APPENDIX C
DEDUCT VALUE CURVES-ASPHALT SURFACED JOINTED CONCRETE PAVEMENT

C-1. Introduction

In this appendix is furnished the deduct value curves essential for computing the PCI of a pavement sample unit as used in the manual PAVER system (figs C-1 through C-40).

C-2. Type of pavements

The curves are provided in alphabetical order according to distress types, covering first asphalt surfaced pavement, then concrete pavements.

C-3. User instructions

As explained in chapter 3, the following five steps are involved in calculating the PCI for a sample unit::

a. Step 1. Each sample unit is inspected and distress data recorded on DA Form 5145-R for concrete or DA Form 5146-R for bituminous pavements.

b. Step 2. The deduct values are determined from the deduct value curves in this appendix. The following examples are given for a sample unit 25 feet by 100 feet (2500 square feet):

(1) For 6 square feet of distress type 1 (alligator cracking) low severity, the density equals

$$\frac{6}{2500} \times 100 = .24.$$

Using figure C-1, find .24 on the distress density line. Proceed vertically to the L (Low Severity) curve, then horizontally to the left to read a deduct value of 4.

(2) For 16 square feet of distress type 1 (Alligator Cracking) Medium Severity the density equals

$$\frac{16}{2500} \times 100 = .64.$$

Using figure C-1, find .64 on the distress density line. Proceed vertically to the M (Medium Severity) curve, then horizontally to the left to read a deduct value of 17.

(3) For 50 square feet of distress type 15 (Rutting) Low Severity, the density equals

$$\frac{50}{2500} \times 100 = 2.0.$$

Using figure C-15, find 2.0 on the distress density line. Proceed vertically to the L (Low Severity) curve, then to the left to read a deduct value of 13.

c. Step 3. A total deduct value is computed by summing all individual deduct values in the sample unit.

d. Step 4. The corrected deduct value (CDV) is computed. In the example given in figure 3-3, the total deduct value (the sum of all deduct values) was found to be 45. The value of q (the number of individual deducts whose value is greater than 5) was found to be 2. Using figure C-20 find 45 on the TDV line. Proceed vertically to the line q equals 2, then to the left to read a CDV of 33.

e. Step 5. The PCI is computed using the relation PCI = 100CDV. In the example, PCI= 100-33 = 67; the rating is good.

C-4. Deduct value curves

The deduct value curves and the corrected deduct value curves provided in this appendix are needed to solve steps 2 and 4 above.

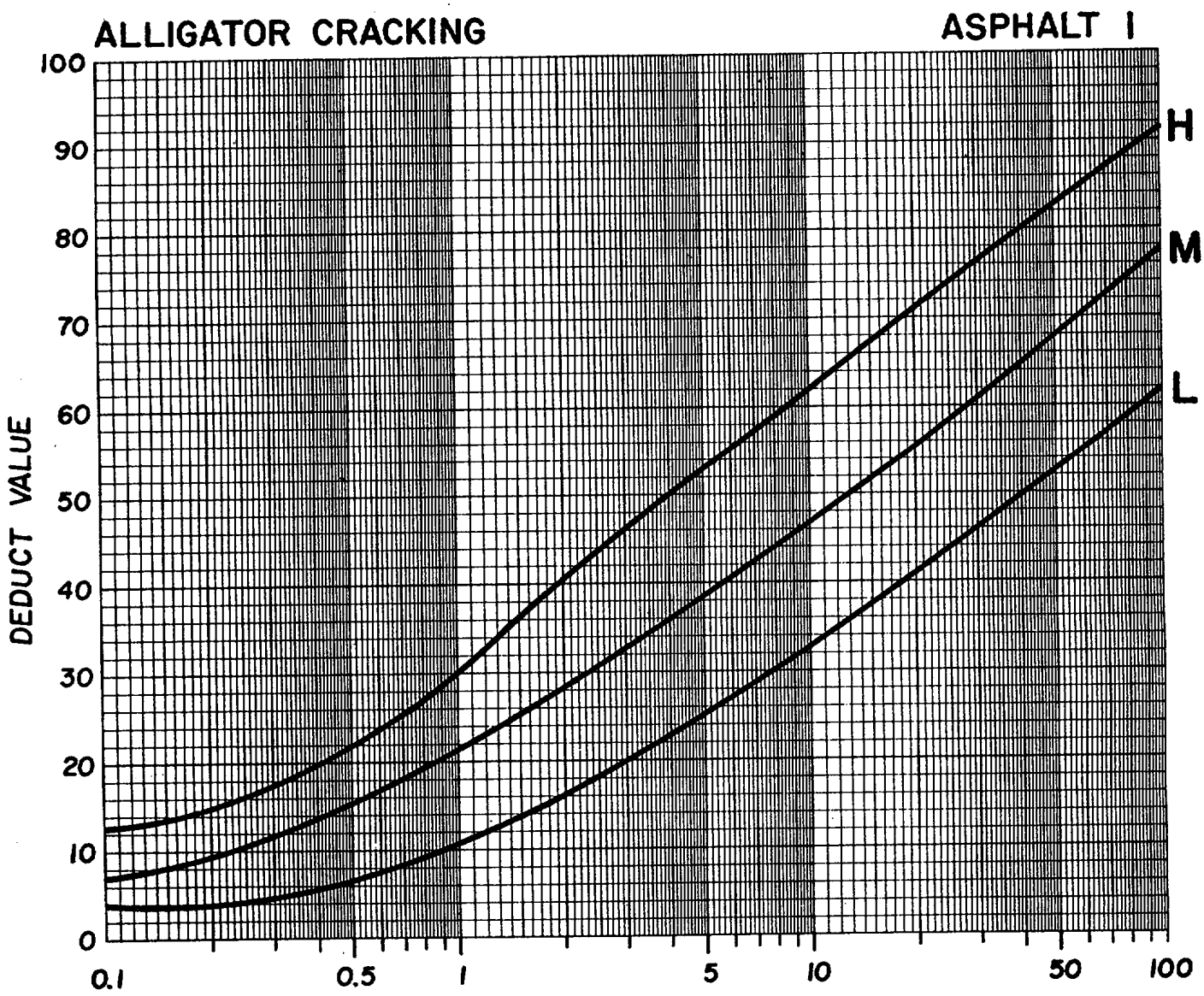


Figure C-1. Deduct value curves for alligator cracking.

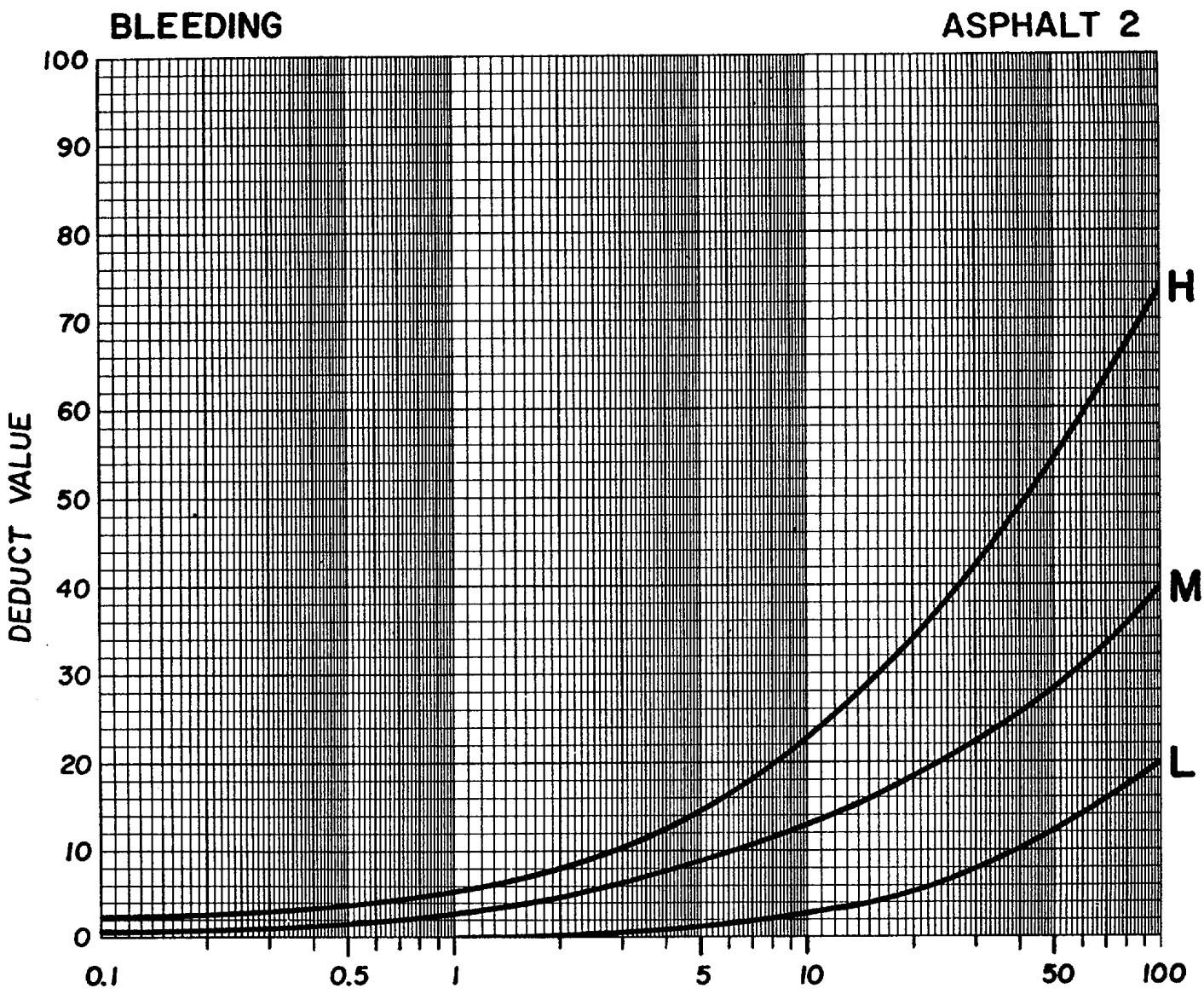


Figure C-2. Deduct value curves for bleeding.

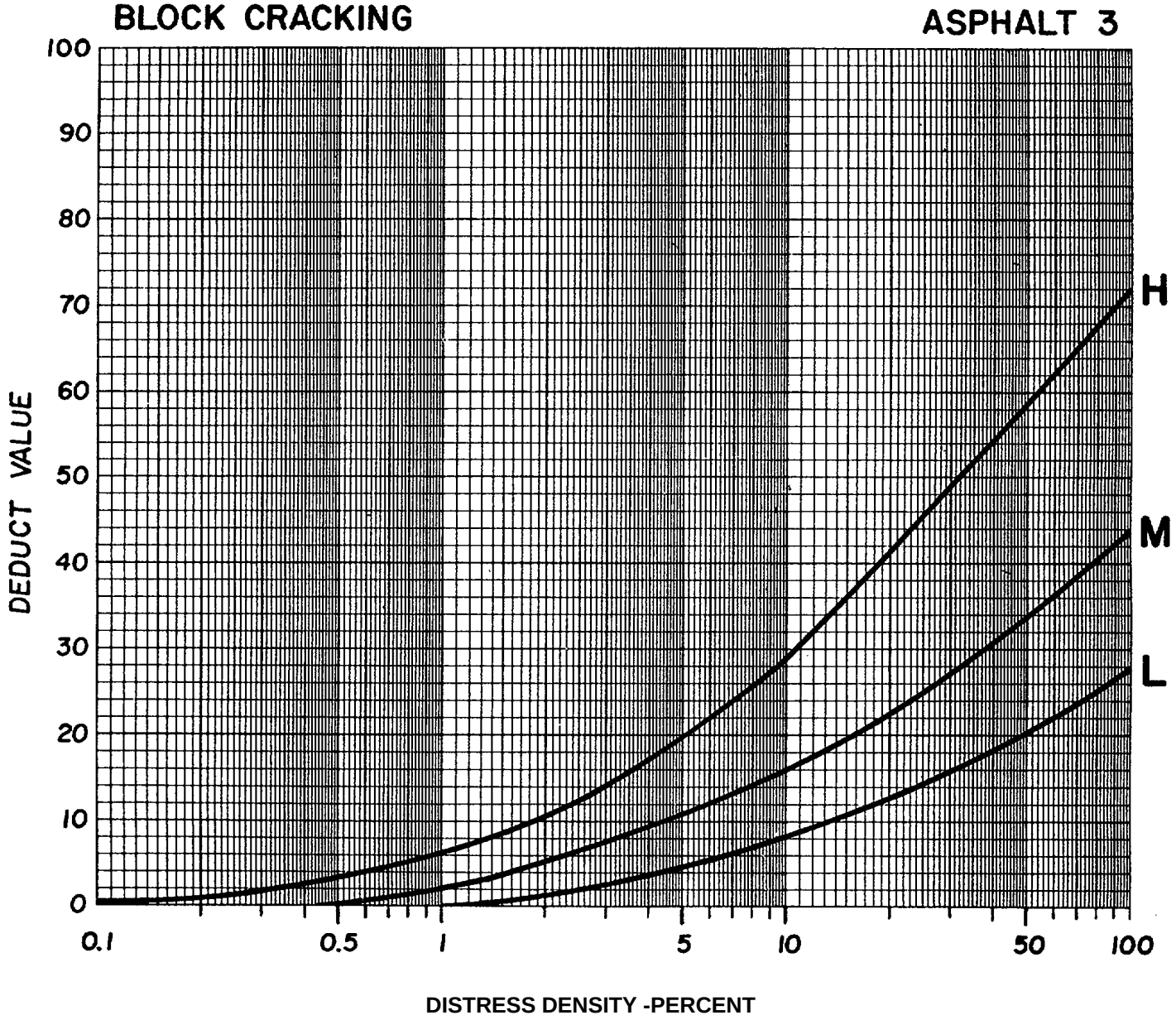


Figure C-3. Deduct value curves for block cracking.

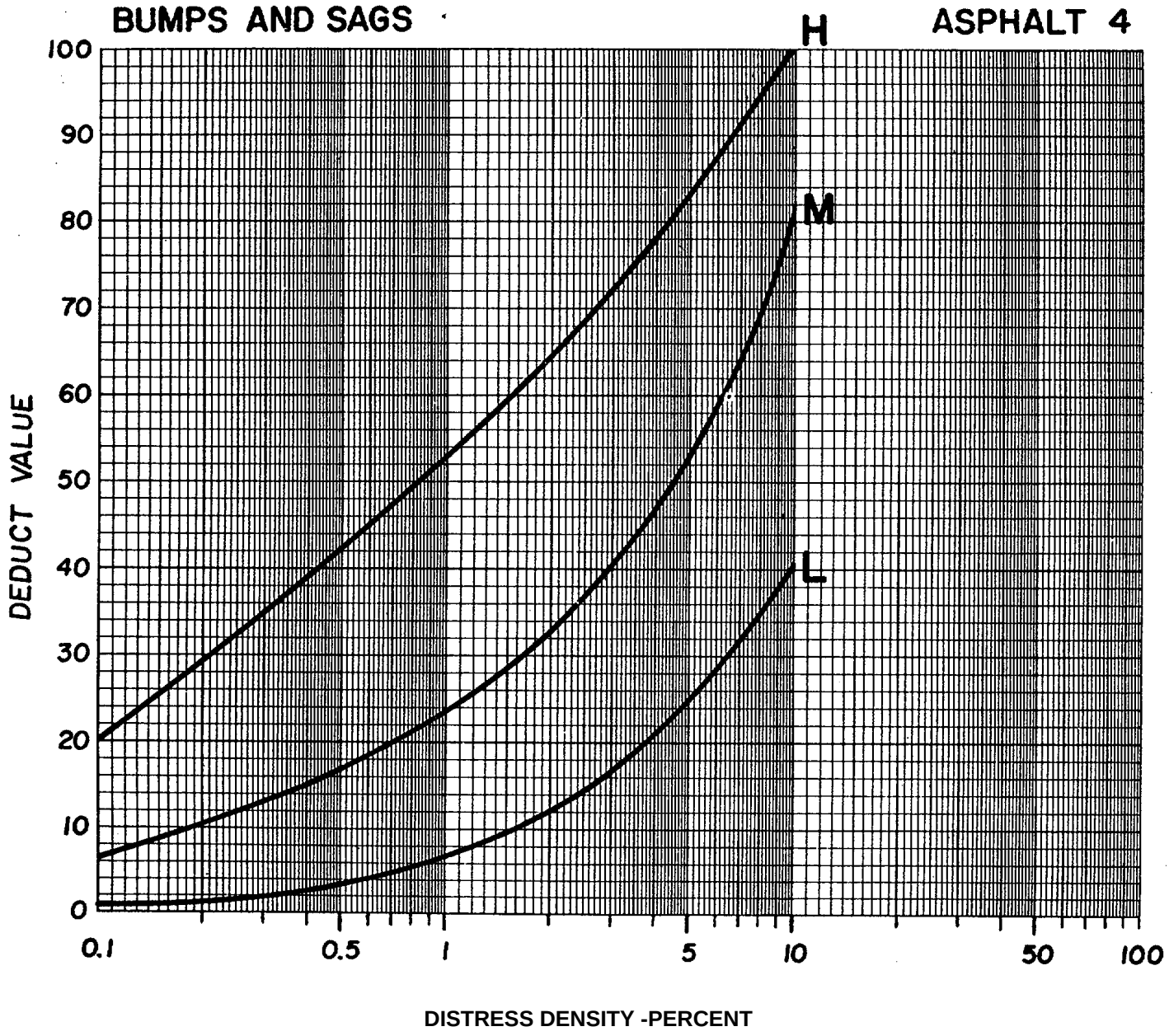


Figure C-4. Deduct value curves for bumps and sags.

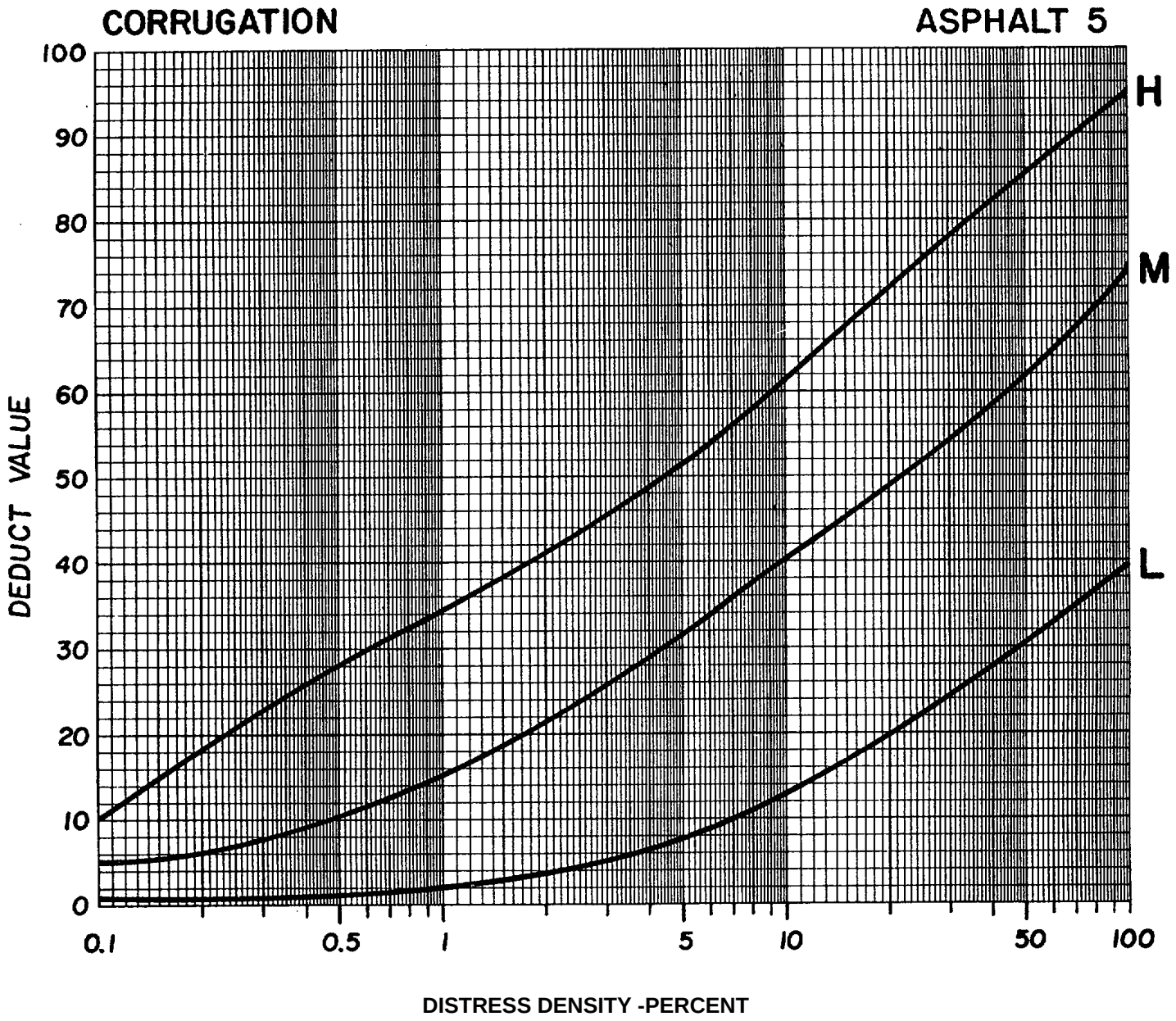


Figure C-5. Deduct value curves for corrugation.

