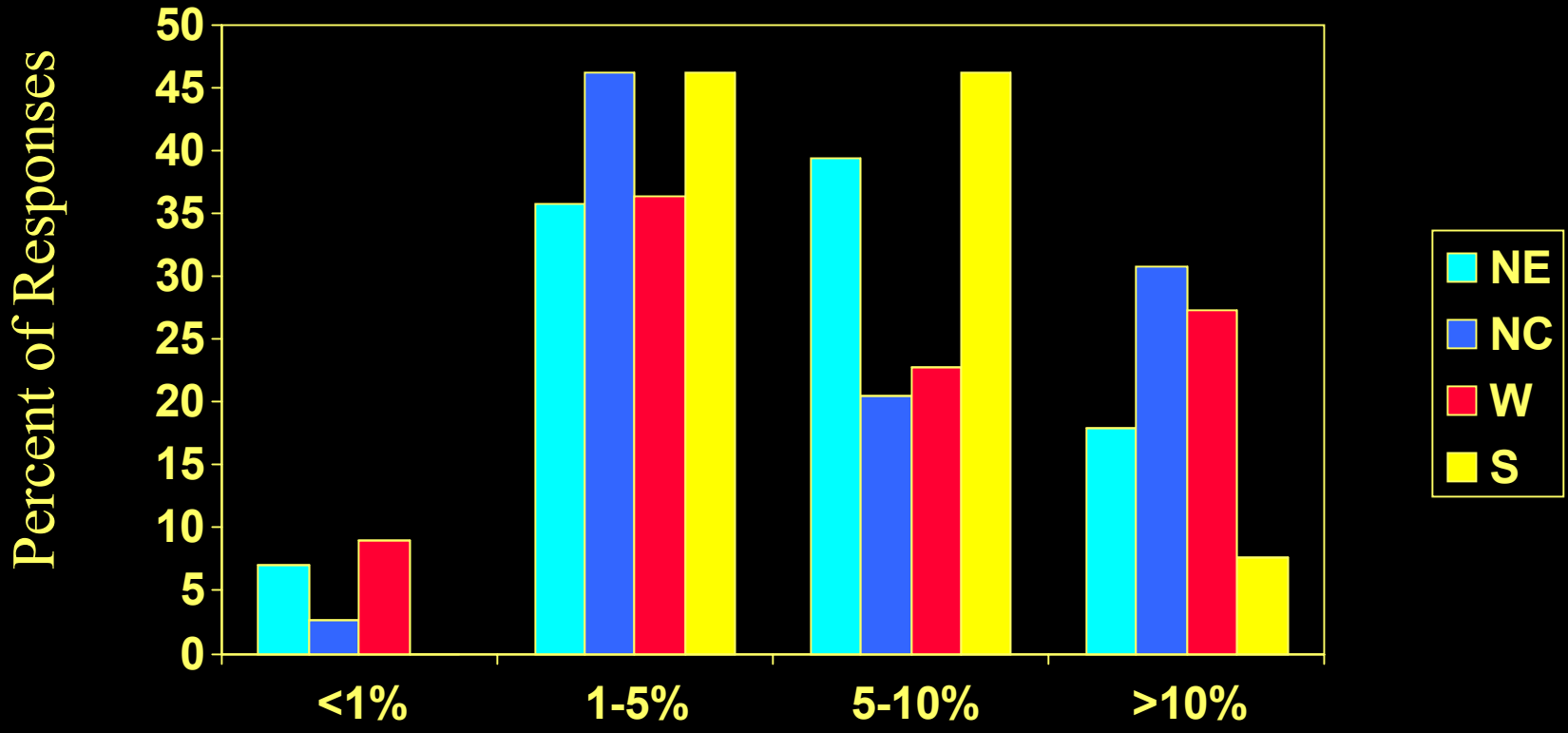
What percent of your HMA projects have been constructed during the regular paving season but in adverse conditions?

A. <1%
B. 1-5%
C. 5-10%
D. >10%

CONSTRUCTION IN ADVERSE CONDITIONS



CONSTRUCTION IN ADVERSE CONDITIONS (by percentage)



PERCENTAGE OF REGULAR SEASON HMA PROJECTS CONSTRUCTED DURING ADVERSE CONDITIONS

- Northeast region: 5-10%
- Northcentral region: 5-10%
- West region: 1-5%
- South region: 1-5%

QUESTION 7

What type of jobs are you typically constructing during the regular season but during what you would consider adverse environmental conditions (e.g. cold snaps, cold night paving, extreme warm temperatures)?

A. Parking lots / Driveways
B. Municipal Streets
C. County Roads / Highways
D. State Highways / Interstates

CONSTRUCTION IN ADVERSE CONDITIONS

- Wide range of projects
- Parking lots and driveways to state highways and interstates
- Deadlines
- Modifications

QUESTION 8

When paving outside of the regular or ‘normal’ construction season or during adverse conditions, how are your mix placement or rolling operations modified?