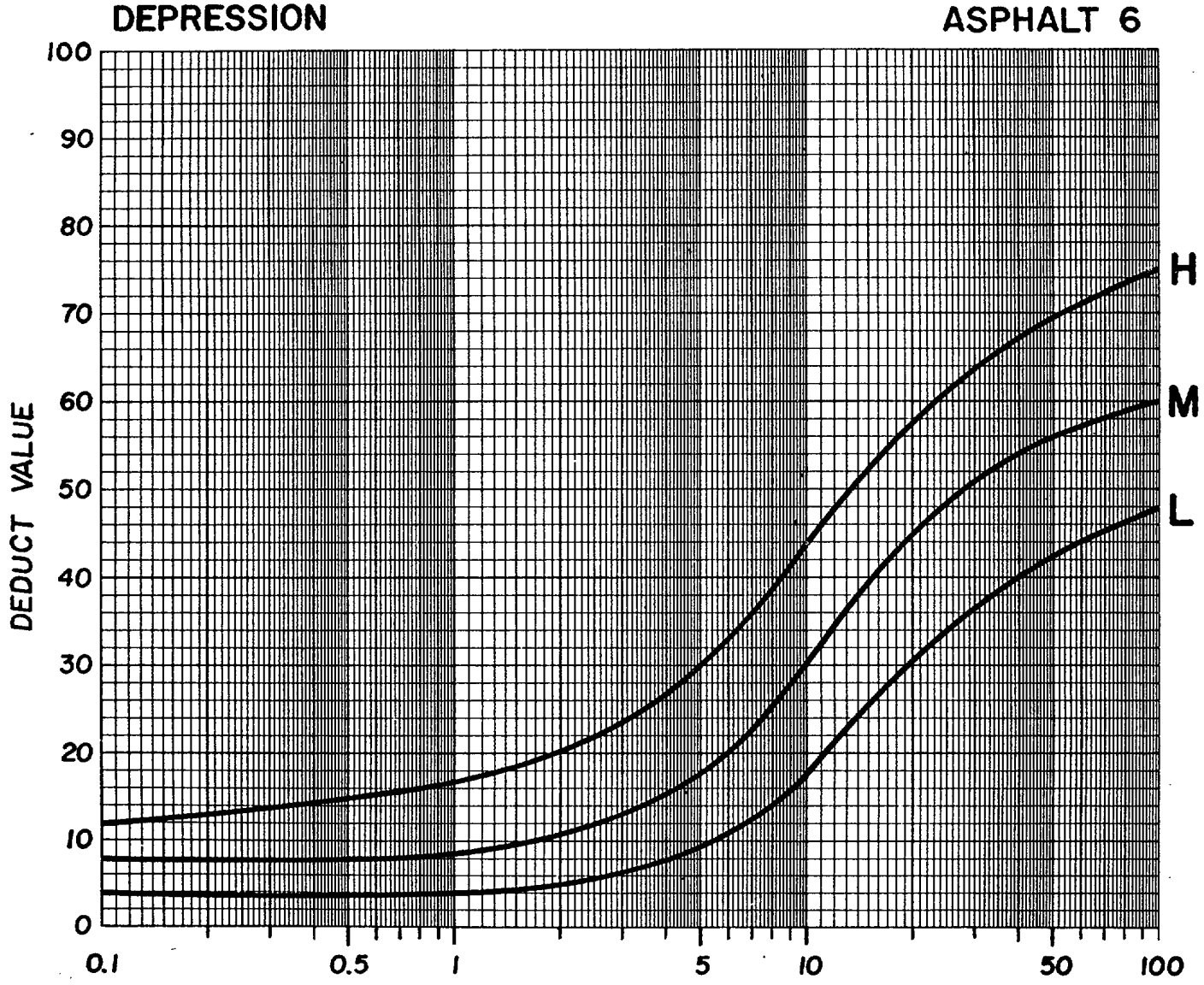


Figure C-6. Deduct value curves for depression.

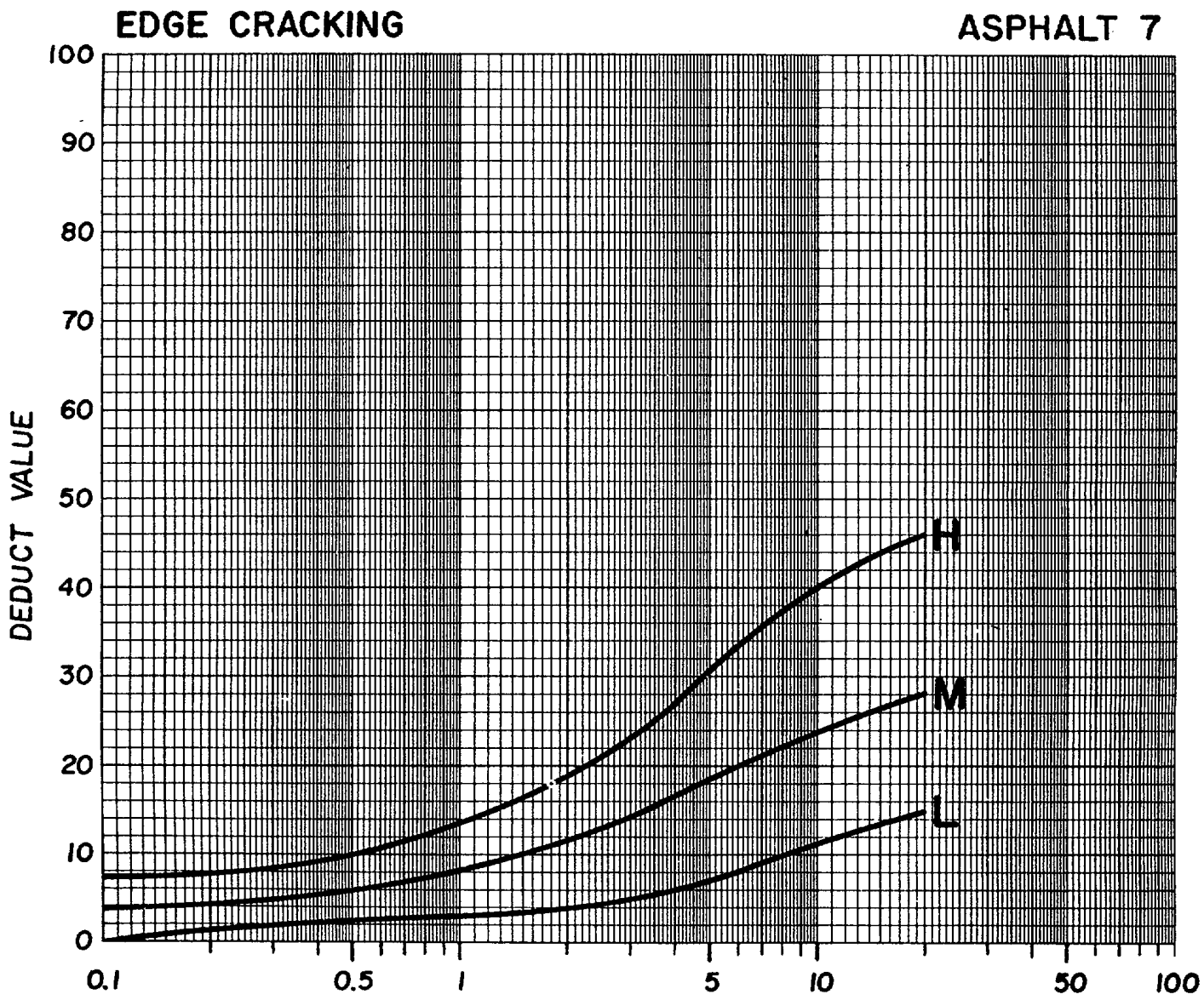


Figure C-7. Deduct value curves for edge cracking.

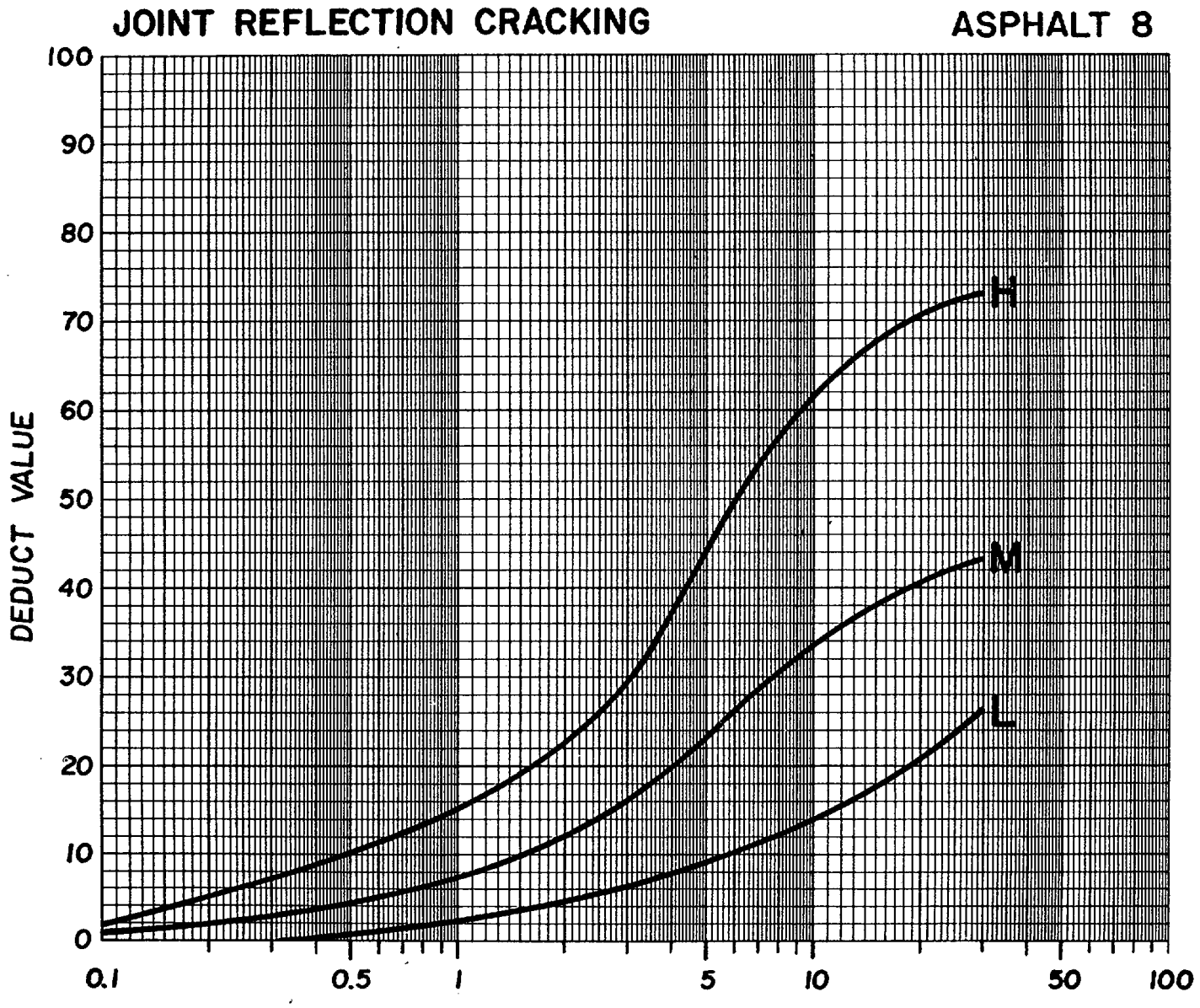


Figure C-8. Deduct value curves for joint reflection cracking.

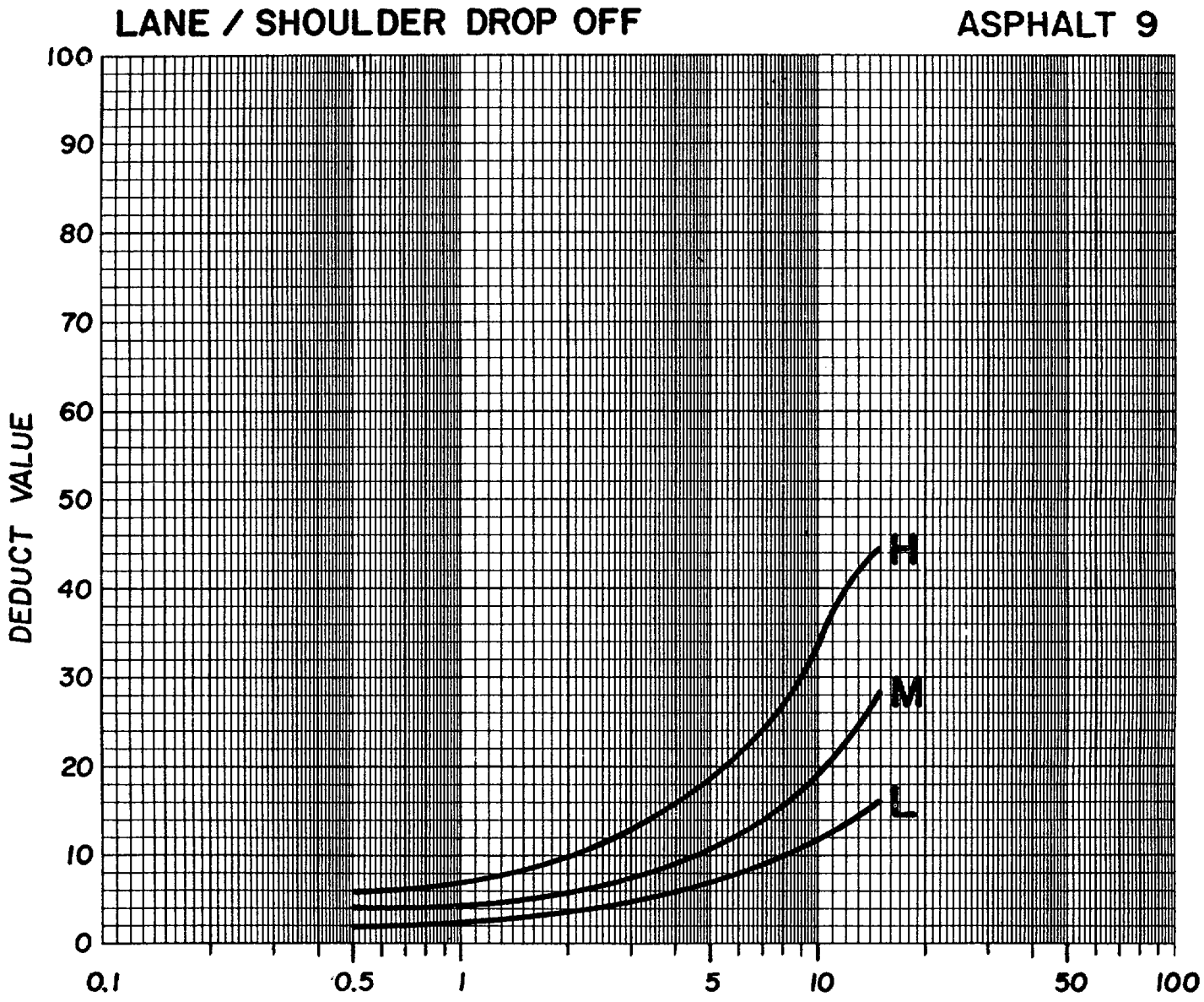


Figure C-9. Deduct value curves for lane/shoulder drop off

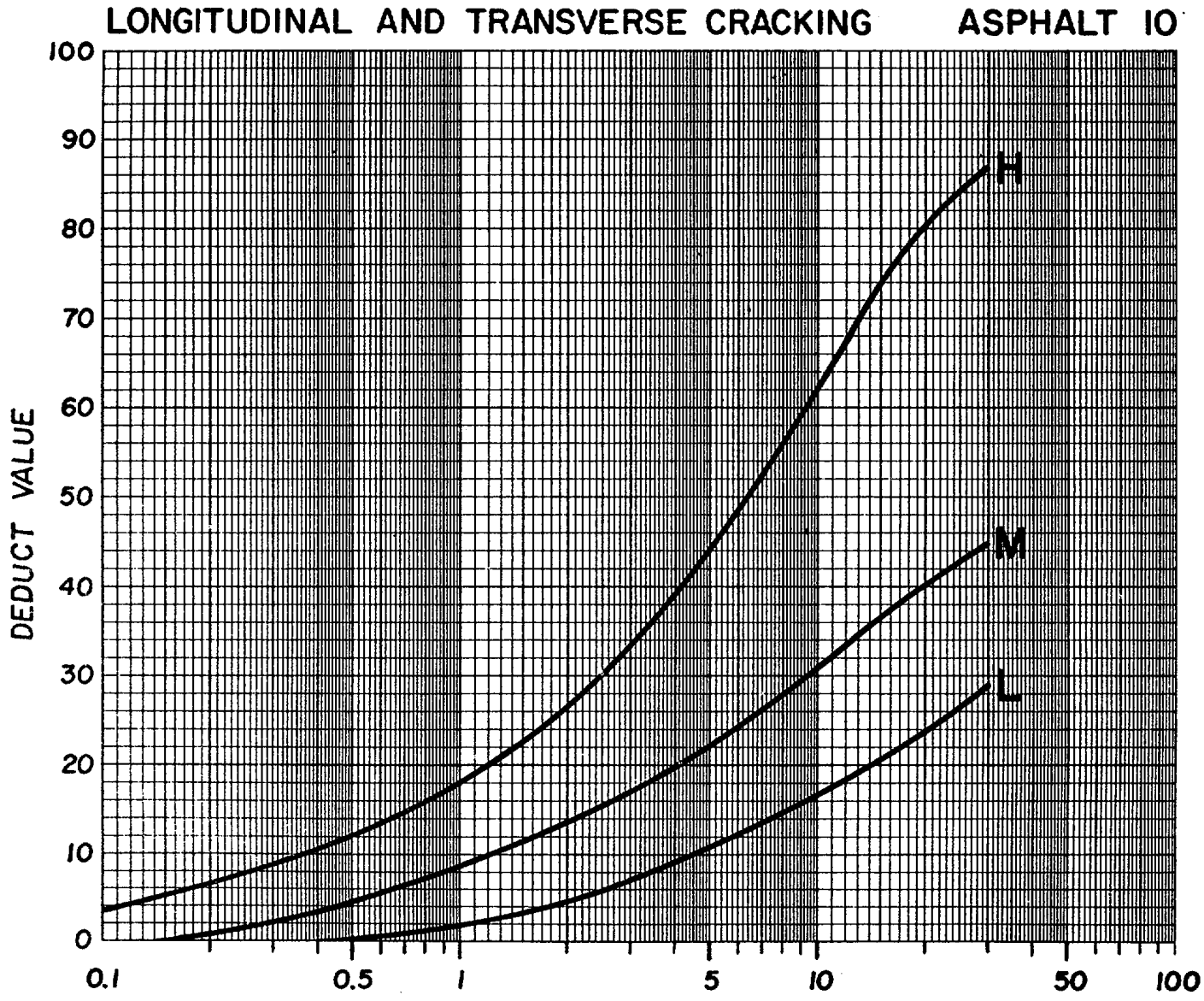


Figure C-10. Deduct value curves for longitudinal and transverse cracking.

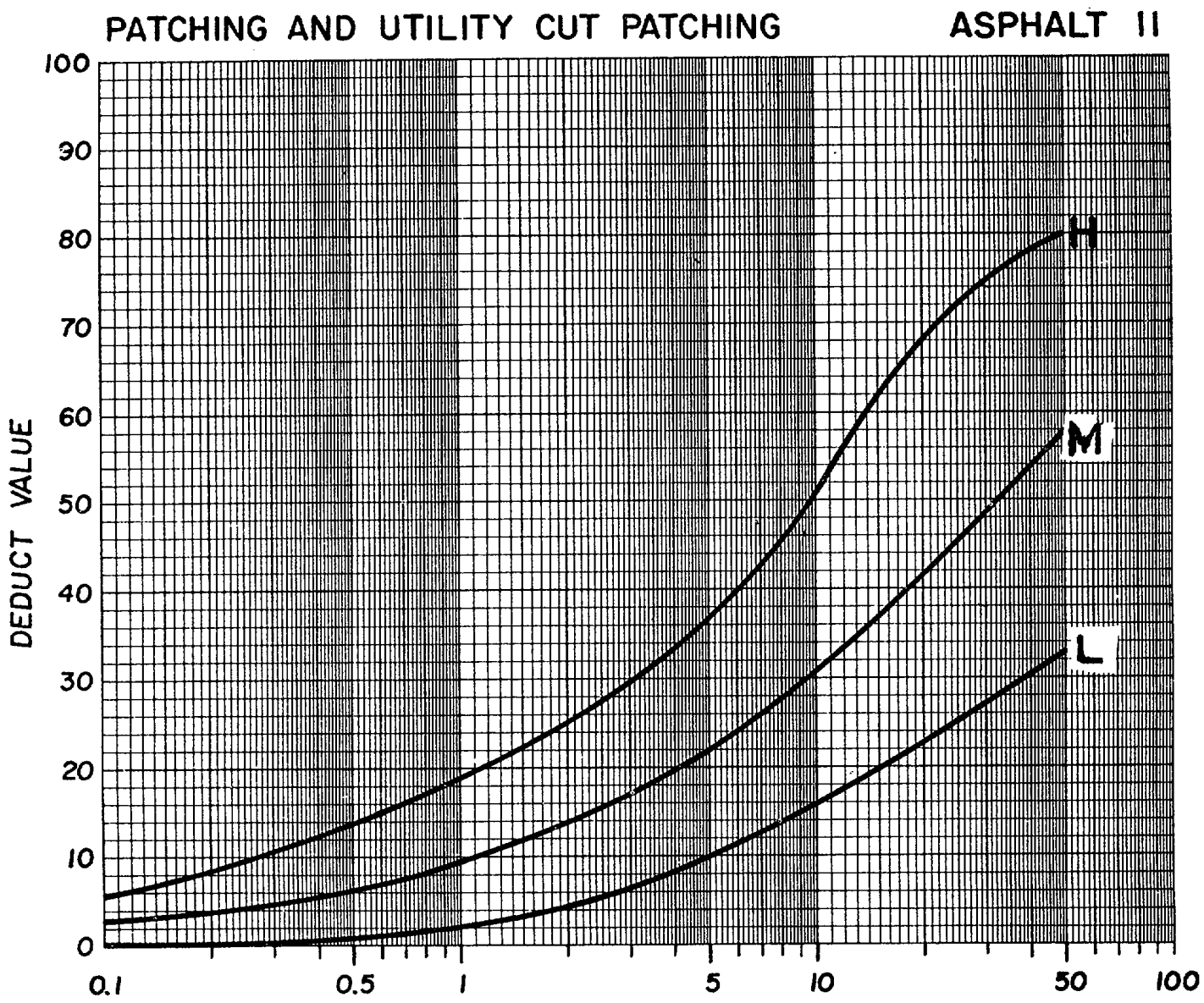


Figure C-11. Deduct value curves for patching and utility cut patching.