ADVERSE MODIFICATIONS

- Responses are consistent throughout each region.
  - Adjust mix temperature (52)
  - Adjust roller distance from paver (50)
  - Increase/Decrease number of rollers (42)
  - Slow paver down (14)
  - Use tarps on trucks leaving plant (8)
  - PAVECOOL SOFTWARE (2)

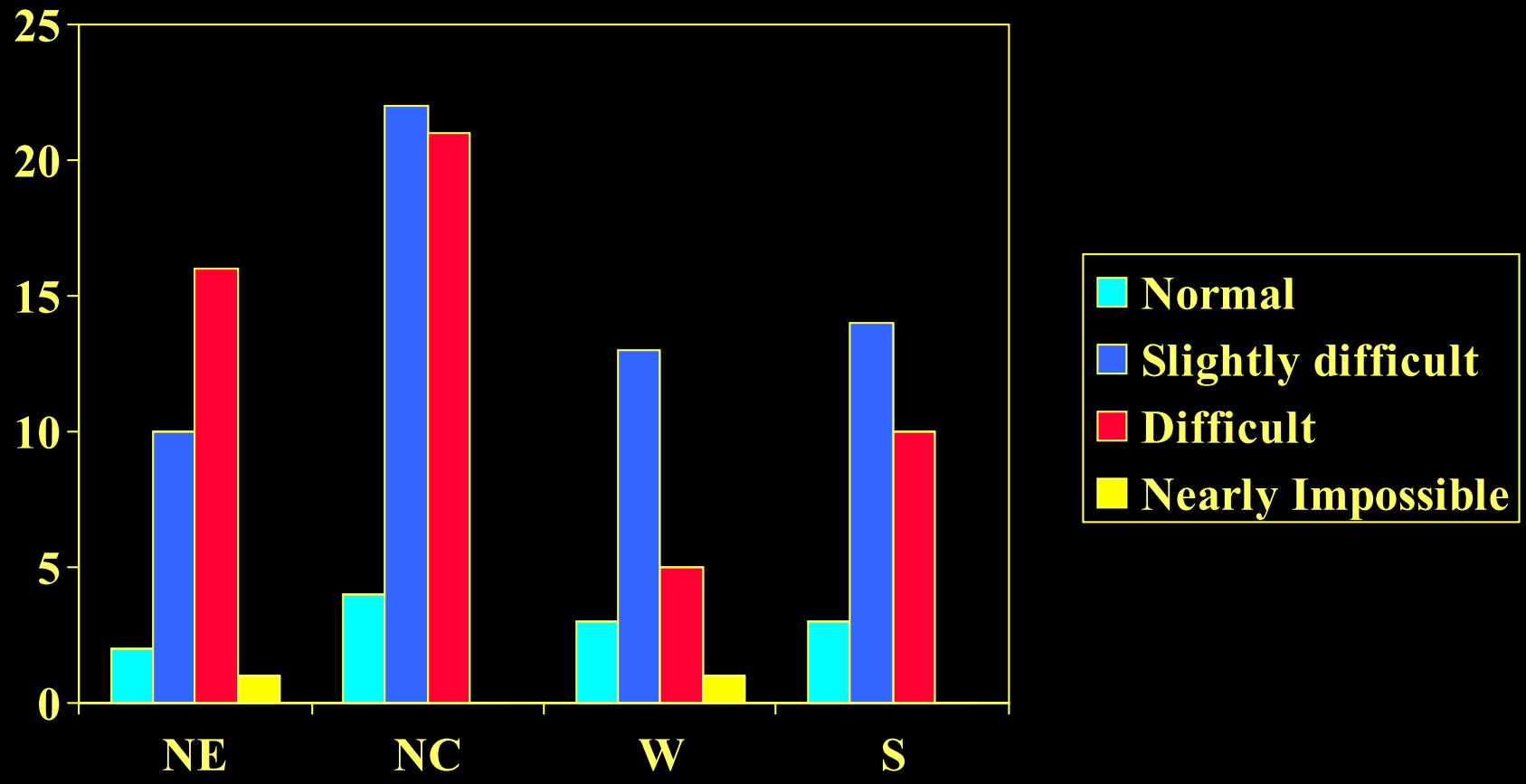
  *10 responses show no modifications made