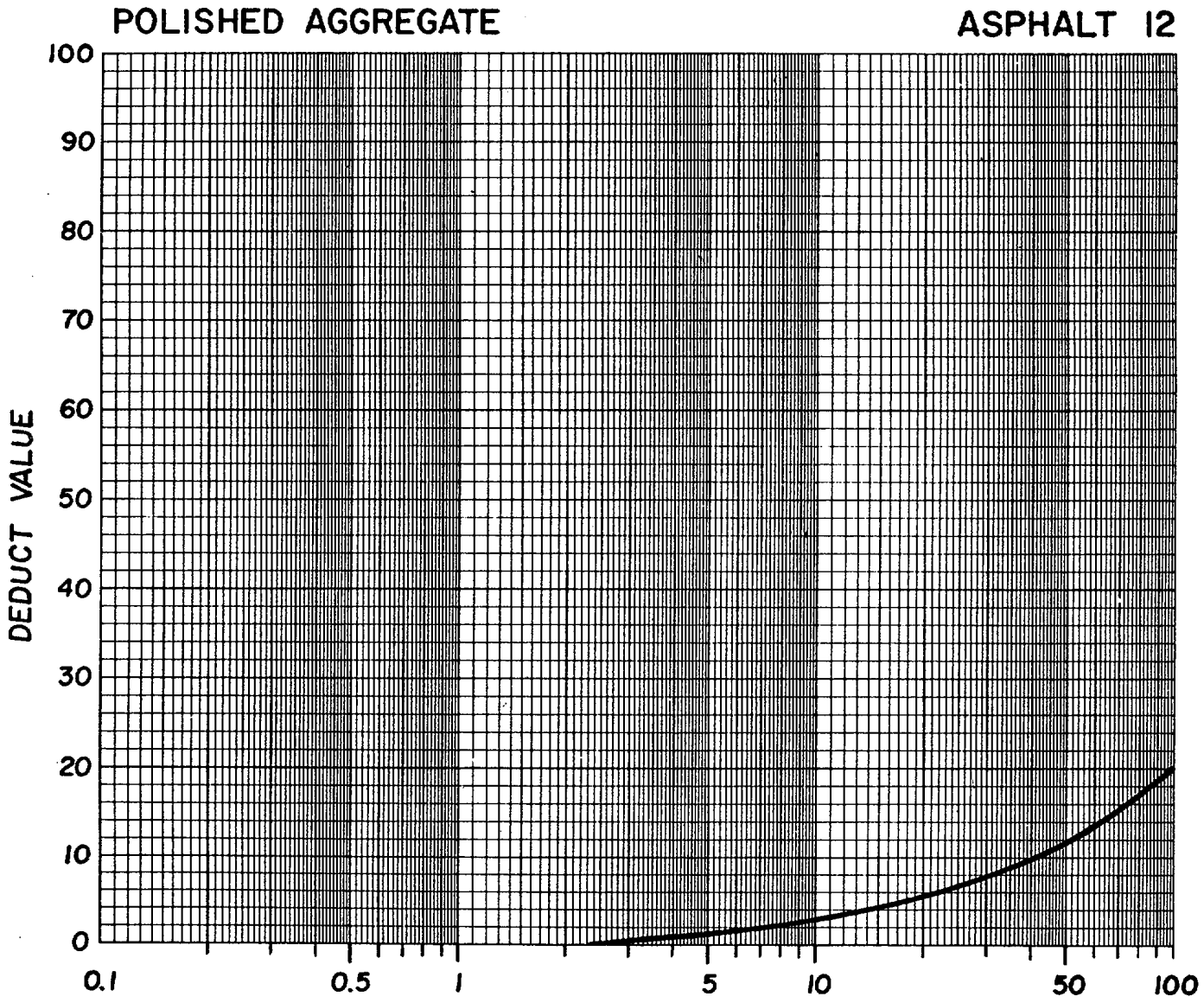


Figure C-12. Deduct value curves for polished aggregate.

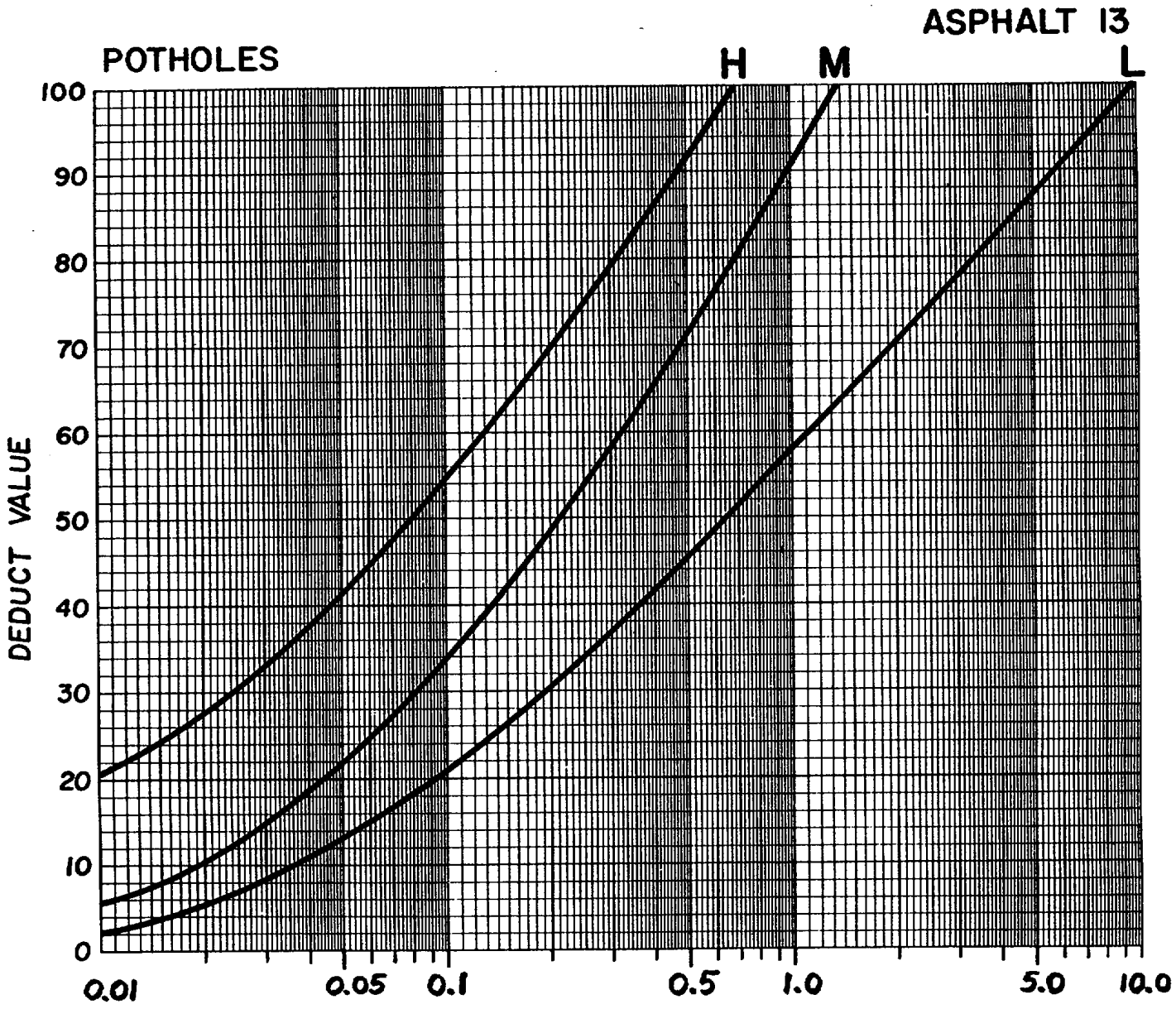


Figure C-13. Deduct value curves for potholes.

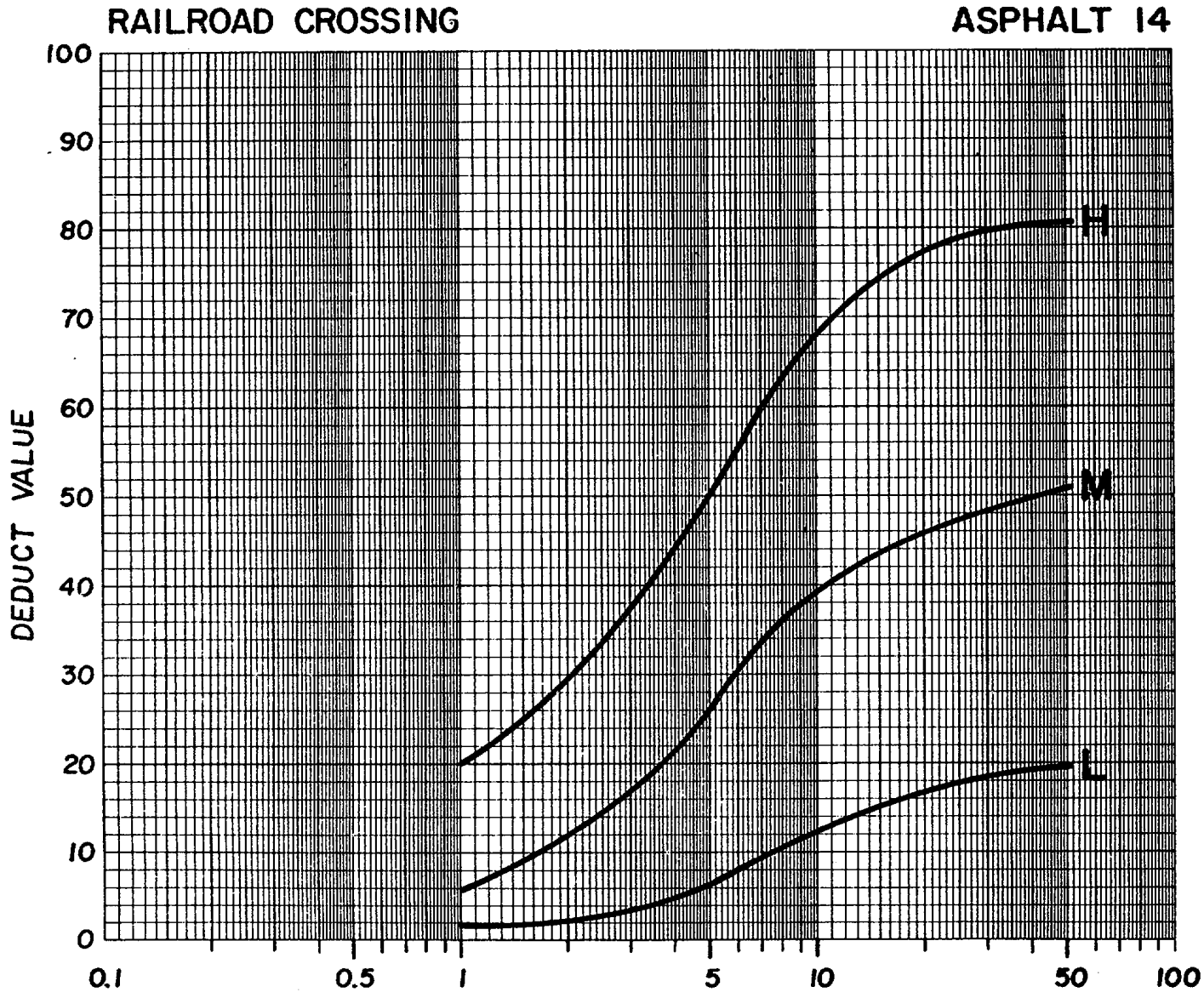


Figure C-14. Deduct value curves for railroad crossing.

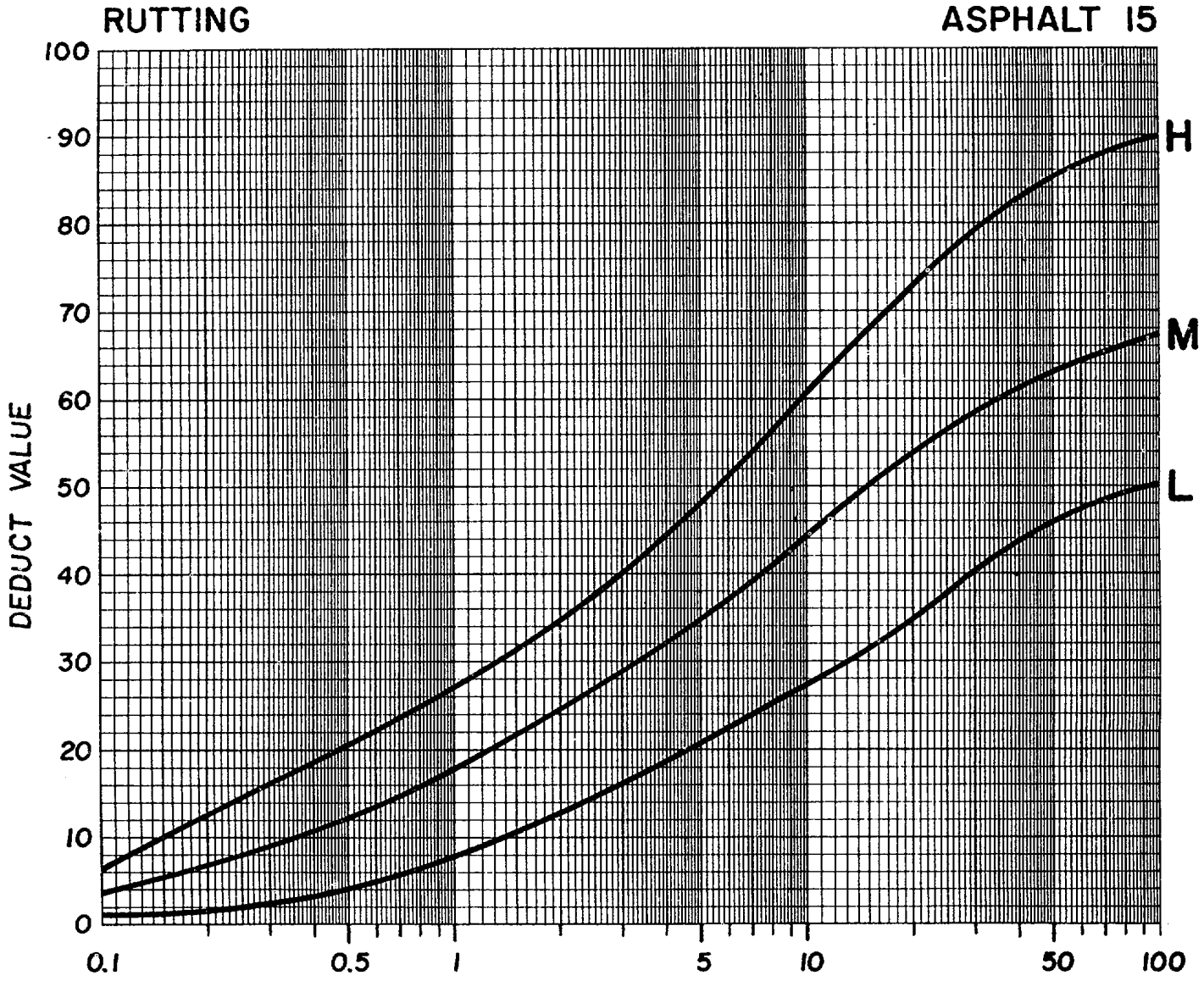


Figure C-15. Deduct value curves for rutting.

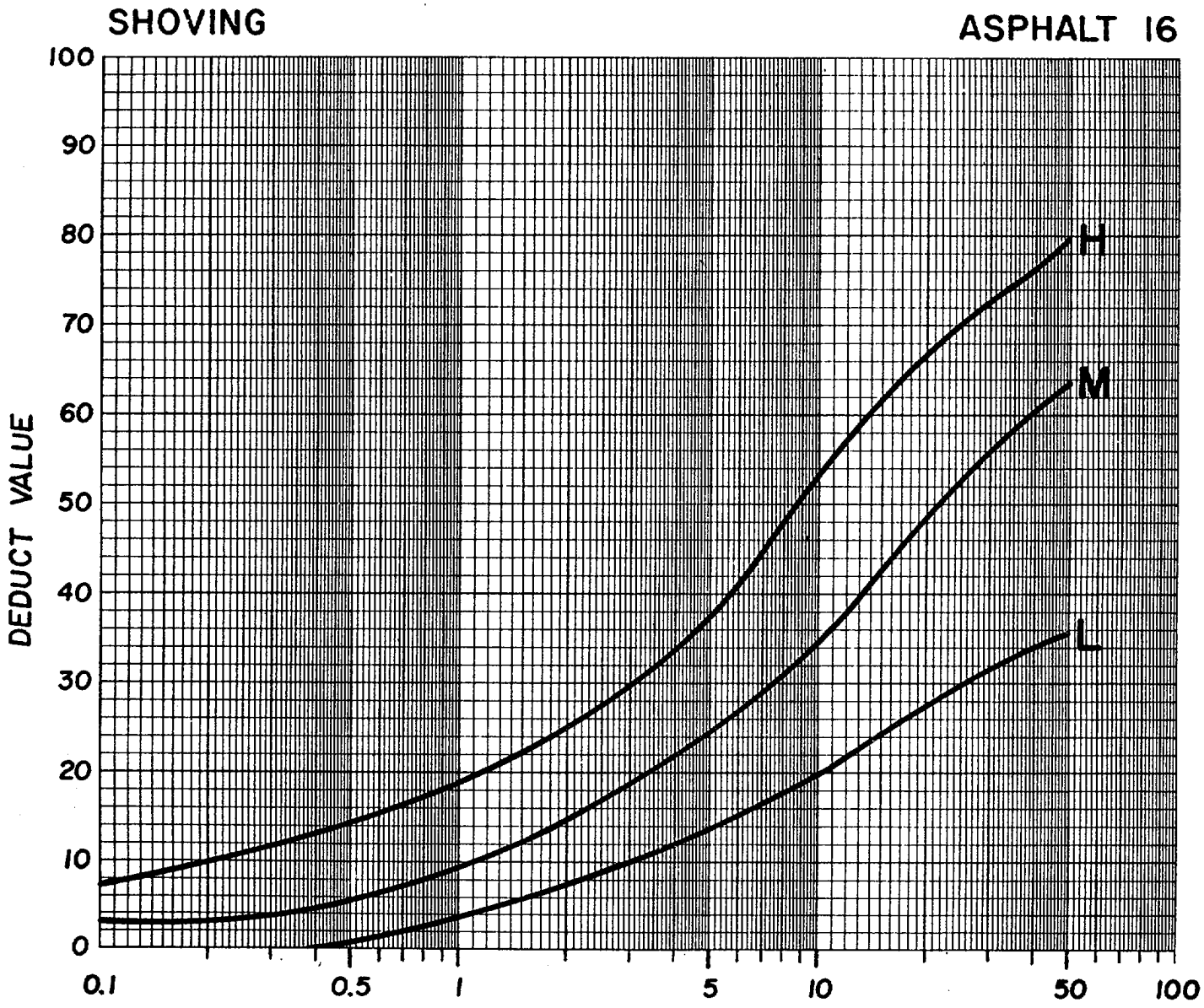


Figure C-16. Deduct value curves for shoving.

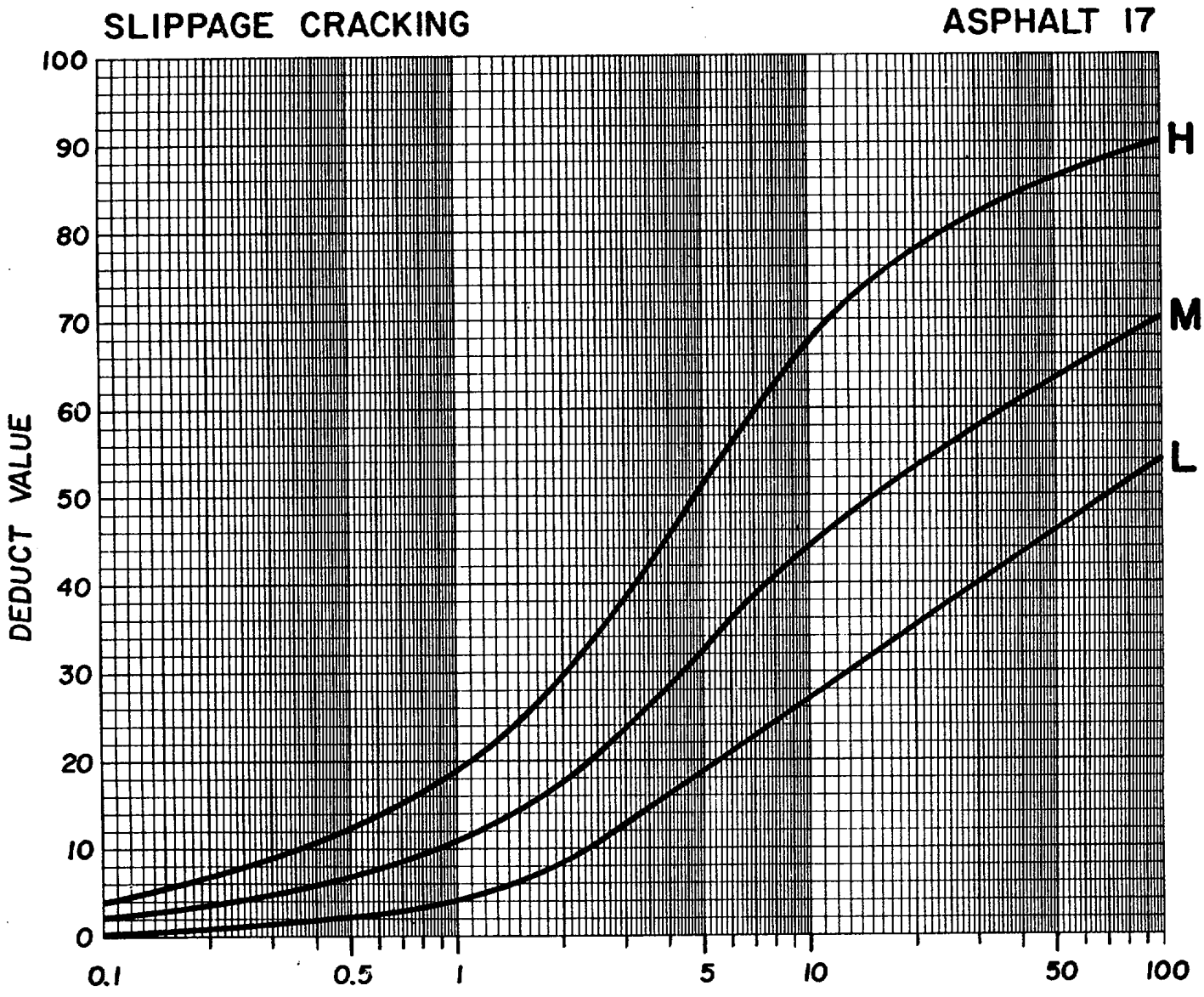


Figure C-17. Deduct value curves for slippage.

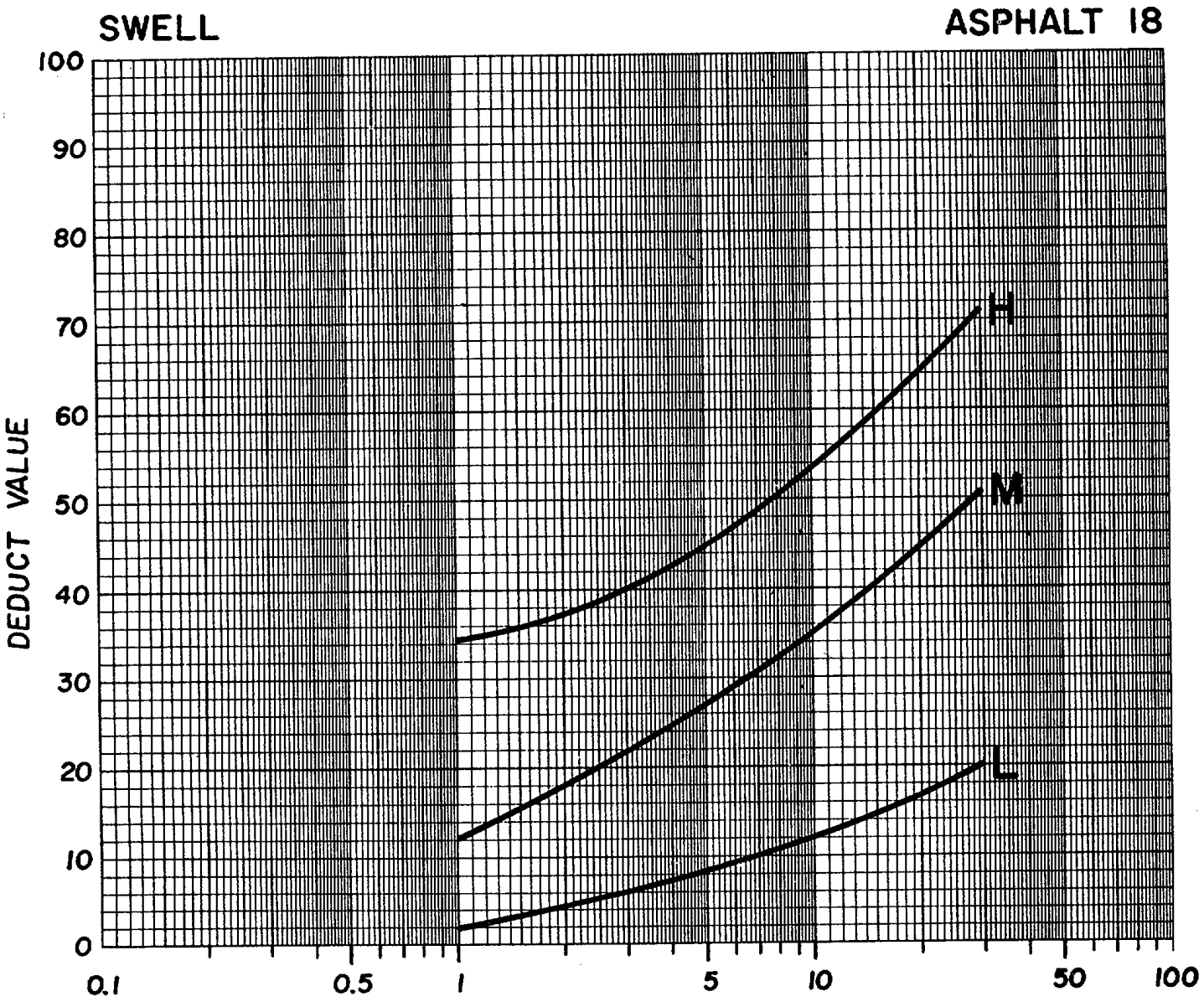


Figure C-18. Deduct value curves for swell.

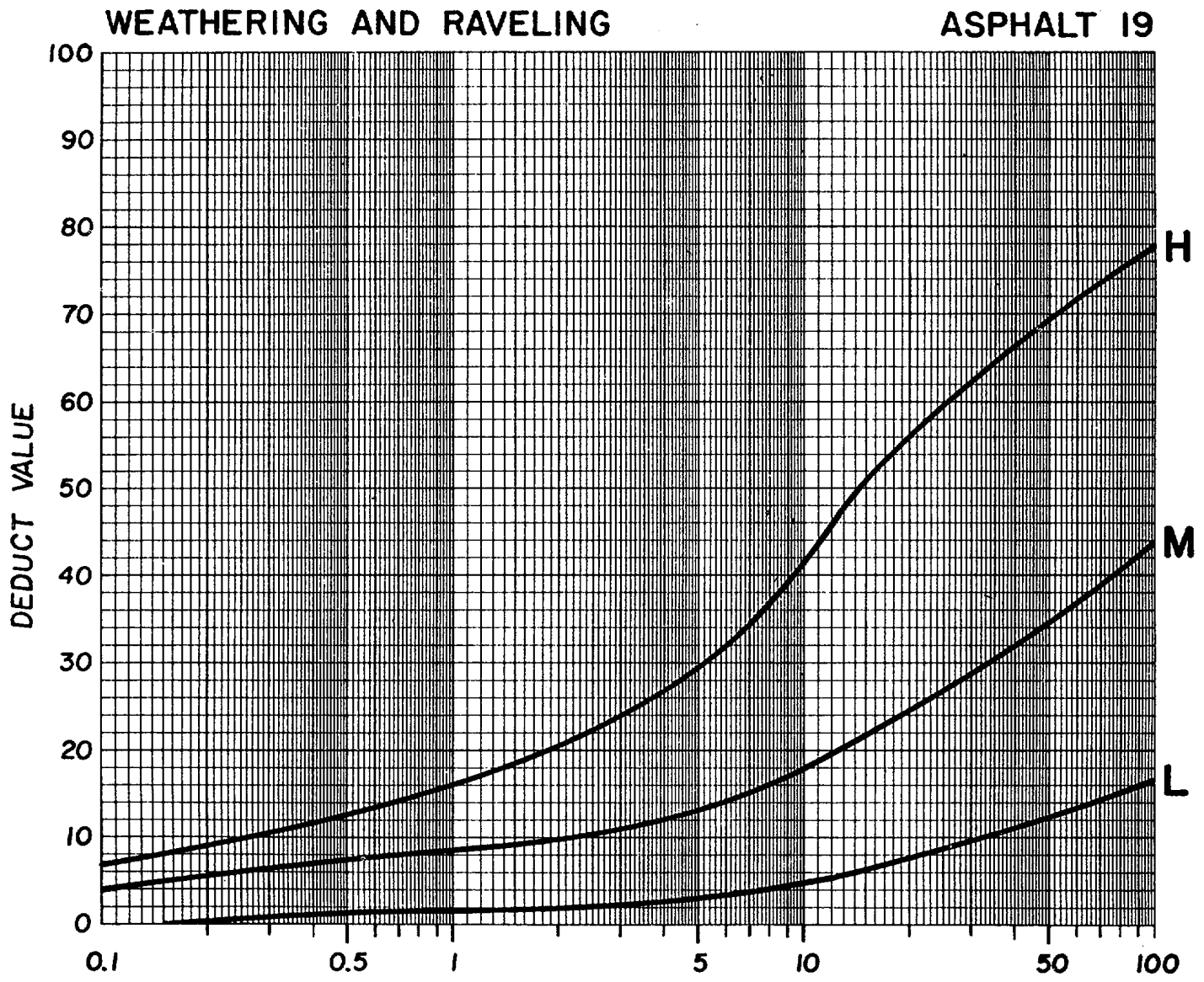


Figure C-19. Deduct value curves for weathering and raveling.

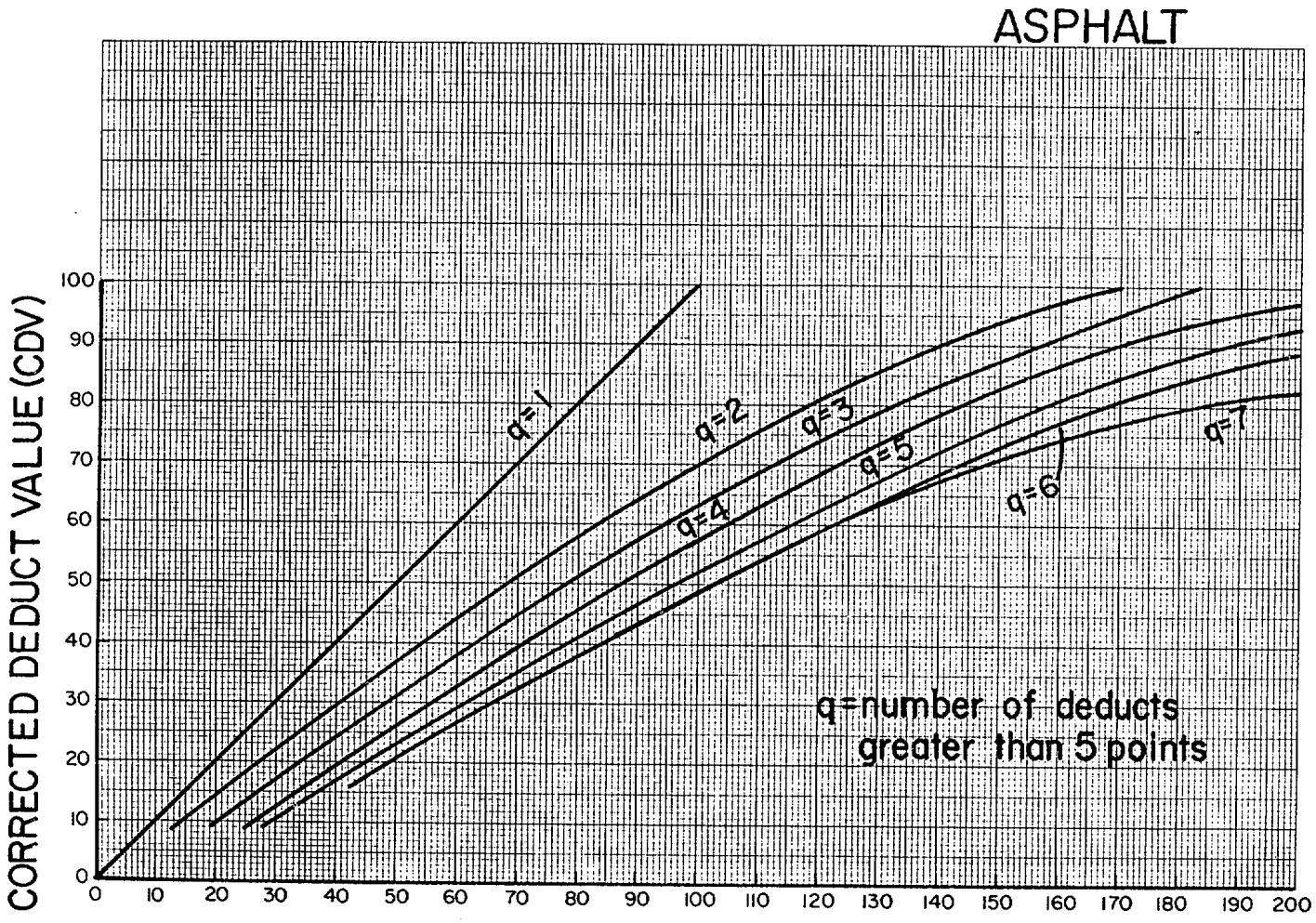


Figure C-20. Corrected deduct value curves for asphalt-surfaced pavements.

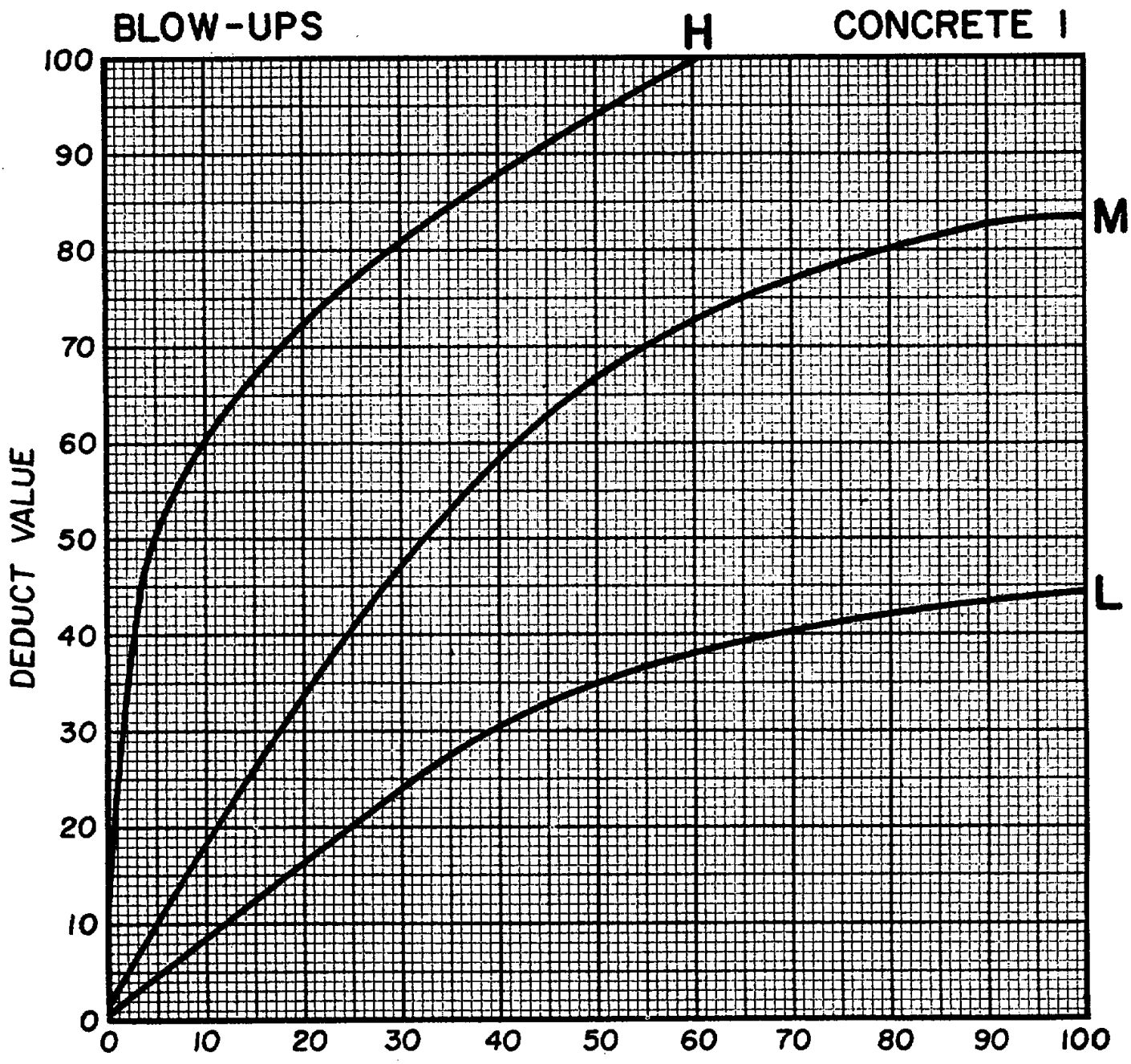


Figure C-21. Deduct value curves for blow-ups.

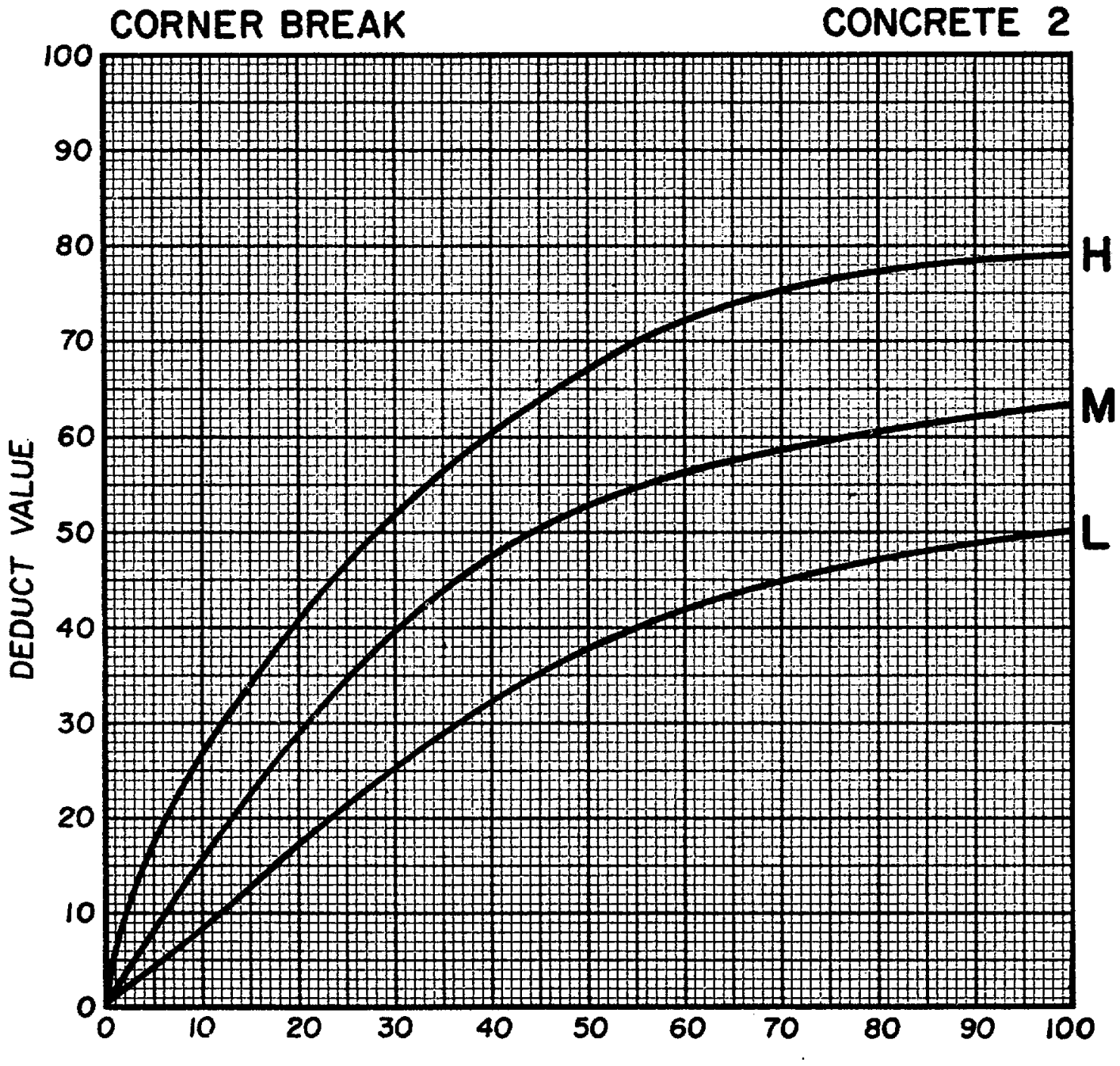


Figure C-22. Deduct value curves for corner break.

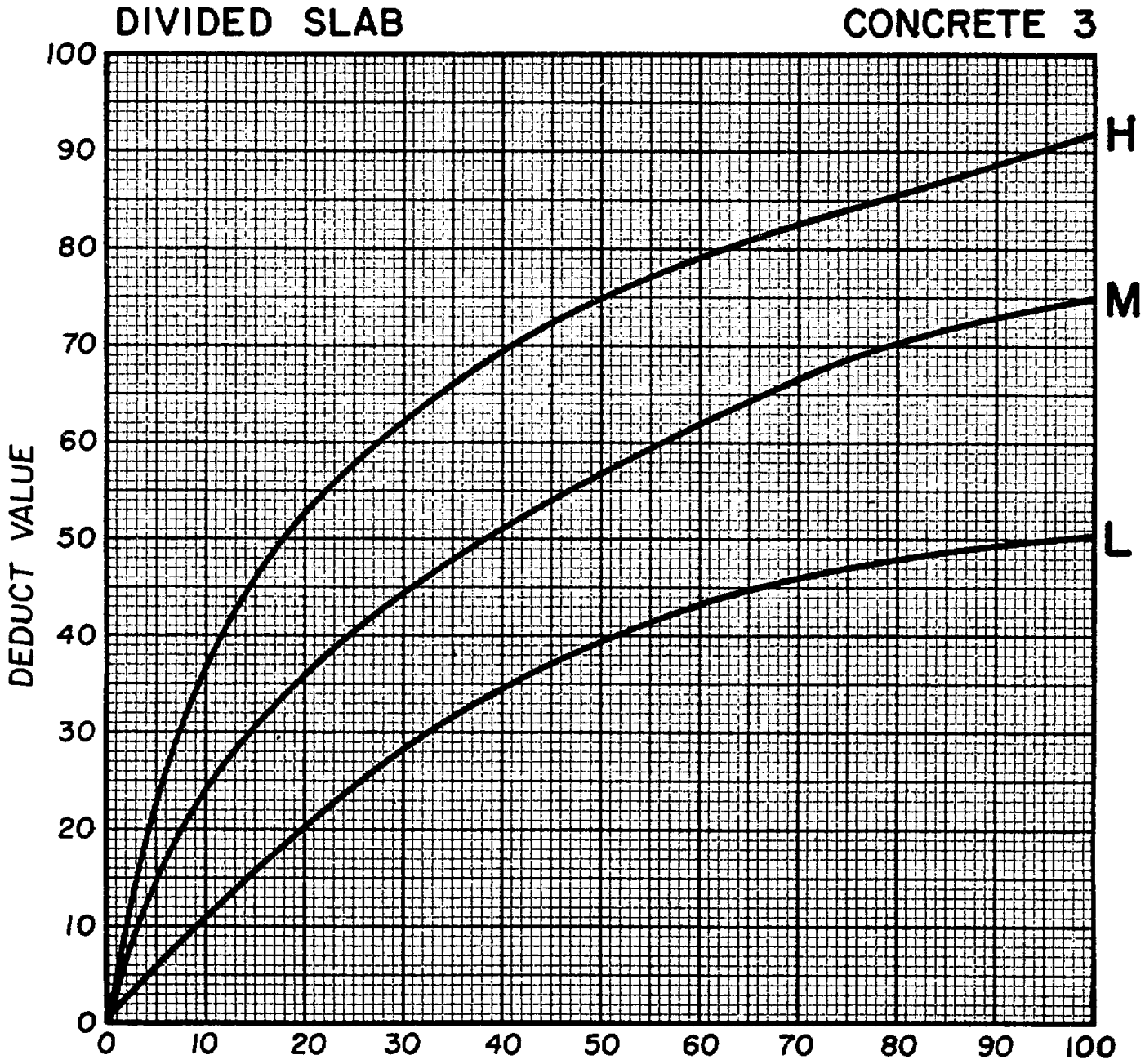


Figure C-23. Deduct value curves for divided slab.