QUESTION 9

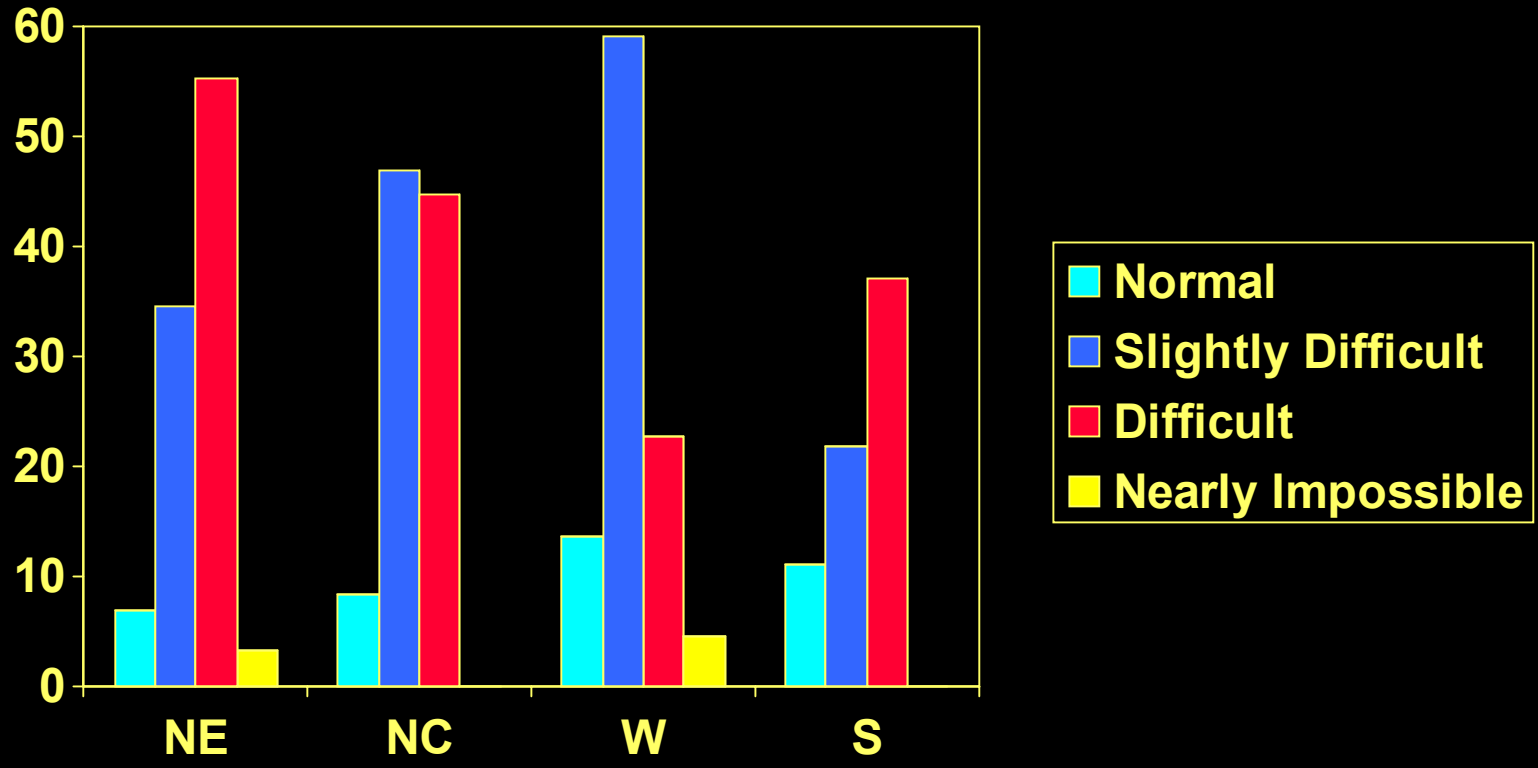
In your experience, how difficult is it to achieve proper HMA density in late season paving?

A. NORMAL
B. SLIGHTLY DIFFICULT
C. DIFFICULT
D. NEARLY IMPOSSIBLE

DIFFICULTY IN ACHIEVING PROPER HMA DENSITY IN LATE SEASON PAVING



DIFFICULTY IN ACHIEVING PROPER HMA DENSITY IN LATE SEASON PAVING (by percentage)



DIFFICULTY IN ACHIEVING PROPER HMA DENSITY IN LATE SEASON PAVING

- Typical response per region:
  - **Northeast: Difficult**
  - **Northcentral: Slightly Difficult to Difficult**
  - **West: Slightly Difficult**
  - **South: Slightly Difficult**

QUESTION 10

In what percent of your projects have tender mixes been a problem?

A. <1%
B. 1-5%
C. 5-10%
D. >10%

In your opinion, what is the primary cause of tender mixes?

TENDER MIXES

- Generally 1-5% of projects constructed
- Reasons:
  - Poor gradation (excessive fines) (75)
    - Overall mix design
    - Excessive natural sands
  - Excessive mix temperature (20)
  - Moisture content in mix (17)