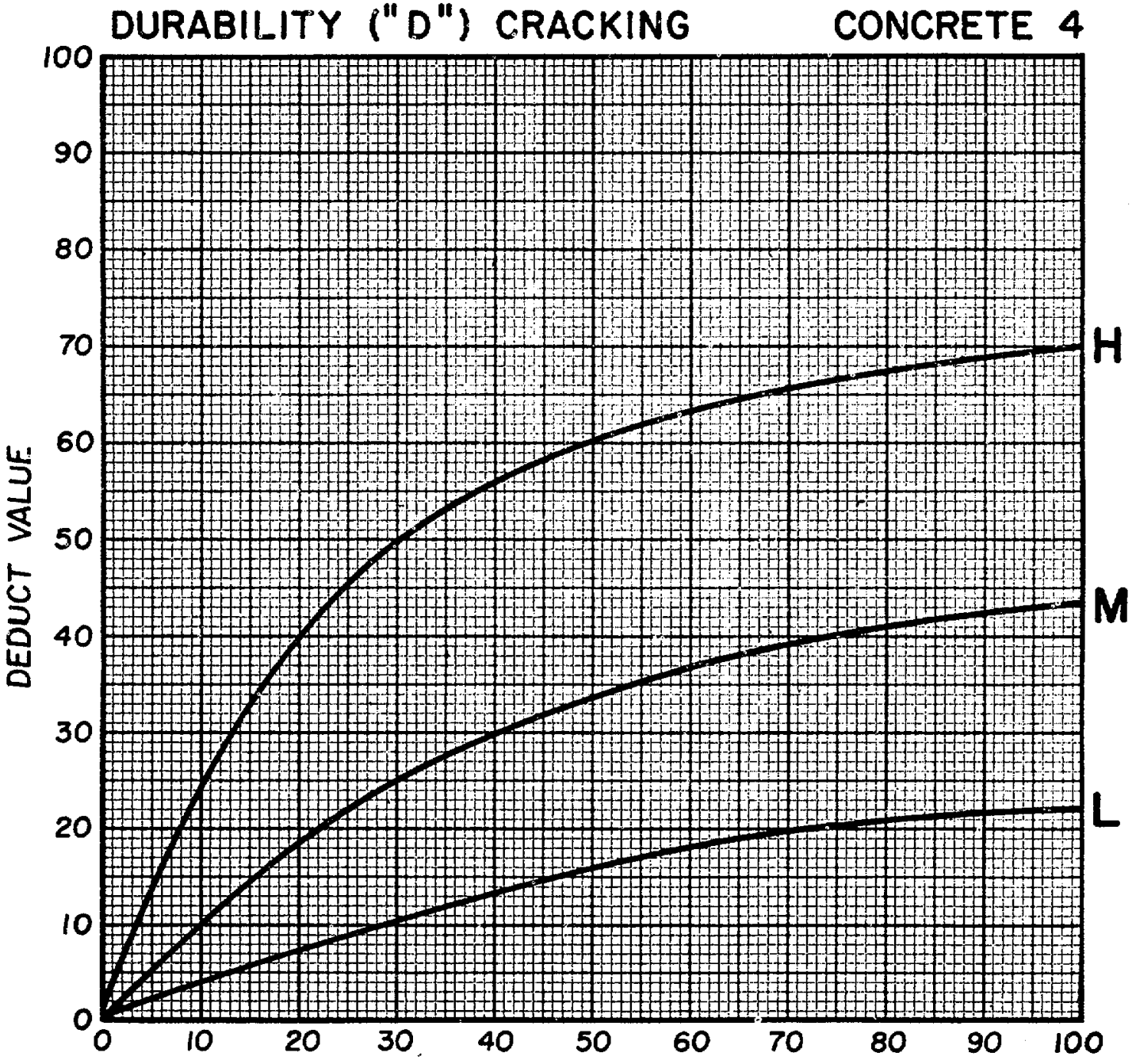


Figure C-24. Deduct value curves for durability ("D") cracking.

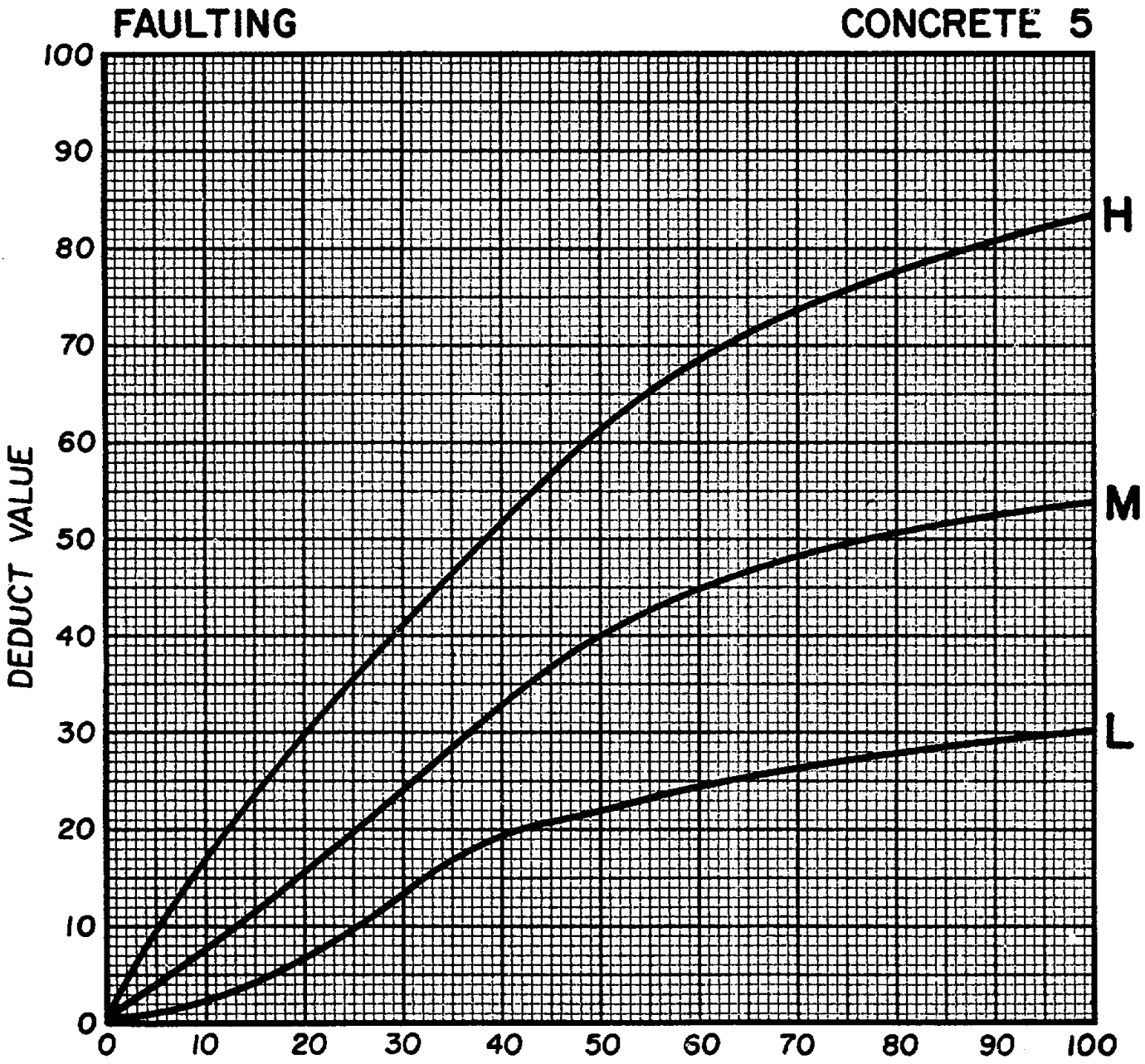


Figure C-25. Deduct value curves for faulting.

JOINT SEAL DAMAGE CONCRETE 6

The deduct values for the three levels of severity are:

LOW	2 points
MEDIUM	4 points
HIGH	8 points

Joint seal damage is not rated by density. The severity of the distress is determined by the sealant's overall condition for a particular sample unit.

Figure C-26. Deduct values for joint seal damage.

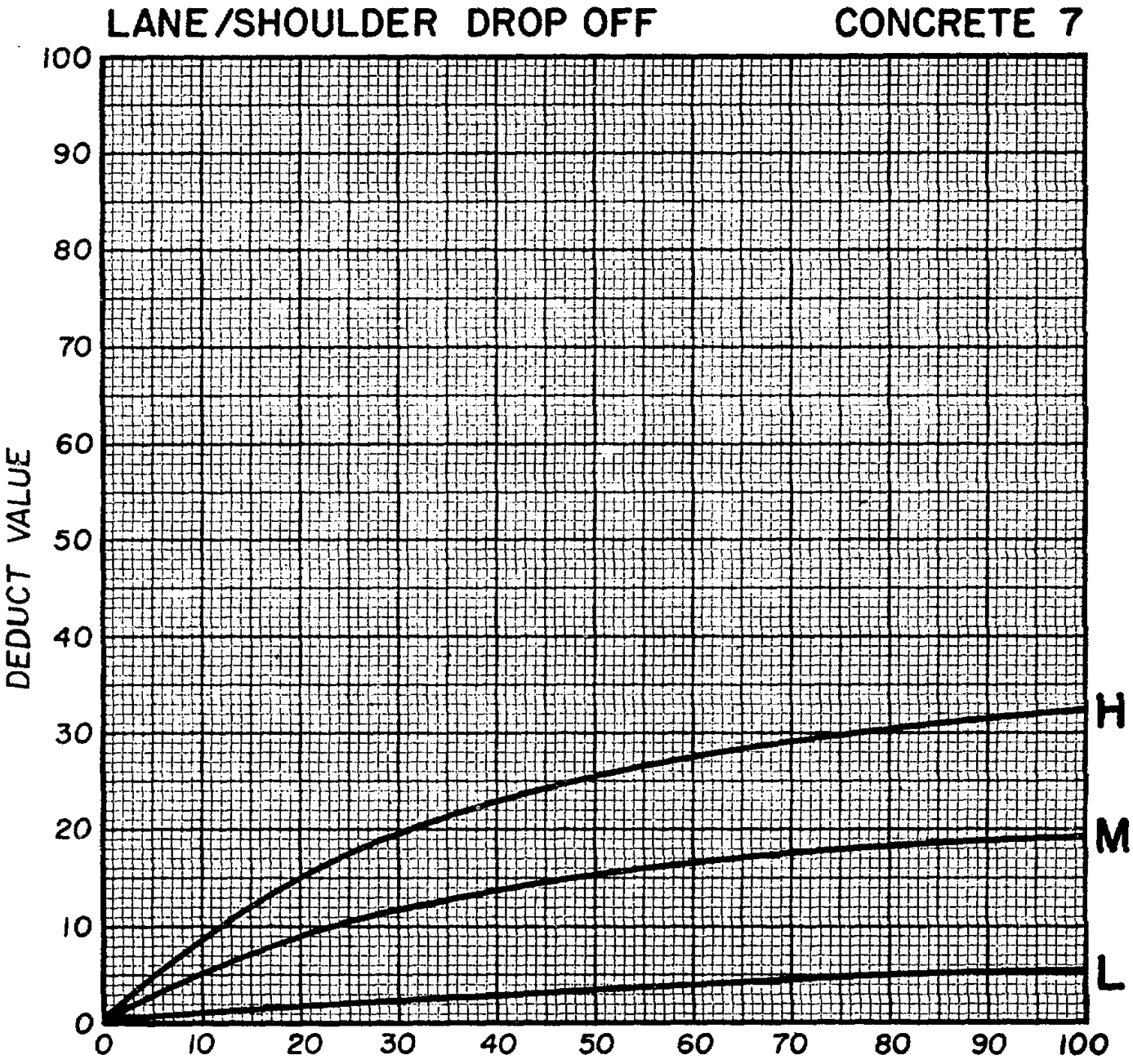


Figure C-27. Deduct value curves for lane/shoulder drop off

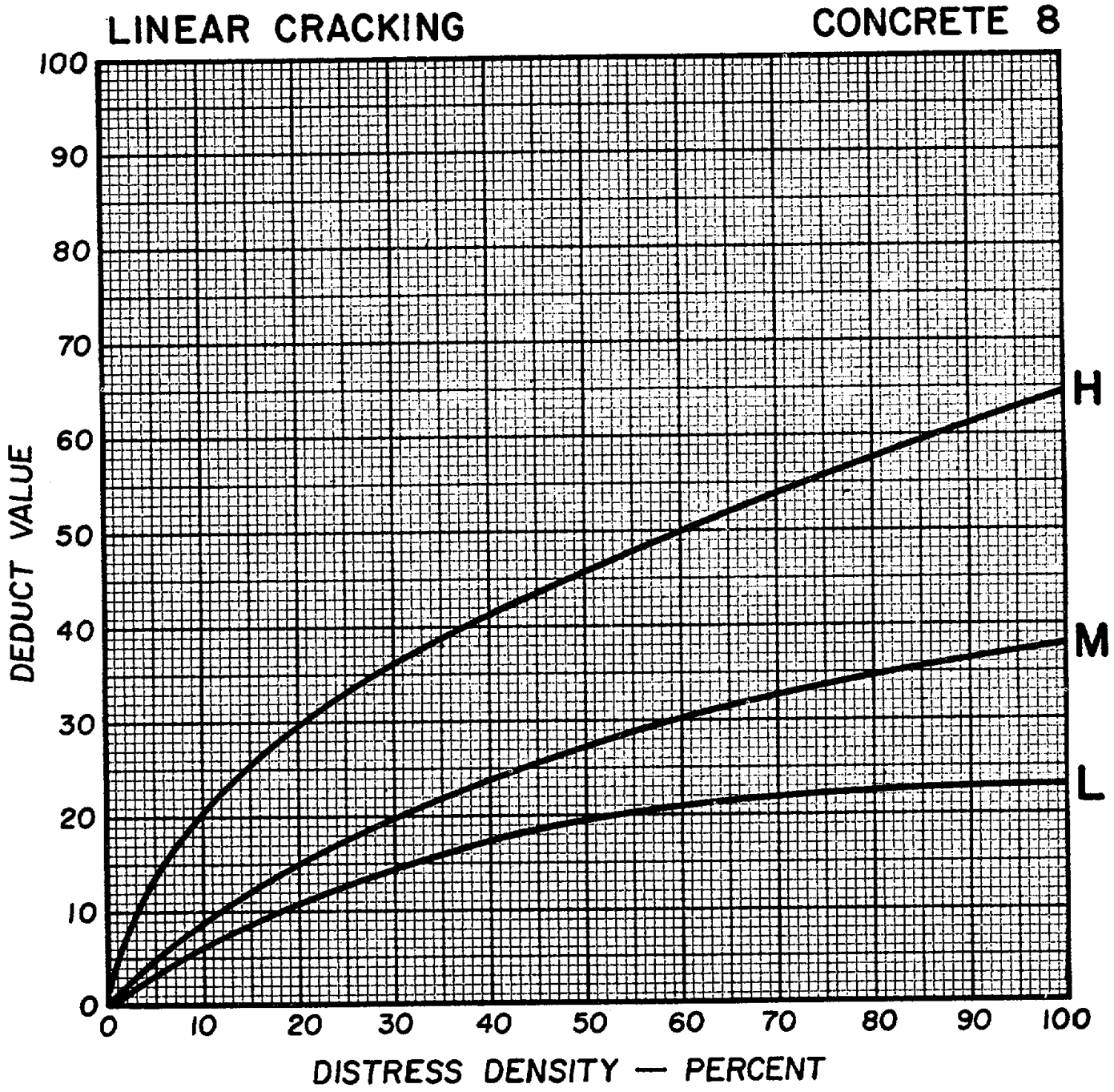


Figure C-28. Deduct value curves for linear cracking.

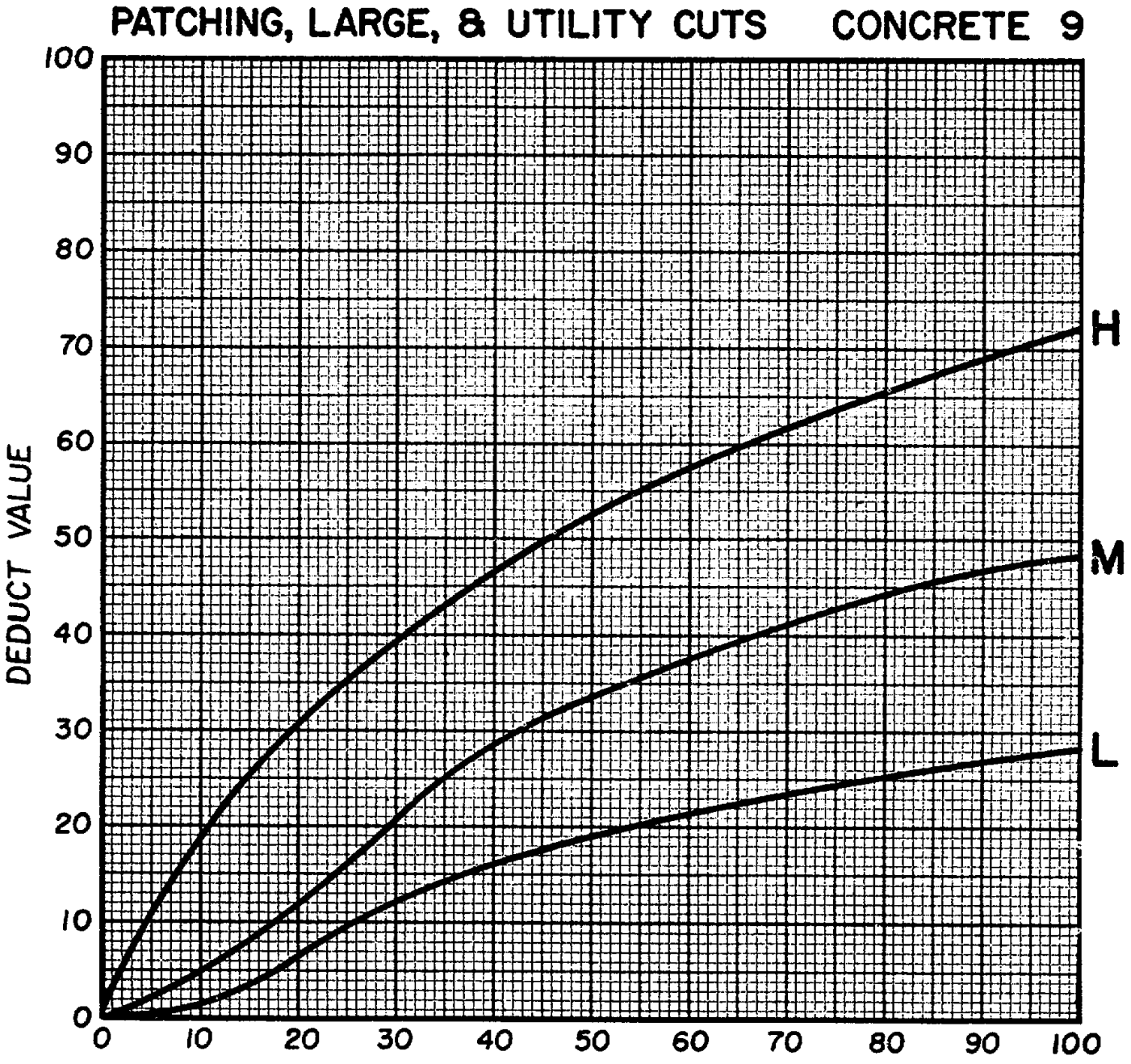


Figure C-29. Deduct value curves for patching large and utility cuts.

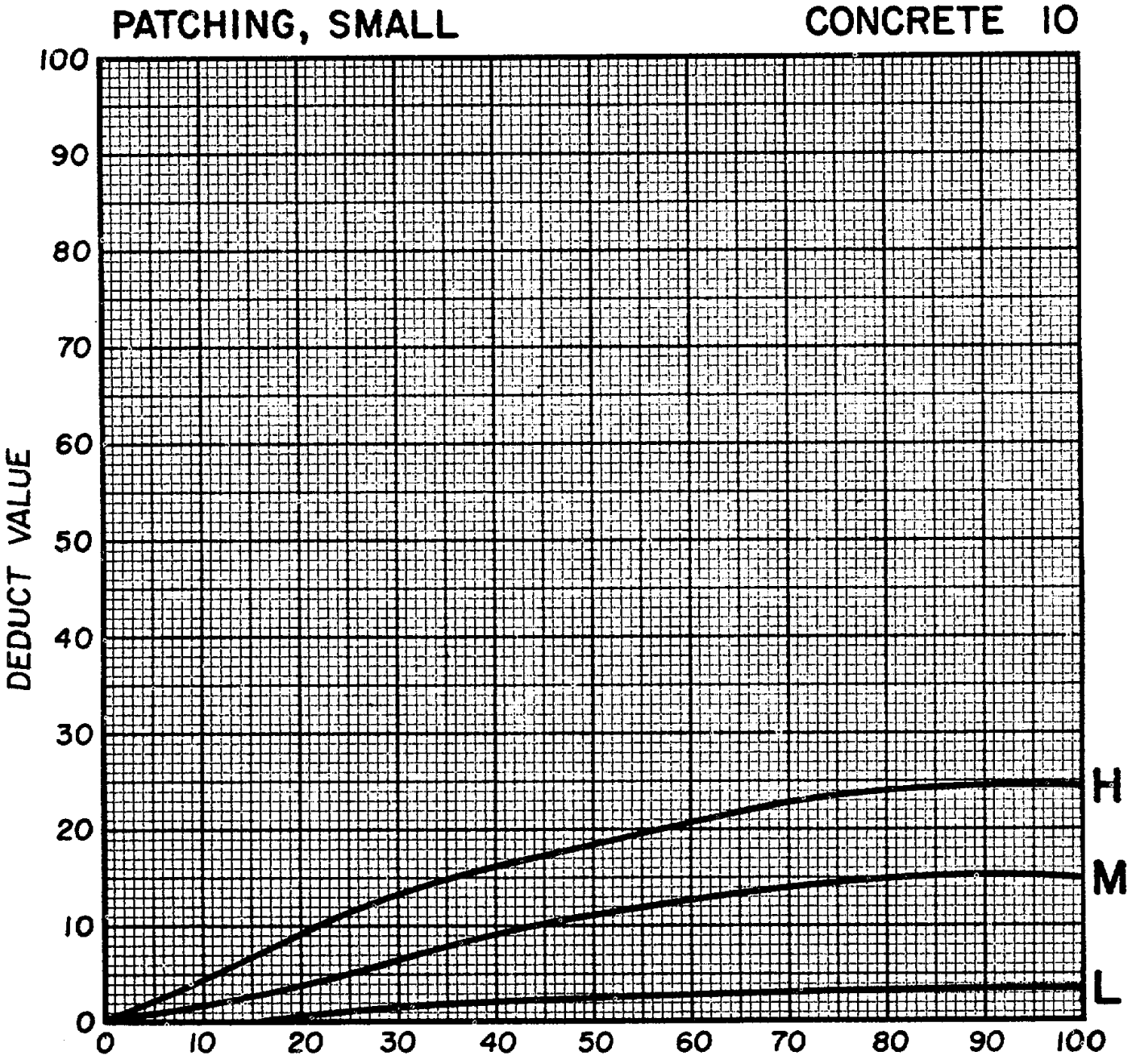


Figure C-30. Deduct value curves for patching small.

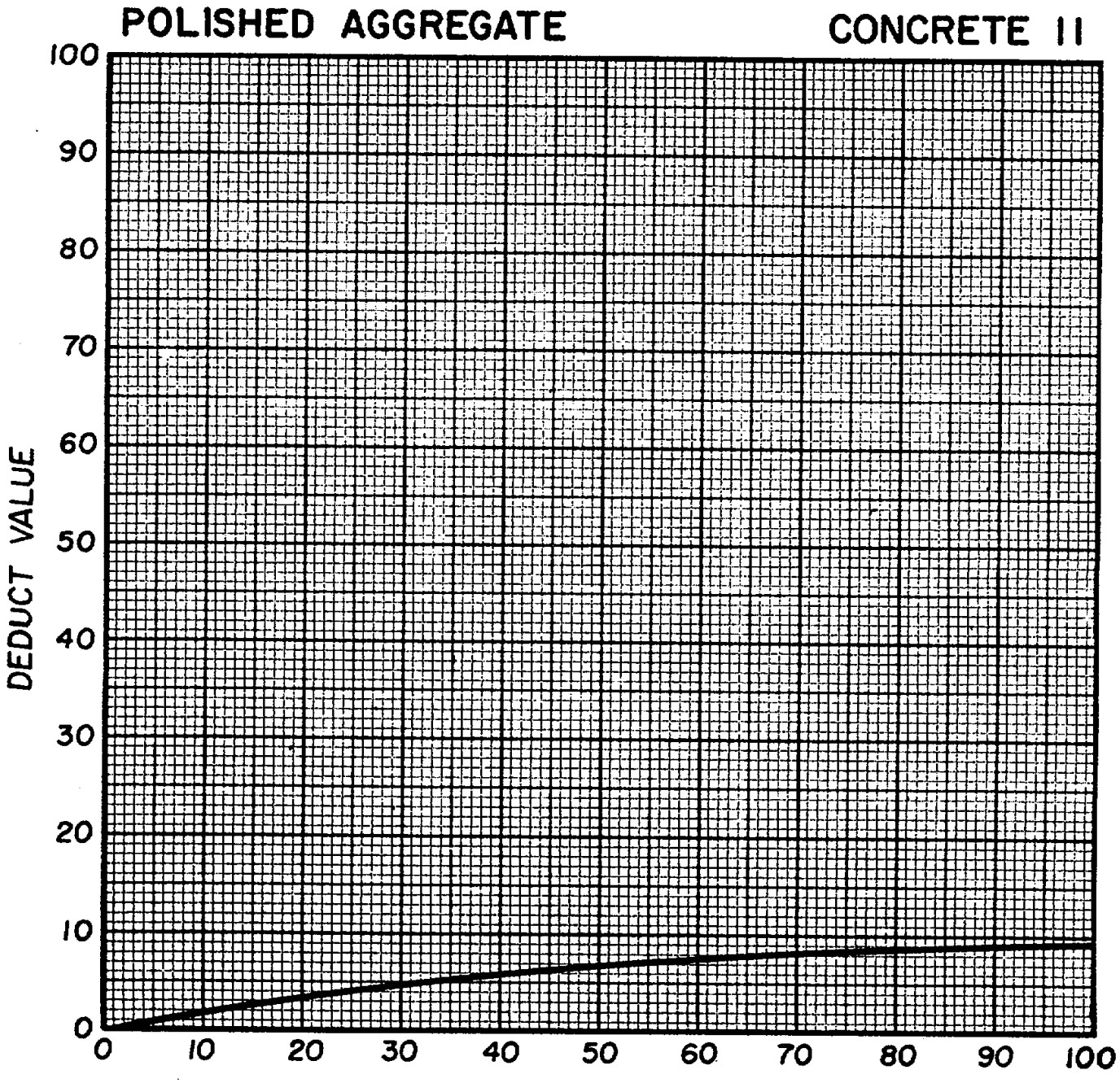


Figure C-31. Deduct value curve for polished aggregate.

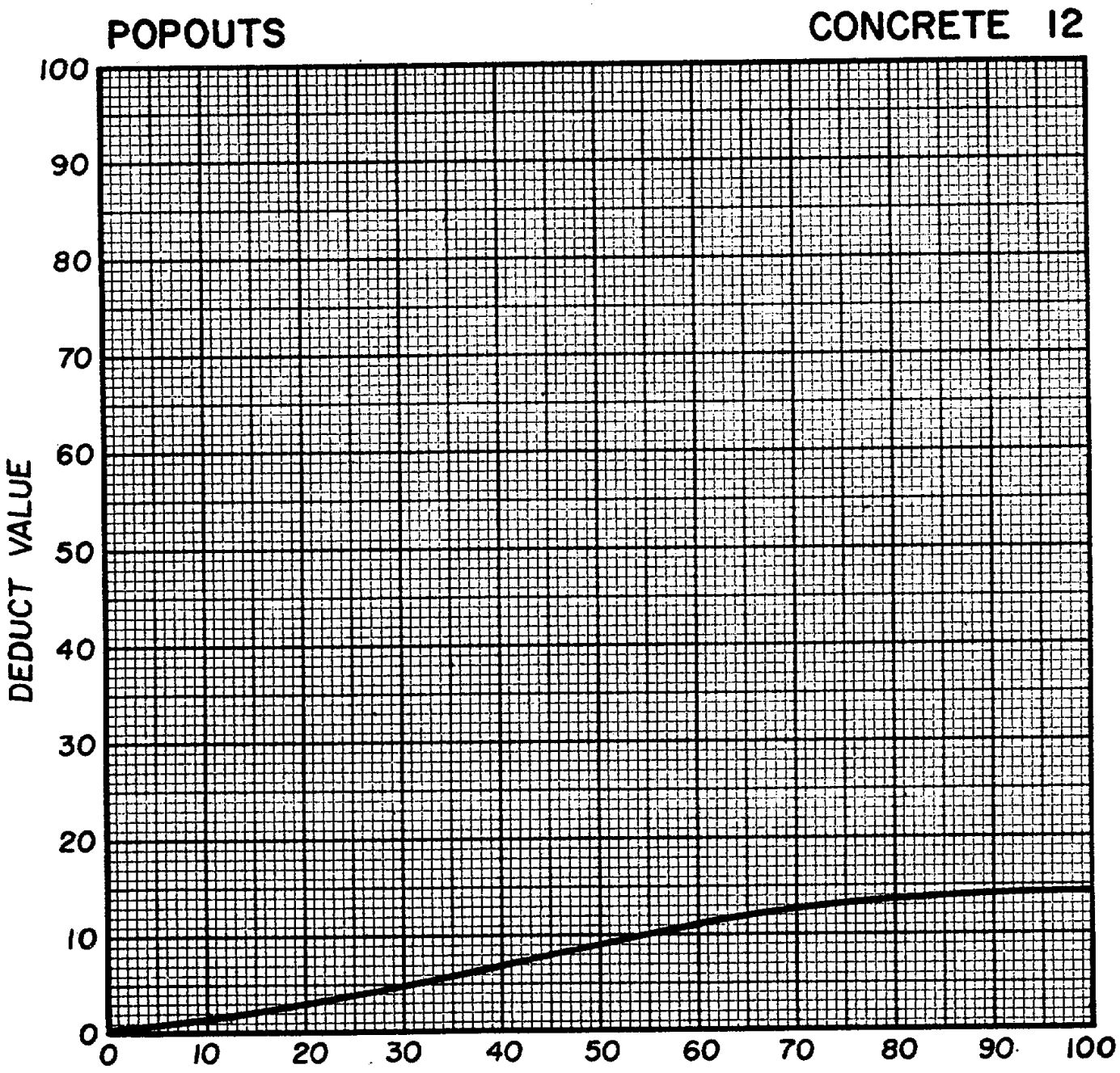


Figure C-32. Deduct value curves for popouts.

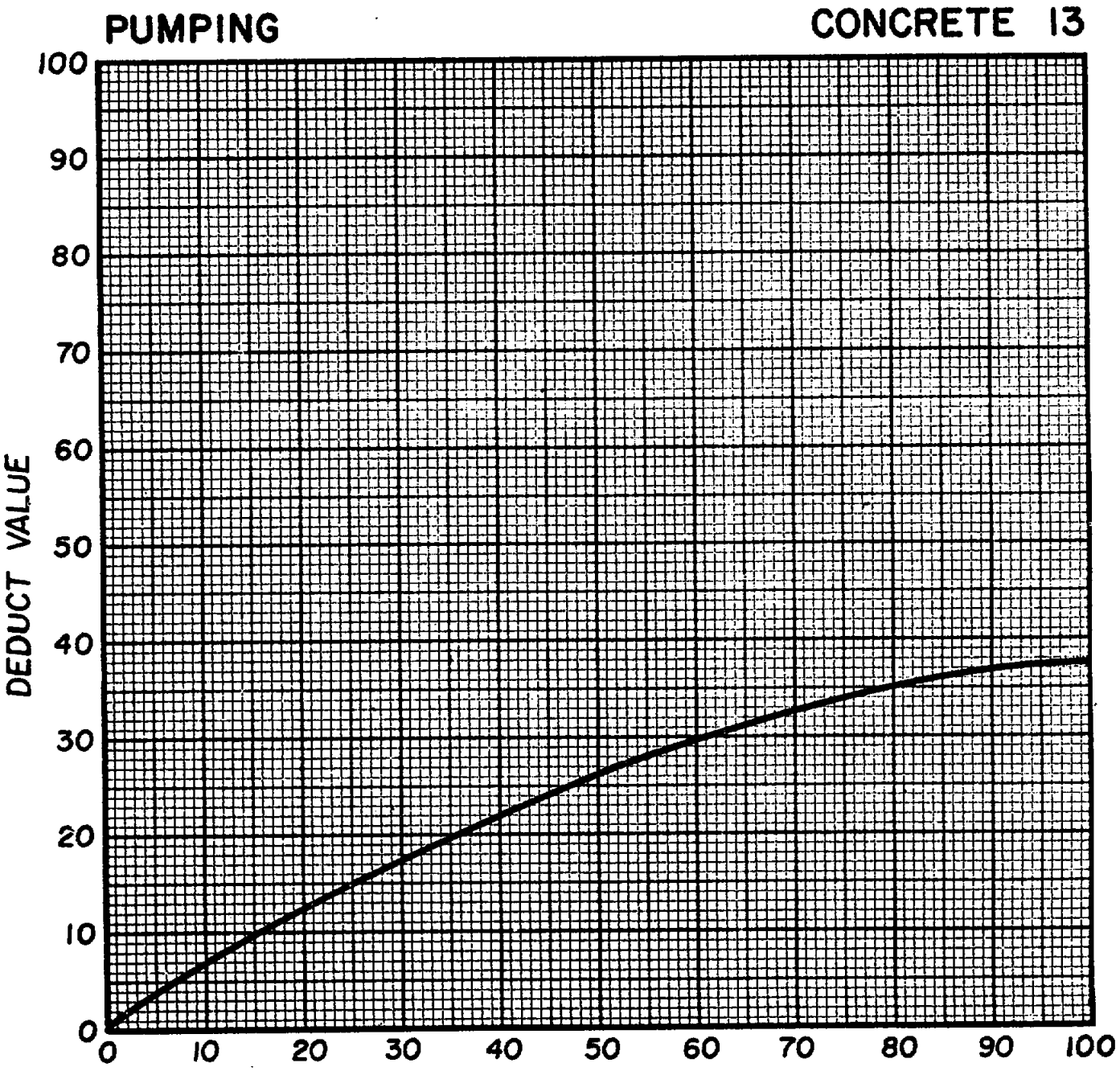


Figure C-33. Deduct value curve for pumping.

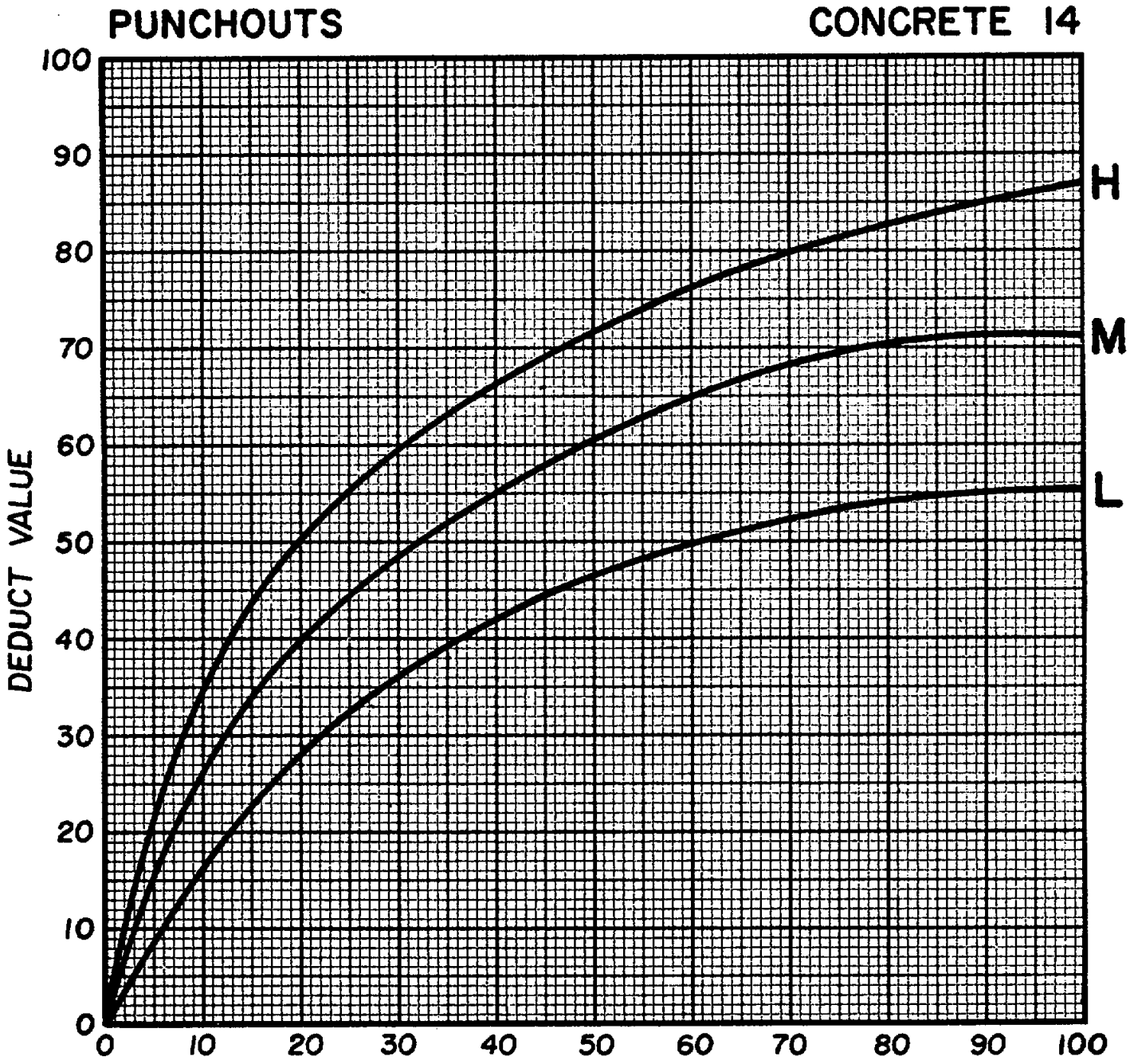


Figure C-34. Deduct value curves for punchouts.

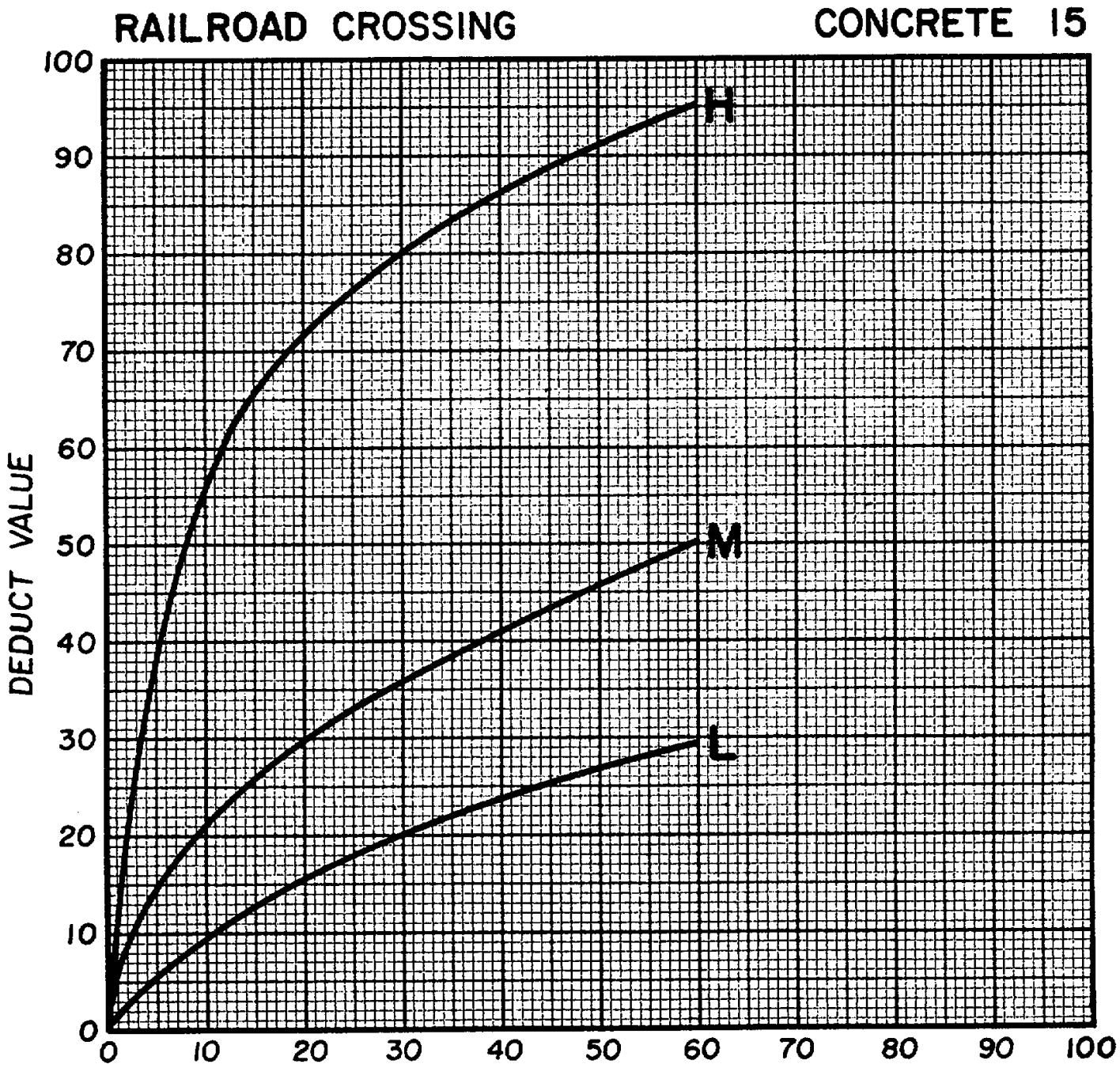


Figure C-35. Deduct value curves for railroad crossing.

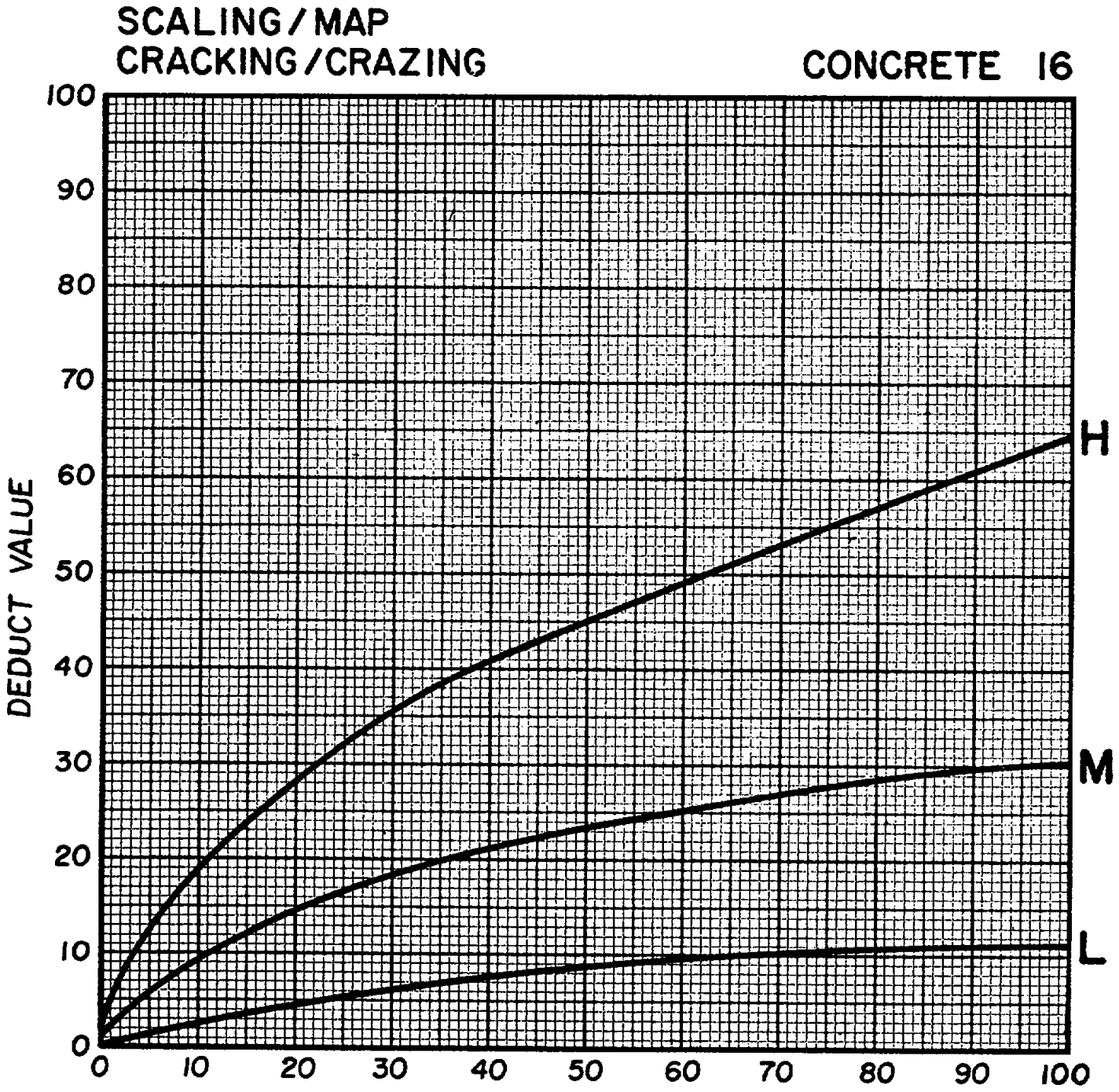


Figure C-36. Deduct value curves for scaling/map cracking/crazing.

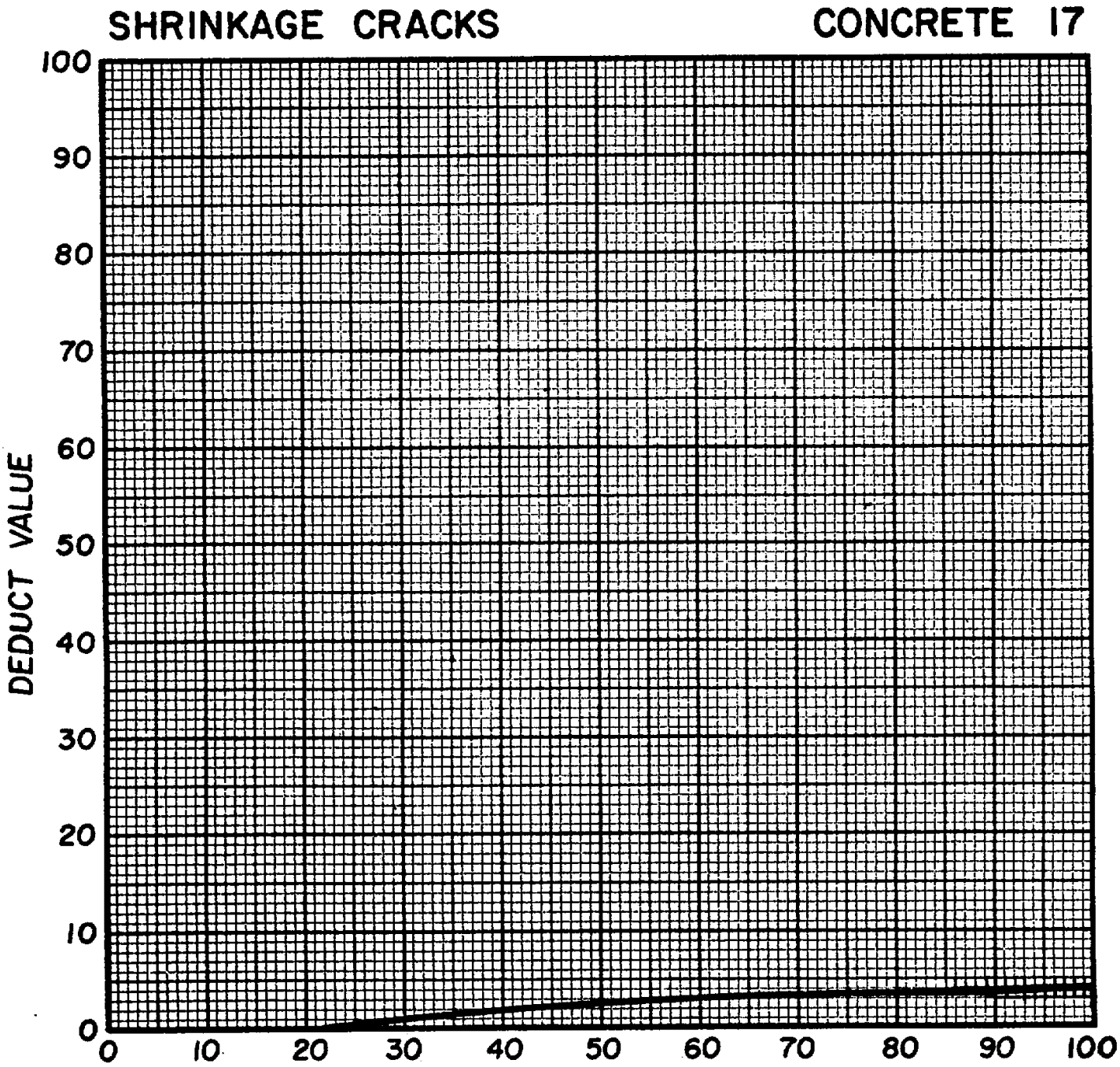


Figure C-37. Deduct value curve for shrinkage cracks.

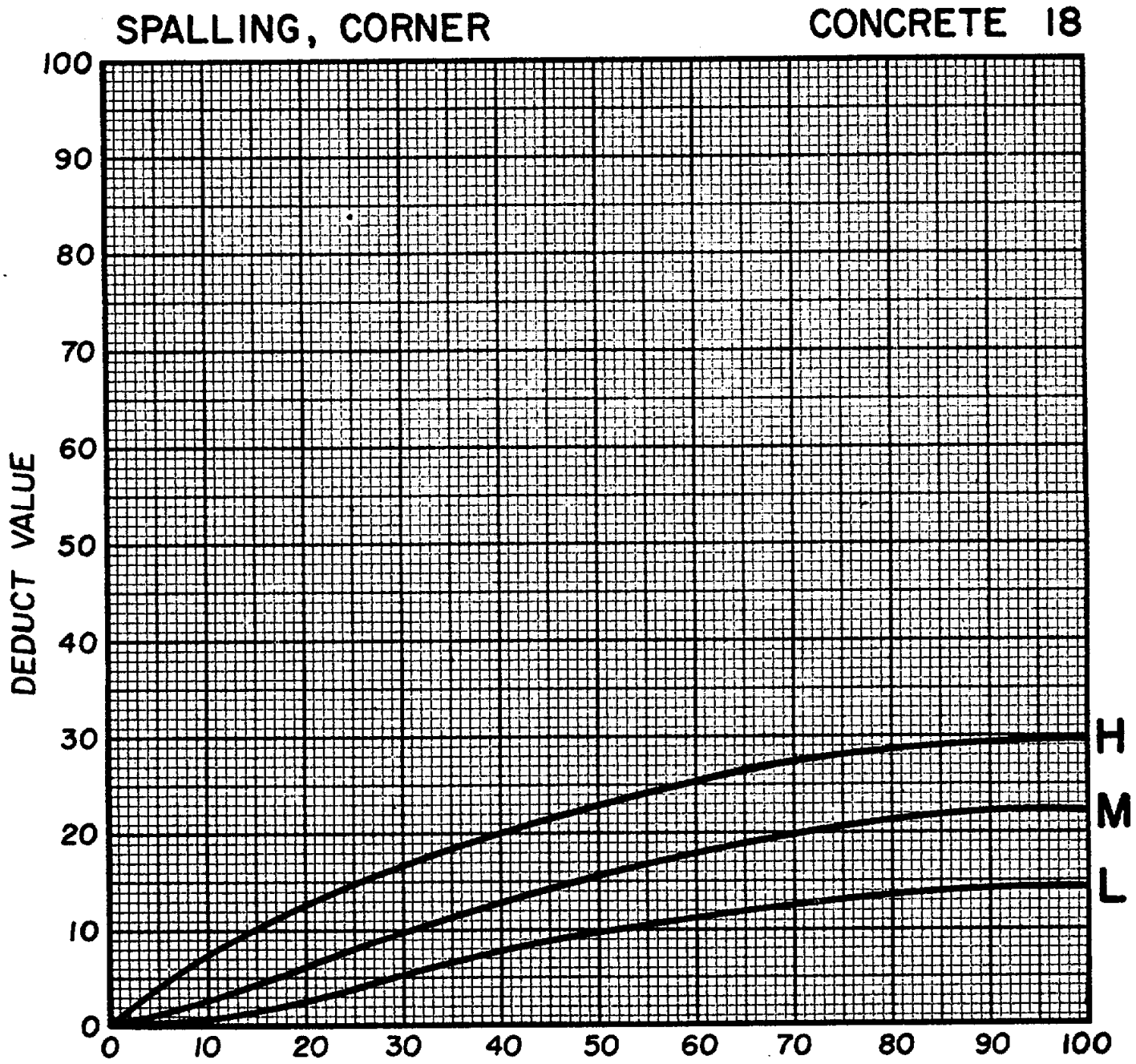


Figure C-38. Deduct value curves for spalling, corner.

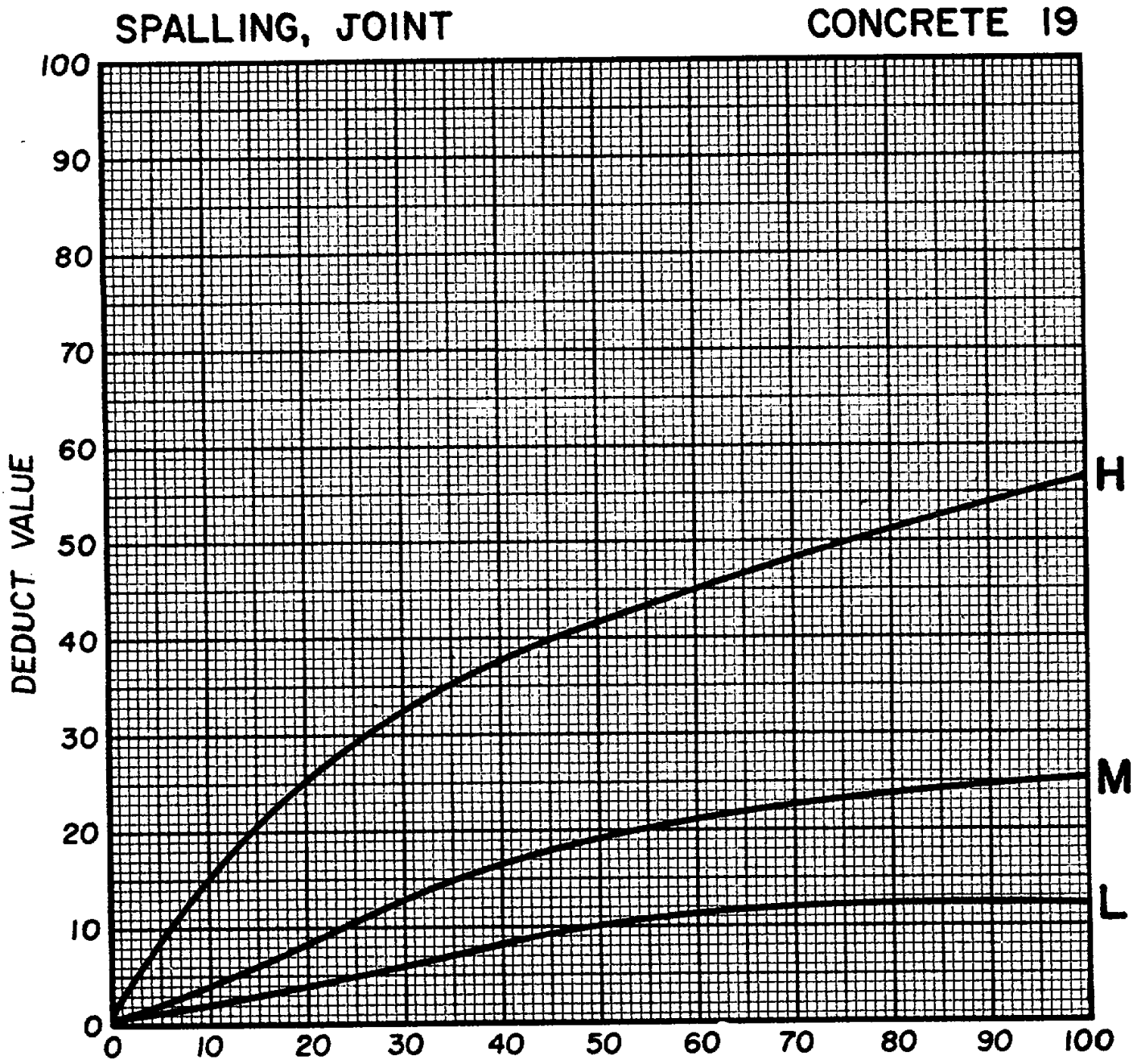


Figure C-39. Deduct value curves for spalling, joint.

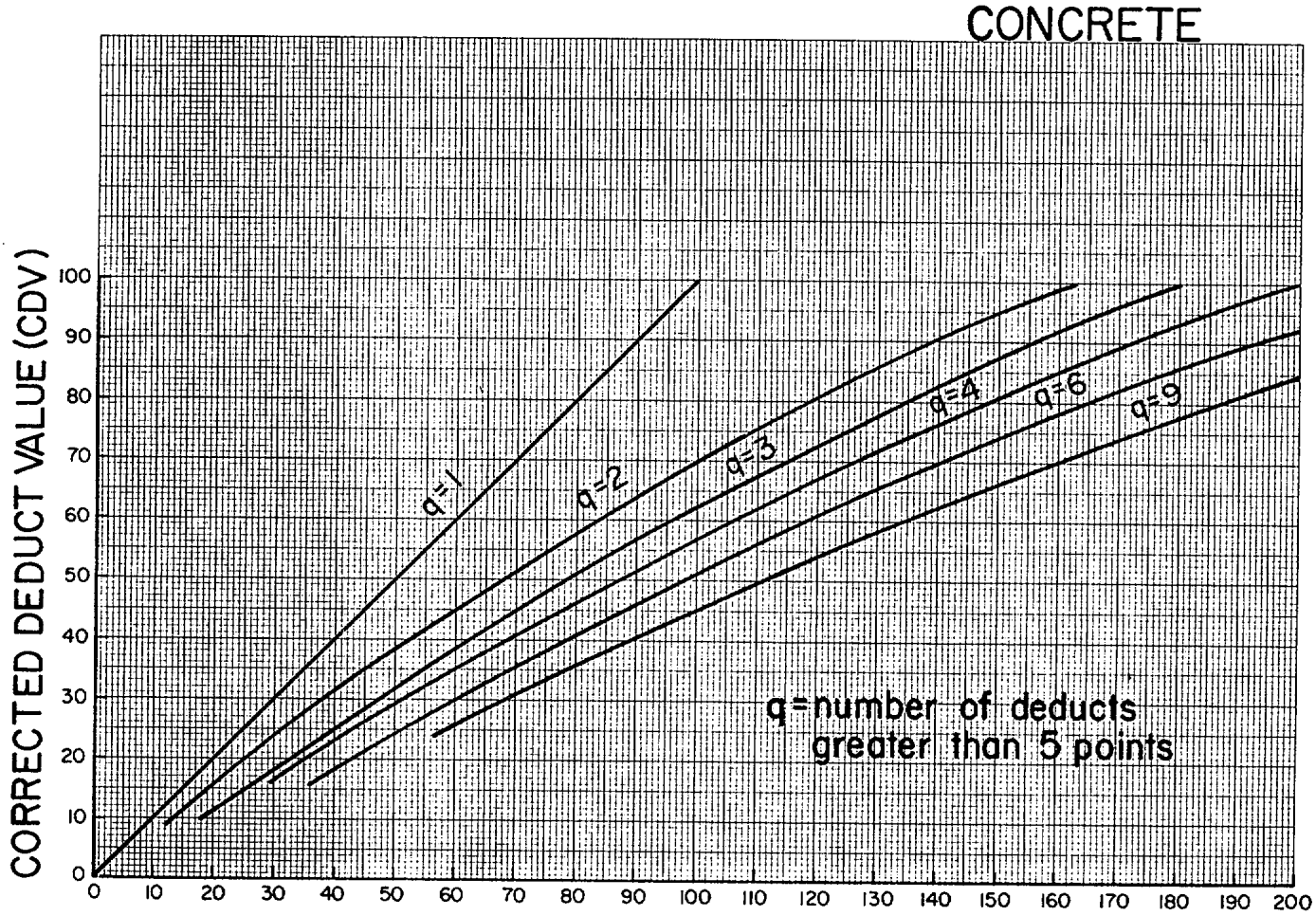


Figure C-40. Corrected deduct value curves for jointed concrete pavements.

APPENDIX D

AUTOMATED PAVER REPORTS

DESCRIPTION AND USE

D-1. Report title: LIST

a. Description. The LIST report is a printout of the names and numbers for the branches of the pavement network in alphabetical order by branch name.

b. Contents. The report contains branch numbers, branch names, and number of sections for each branch.

c. Uses. The report is used to determine what branch number has been assigned to a particular street, and the number of sections for any branch.

D-2. Report title: INV

a. Description. This report provides an inventory of pavement sections for a given network.

b. Contents. The report identifies each section and provides section location, surface type, branch use, pavement rank, area and total branch area.

c. Uses. The report is used to obtain general information about a section, including the beginning and ending points and total area for a given branch.

D-3. Report title: RECORD (Format 1)

a. Description. This report provides comprehensive information about a selected pavement section.

b. Contents. The report contains section identification, section dimensions, shoulder identification, drainage identification, secondary structure identification, work history, pavement structure, layer material properties, results of surveys, and proposed future work for the pavement section.

c. Uses. The report is used to obtain detailed information necessary when considering repair work to be performed in the section.

D-4. Report title: RECORD (Format 2)

a. Description. This report provides specific information about a number of pavement sections, such as structural drainage, or shoulder information.

b. Contents. The report may contain, depending on the record selected, full section identification and dimensions with pavement structural information; or drainage information; or traffic or layer material property information; or a work history for the pavement.

c. Uses. The report is used to obtain information needed for scheduling and planning major work efforts or whenever specific information about all sections of a facility is needed.

D-5. Report title: INSPECT

a. Description. The report contains section identification, PCI value, inspection date, distress type, severity, and quantity for the entire section.

b. Contents. The report contains section identification, PCI value, inspection date, distress type, severity, and quantity for the entire section.

c. Uses. The report is used to determine pavement condition and distress types, severities, and quantities for a given pavement section(s) and/or to determine history of pavement condition for the pavement in order to perform a desk estimate of needed maintenance and repair costs for a given pavement.

D-6. Report title: SAMPLE

a. Description. This report is used to obtain inspection results for each section detailed by sample units.

b. Contents. The report contains sample unit number, sample type, distress type, severity, quantity, density-percent, sample size, sample PCI, and overall PCI and distress for the pavement section.

c. Uses. The report is used to determine where a distress type exists in a pavement section; to monitor change in condition for a given sample unit; and to identify variation in condition within a given pavement section.

D-7. Report title: PCI & PCIA

a. Description. This report provides a list of sections and PCI values based on last inspection results

for selected pavements. The PCI report lists the sections in order of increasing PCI. The PCIA report lists the sections in alphabetical order.

b. Contents. The report identifies each pavement section and provides section location, section number, PCI value, date of last inspection, surface type, section area, and pavement rank.

c. Uses. The report is used to identify pavement sections in a given PCI range; to determine priorities of maintenance and repair; to develop annual and long range work plan.

D-8. Report title: PCI DISTRIBUTION

a. Description. The report provides the user with a frequency diagram of the PCIs for specific branch uses, pavement rank, and surface type. A listing of the sections is also available. The distribution can be of the current year or any year in the future. If future years are selected the PCI is predicted by straight line extrapolation assuming no overlays or reconstruction are performed.

b. Contents. The report contains branch use(s), pavement rank(s), and surface type(s) PCI prediction year and PCI range.

c. Uses. The report is used to justify budget requests. Report presents distribution of PCI of pavement sections selected; the change of this distribution over a period of time, assuming no overlays or reconstruction can be seen by selecting the year(s) into the future desired.

D-9. Report title: PAVEMENT CONDITION HISTORY

a. Description. The report provides the condition history for a specific pavement section. It plots the PCI-time curve. The PCI is projected 5 years into the future beyond the last inspection date.

b. Contents. The report contains the branch name, pavement rank, section number, section area, and PCI-time plot.

c. Uses. The report is used to assist in justification of a repair project for a specific pavement section.

D-10. Report title: WORKHIS

a. Description. This report provides a record of past maintenance and repair performance on any pavement section.

b. Contents. The report contains a list of work completed with description, manner of accomplishment of that work, material code for the material used, date work was completed, in place unit cost and total repair cost.

c. Uses. The report is used to find what past work has been performed on a pavement section, and to determine the past cost invested in repair of a pavement section.

D-11. Report title: POLICY

a. Description. This report provides lists of maintenance policy proposed for all sections, including estimated unit costs for work proposed, material to be used, distress and repair types, distress severity, and total estimated cost of repair.

b. Contents. The report contains distress type, severity, repair type, material used, unit costs, and total cost of repair.

c. Uses. The report is used to schedule maintenance and repair work; to develop annual and long range work plans; and to estimate budget requirements.

D-12. Report title: WORKREQ

a. Description. This report provides lists identifying maintenance and repair requirements for specified sections. Included are time and cost estimates, and priority for the work required.

b. Contents. The report contains type of work proposed and distress to be repaired, quantity of work, estimated labor and material costs, material to be used, estimated total cost, priority, fiscal year for work proposed, and whether work has been financed.

c. Uses. The report is used to keep inventory of work proposed and completed; to develop estimates for financing future work; and to develop annual work plans, and long range work plans.

D-13. Report title: BUDGET

a. Description. This report provides the user with a 10-year projected budget level for any combination of branch use, pavement rank, and surface type selected. The budget level is projected based on an average cost of repair for the surface type (i.e., AC or PCC). The year to repair is determined by projecting the minimum PCI level specified by the user.

b. Contents. The report contains branch use, surface type, pavement rank, and cost of repair for each fiscal year (10 years from present). A listing of sections projected to be repaired each year can also be obtained.

c. Uses. The report is used to provide an estimate of the budget level necessary to maintain the pavement system above an acceptable minimum condition, based on an average cost.

APPENDIX E

BLANK SUMMARY AND RECORD FORMS

(DA Forms 5145-R to 5156-R used for PAVER will be reproduced locally on 8 1/2 - by 11-inch paper.)

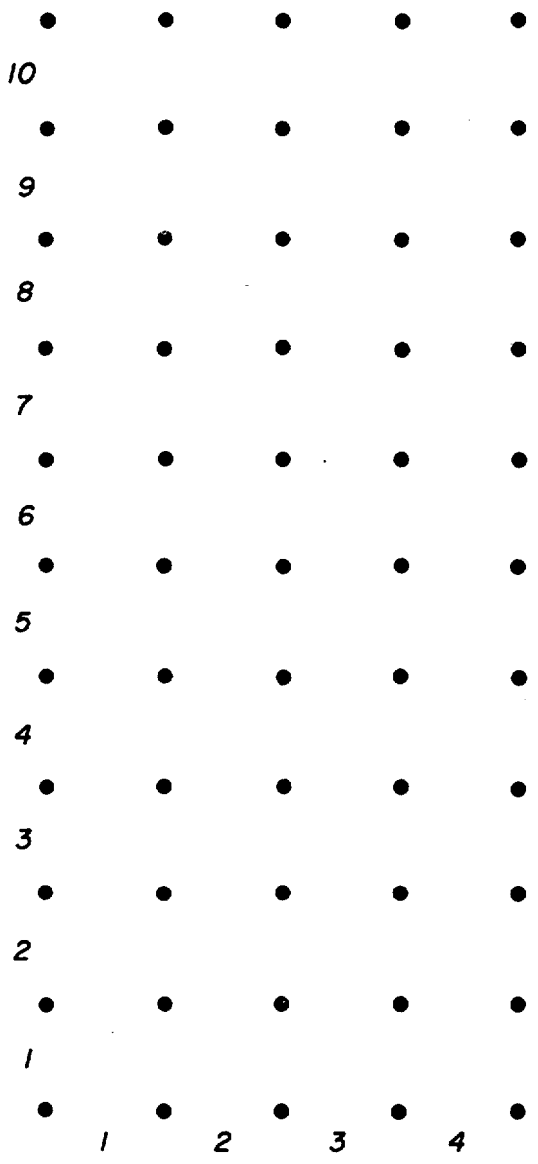
CONCRETE PAVEMENT INSPECTION SHEET

For use of this form, see TM 5-623; the proponent agency is USACE.

BRANCH _____ SECTION _____

DATE _____ SAMPLE UNIT _____

SURVEYED BY _____ SLAB SIZE _____



Distress Types

21. Blow-Up Buckling/Shattering	31. Polished Aggregate
22. Corner Break	32. Popouts
23. Divided Slab	33. Pumping
24. Durability ("D") Cracking	34. Punchout
25. Faulting	35. Railroad Crossing
26. Joint Seal Damage	36. Scaling/Map Cracking/Crazing
27. Lane/Shldr Drop Off	37. Shrinkage Cracks
28. Linear Cracking	38. Spalling, Corner
29. Patching, Large & Util Cuts	39. Spalling, U Joint
30. Patching, Small	

DIST. TYPE	SEV.	NO. SLABS	% SLABS	DEDUCT VALUE
26*				
q=	TOTAL DEDUCT VALUE			
CORRECTED DEDUCT VALUE (CDV)				

PCI = 100 - CDV = _____

RATING = _____

* All Distresses Are Counted On A Slab-By-Slab Basis Except Distress26, Which Is Rated For the Entire Sample Unit.

DA FORM 5145-R, NOV 82

Figure E-1.

ASPHALT PAVEMENT INSPECTION SHEET

For use of this form, see TM 54-623; the proponent agency is USACE.

BRANCH _____ SECTION _____

DATE _____ SAMPLE UNIT _____

SURVEYED BY _____ AREA OF SAMPLE _____

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
4. * Bumps and Sags
5. Corrugation
6. Depression
7. * Edge Cracking
8. * Jt Reflection Cracking
9. * Lane/Shldr Drop Off
10. * Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
13. * Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:

EXISTING DISTRESS TYPE, QUANTITY & SEVERITY

TYPE →						
QUANTITY & SEVERITY						
TOTAL SEVERITY L						
TOTAL SEVERITY M						
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
q=	TOTAL DEDUCT VALUE		
CORRECTED DEDUCT VALUE (CDV)			

PCI = 100 - CDV = _____

RATING = _____

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

DA FORM 5146-R, NOV 82

Figure E-2.

Section Evaluation Summary

For use of this form, see TM 5-623; the proponent agency is USACE.

1. Overall Condition Rating - PCI _____

Rating - PCI	Failed, 0-10	Very Poor, 11-25	Poor, 26-40	Fair, 41-55	Good, 56-70	Very Good, 71-85	Excellent 86-100

2. Variation of Condition Within Section -- PCI

   a. Localized Random Variation — Yes, No
   b. Systematic Variation: — Yes, No

3. Rate of Deterioration of Condition -- PCI

   a. Long-term period (since construction or last overall repair) — Low, Normal, High
   b. Short-term period (1 year) — Low, Normal, High

4. Distress Evaluation

   a. Cause

   Load Associated Distress ____percent deduct value
   Climate/Durability Associated ____percent deduct value
   Other (____) Associated Distress ____percent deduct value

   b. Moisture (Drainage) Effect on Distress — Minor, Moderate, Major

5. Deficiency of Load-Carrying Capacity — No, Yes

6. Surface Roughness — Minor, Moderate, Major

7. Skid Resistance/Hydroplaning Potential — Minor, Moderate, Major

8. Previous Maintenance — Low, Normal, High

9. Comments: _____

_____

_____

_____

_____

_____

_____

DA FORM 5147-R, NOV 82

Figure E-3.

PRESENT WORTH COMPUTATION

For use of this form, see TM 5-623; the proponent agency is USACE.

M & R ALTERNATIVE _____

_____

ANALYSIS PERIOD _____ YEARS INTEREST RATE _____ %

DIFFERENTIAL INFLATION RATE _____ %

YEAR	M & R WORK DESCRIPTION	COST $	f	PRESENT WORTH $
			TOTAL	$

DA FORM 5148-R, NOV 82

Figure E-4.

BRANCH IDENTIFICATION SUMMARY

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation			Date			Up Dates						Total No. of Branches
Code	Name	Location	Mo.	Da.	Yr.	1.			3.			
						2.			4.			
									5.			

Branch Code	Branch Name	Branch Use	Number of Sections	Branch Area Sq. Yd.

Remarks:

DA FORM 5149-R, NOV 82

Figure E-5.

BRANCH IDENTIFICATION SUMMARY
CONTINUATION SHEET

For use of this form, see TM 5-623; the proponent agency is USACE.

PAGE of _

Branch Code	Branch Name	Branch Use	Number of Sections	Branch Area Sq. Yd.

Remarks:

DA FORM 5149-1-R, NOV 82

Figure E-6.

SECTION IDENTIFICATION RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date	Branch Name	Section Area	No. of Sample Units	Section No.
			_____ ft. x _____ ft. _____ sq. yd.		

Traffic Types And Uses				General Information		
				Curb And Gutter	Sidewalks	Surface Type
○ Aircraft ○ Fixed Wing ○ Rotary Wing	○ Runway ○ Taxiway ○ Parking or Pads ○ Apron ○ Other	○ Vehicular ○ Real Property ○ Family Housing	○ Primary ○ Secondary ○ Tertiary ○ Parking - Storage ○ Other	○ Left ○ Right ○ None	○ Left ____ ft. ○ Right ____ ft. ○ None ____	○ PCC ○ AC ○ Surface Treatment ○ Other

Sketch:

On sketch: note any subsurface drainage (type, location) and, secondary structures, such as, manholes, water shut-offs, etc.

DA FORM 5150-R, NOV 82

Figure E-7.

SECTION PAVEMENT STRUCTURE RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date	Branch Name	Section Number

		Material	Material Code	Thickness (in.)	Date Const.	Location (If less than entire section)* From	To
Surface Treatment	Surf. Treat. (3)						
	Surf. Treat. (2)						
	Surf. Treat. (1)						
Overlays	Overlay (3)						
	Overlay (2)						
	Overlay (1)						

		Material	Material Code	Thickness (in.)	Date Const.	Comments
Initial Construction	Surface					
	Leveling					
	Base					
	Subbase					
	Select					
	Compacted Subgrade					
	Natural Subgrade					

**New Section of Branch Must Then Be Identified.*

DA FORM 5151-R, NOV 82

Figure E-8.

SECTION MATERIALS PROPERTIES RECORD

For use of this form, see TM 5623; the proponent agency is USACE.

Installation Name	Date			Branch Name	Section Number

Pavement Layer	Material Properties	Value / Unit	Comments

DA FORM 5152-R, NOV 82

Figure E-9.

SECTION TRAFFIC RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date			Branch Name	Section Number

Roads or Streets																							
Date of Survey																							
Traffic Type	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f
Volume Index																								

Parking Lots – Airfields – Other	
Date of Survey	Description

DA FORM 5153-R, NOV 82

Figure E-10.

SECTION CONDITION RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Branch Name	Date	Section Number

Average PCI _____ Condition Rating _____

Ride Quality G____ F____ P____ Safety G____ F____ P____ Drainage G____ F____ P____

Total No. of Sample Units _____ No. of Random Units Surveyed _____

No. of Additional Units Surveyed _____

PCI Range _____ Minimum of Units to be Surveyed _____

Pavement Type
○AC ○PCC

Section Area
_____ ft. x _____ ft.
_____ sq. yd.

Section Distress Data
○ Extrapolated Quantities ○ Actual Quantities

Distress Type	Severity Level	Quantity	Section Density	Deduct Value	Comments
			Total		

Percent Deducts Structural Related _____ Enviromental _____ Other _____

DA FORM 5154-R, NOV 82

Figure E-11.

BRANCH MAINTENANCE & REPAIR REQUIREMENTS

For use of this form, see TM 5o623; the proponent agency is USACE.

PAGE _ of _

Installation Name	Date	Branch Name	Total No. of Sections

Work Class : M = Maintenance R=Repair C=New Construction Location : R=Roadway PL=Parking Lot A=Airfield O=Other

Section No.	Work Description	Work Class	Loc.	Thickness, inches	Quantity/Unit	Est. Cost	Priority	Date Completed, M/Y

Remarks _____

DA FORM 5155-R, NOV 00

Figure E-12.

SECTION MAINTENANCE AND REPAIR RECORD

For use of this form, see TM 5-623, the proponent agency is USACE,

PAGE _ of _

Installation Name	Date			Branch Name	Section Number
	Mo.	Da.	Yr.		

Work Performed					
Date of M&R	Description of Work	Location	Thickness	Quantity/Unit	Cost

Remarks: _____

DA FORM 5156-R, NOV 82

Figure E-13.

APPENDIX D

AUTOMATED PAVER REPORTS

DESCRIPTION AND USE

D-1. Report title: LIST

a. Description. The LIST report is a printout of the names and numbers for the branches of the pavement network in alphabetical order by branch name.

b. Contents. The report contains branch numbers, branch names, and number of sections for each branch.

c. Uses. The report is used to determine what branch number has been assigned to a particular street, and the number of sections for any branch.

D-2. Report title: INV

a. Description. This report provides an inventory of pavement sections for a given network.

b. Contents. The report identifies each section and provides section location, surface type, branch use, pavement rank, area and total branch area.

c. Uses. The report is used to obtain general information about a section, including the beginning and ending points and total area for a given branch.

D-3. Report title: RECORD (Format 1)

a. Description. This report provides comprehensive information about a selected pavement section.

b. Contents. The report contains section identification, section dimensions, shoulder identification, drainage identification, secondary structure identification, work history, pavement structure, layer material properties, results of surveys, and proposed future work for the pavement section.

c. Uses. The report is used to obtain detailed information necessary when considering repair work to be performed in the section.

D-4. Report title: RECORD (Format 2)

a. Description. This report provides specific information about a number of pavement sections, such as structural drainage, or shoulder information.

b. Contents. The report may contain, depending on the record selected, full section identification and dimensions with pavement structural information; or drainage information; or traffic or layer material property information; or a work history for the pavement.

c. Uses. The report is used to obtain information needed for scheduling and planning major work efforts or whenever specific information about all sections of a facility is needed.

D-5. Report title: INSPECT

a. Description. The report contains section identification, PCI value, inspection date, distress type, severity, and quantity for the entire section.

b. Contents. The report contains section identification, PCI value, inspection date, distress type, severity, and quantity for the entire section.

c. Uses. The report is used to determine pavement condition and distress types, severities, and quantities for a given pavement section(s) and/or to determine history of pavement condition for the pavement in order to perform a desk estimate of needed maintenance and repair costs for a given pavement.

D-6. Report title: SAMPLE

a. Description. This report is used to obtain inspection results for each section detailed by sample units.

b. Contents. The report contains sample unit number, sample type, distress type, severity, quantity, density-percent, sample size, sample PCI, and overall PCI and distress for the pavement section.

c. Uses. The report is used to determine where a distress type exists in a pavement section; to monitor change in condition for a given sample unit; and to identify variation in condition within a given pavement section.

D-7. Report title: PCI & PCIA

a. Description. This report provides a list of sections and PCI values based on last inspection results

for selected pavements. The PCI report lists the sections in order of increasing PCI. The PCIA report lists the sections in alphabetical order.

b. Contents. The report identifies each pavement section and provides section location, section number, PCI value, date of last inspection, surface type, section area, and pavement rank.

c. Uses. The report is used to identify pavement sections in a given PCI range; to determine priorities of maintenance and repair; to develop annual and long range work plan.

D-8. Report title: PCI DISTRIBUTION

a. Description. The report provides the user with a frequency diagram of the PCIs for specific branch uses, pavement rank, and surface type. A listing of the sections is also available. The distribution can be of the current year or any year in the future. If future years are selected the PCI is predicted by straight line extrapolation assuming no overlays or reconstruction are performed.

b. Contents. The report contains branch use(s), pavement rank(s), and surface type(s) PCI prediction year and PCI range.

c. Uses. The report is used to justify budget requests. Report presents distribution of PCI of pavement sections selected; the change of this distribution over a period of time, assuming no overlays or reconstruction can be seen by selecting the year(s) into the future desired.

D-9. Report title: PAVEMENT CONDITION HISTORY

a. Description. The report provides the condition history for a specific pavement section. It plots the PCI-time curve. The PCI is projected 5 years into the future beyond the last inspection date.

b. Contents. The report contains the branch name, pavement rank, section number, section area, and PCI-time plot.

c. Uses. The report is used to assist in justification of a repair project for a specific pavement section.

D-10. Report title: WORKHIS

a. Description. This report provides a record of past maintenance and repair performance on any pavement section.

b. Contents. The report contains a list of work completed with description, manner of accomplishment of that work, material code for the material used, date work was completed, in place unit cost and total repair cost.

c. Uses. The report is used to find what past work has been performed on a pavement section, and to determine the past cost invested in repair of a pavement section.

D-11. Report title: POLICY

a. Description. This report provides lists of maintenance policy proposed for all sections, including estimated unit costs for work proposed, material to be used, distress and repair types, distress severity, and total estimated cost of repair.

b. Contents. The report contains distress type, severity, repair type, material used, unit costs, and total cost of repair.

c. Uses. The report is used to schedule maintenance and repair work; to develop annual and long range work plans; and to estimate budget requirements.

D-12. Report title: WORKREQ

a. Description. This report provides lists identifying maintenance and repair requirements for specified sections. Included are time and cost estimates, and priority for the work required.

b. Contents. The report contains type of work proposed and distress to be repaired, quantity of work, estimated labor and material costs, material to be used, estimated total cost, priority, fiscal year for work proposed, and whether work has been financed.

c. Uses. The report is used to keep inventory of work proposed and completed; to develop estimates for financing future work; and to develop annual work plans, and long range work plans.

D-13. Report title: BUDGET

a. Description. This report provides the user with a 10-year projected budget level for any combination of branch use, pavement rank, and surface type selected. The budget level is projected based on an average cost of repair for the surface type (i.e., AC or PCC). The year to repair is determined by projecting the minimum PCI level specified by the user.

b. Contents. The report contains branch use, surface type, pavement rank, and cost of repair for each fiscal year (10 years from present). A listing of sections projected to be repaired each year can also be obtained.

c. Uses. The report is used to provide an estimate of the budget level necessary to maintain the pavement system above an acceptable minimum condition, based on an average cost.

APPENDIX E

BLANK SUMMARY AND RECORD FORMS

(DA Forms 5145-R to 5156-R used for PAVER will be reproduced locally on 8 1/2 - by 11-inch paper.)

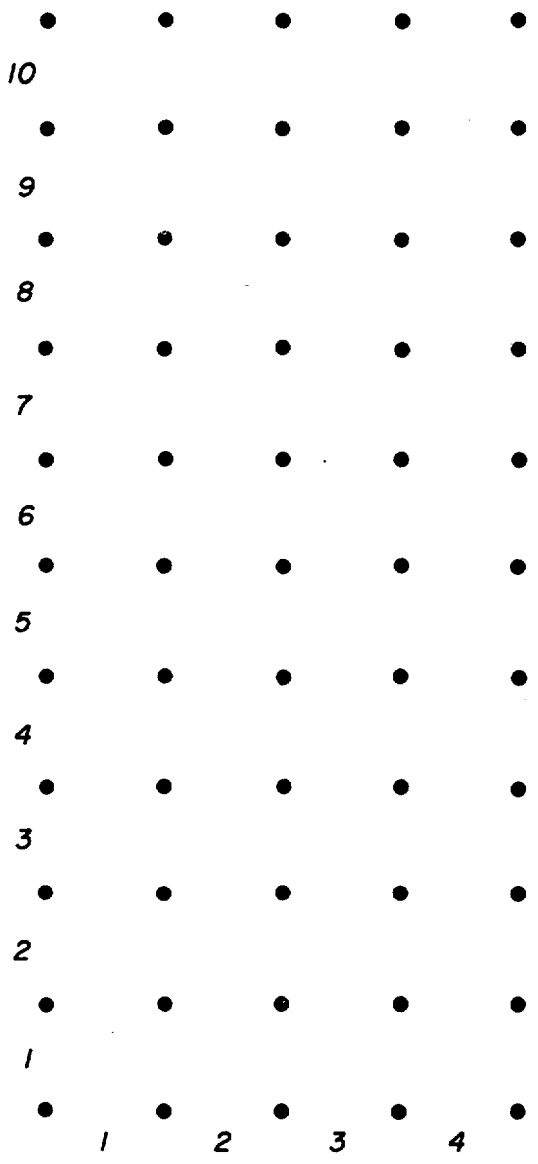
CONCRETE PAVEMENT INSPECTION SHEET

For use of this form, see TM 5-623; the proponent agency is USACE.

BRANCH _____ SECTION _____

DATE _____ SAMPLE UNIT _____

SURVEYED BY _____ SLAB SIZE _____



Distress Types

21. Blow-Up Buckling/Shattering	31. Polished Aggregate
22. Corner Break	32. Popouts
23. Divided Slab	33. Pumping
24. Durability ("D") Cracking	34. Punchout
25. Faulting	35. Railroad Crossing
26. Joint Seal Damage	36. Scaling/Map Cracking/Crazing
27. Lane/Shldr Drop Off	37. Shrinkage Cracks
28. Linear Cracking	38. Spalling, Corner
29. Patching, Large & Util Cuts	39. Spalling, U Joint
30. Patching, Small	

DIST. TYPE	SEV.	NO. SLABS	% SLABS	DEDUCT VALUE
26*				
q=	TOTAL DEDUCT VALUE			
CORRECTED DEDUCT VALUE (CDV)				

PCI = 100 - CDV = _____

RATING = _____

* All Distresses Are Counted On A Slab-By-Slab Basis Except Distress26, Which Is Rated For the Entire Sample Unit.

DA FORM 5145-R, NOV 82

Figure E-1.

ASPHALT PAVEMENT INSPECTION SHEET

For use of this form, see TM 54-623; the proponent agency is USACE.

BRANCH _____ SECTION _____

DATE _____ SAMPLE UNIT _____

SURVEYED BY _____ AREA OF SAMPLE _____

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
4. * Bumps and Sags
5. Corrugation
6. Depression
7. * Edge Cracking
8. * Jt Reflection Cracking
9. * Lane/Shldr Drop Off
10. * Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
13. * Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:

EXISTING DISTRESS TYPE, QUANTITY & SEVERITY

TYPE →						
QUANTITY & SEVERITY						
TOTAL SEVERITY L						
TOTAL SEVERITY M						
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
q=	TOTAL DEDUCT VALUE		
CORRECTED DEDUCT VALUE (CDV)			

PCI = 100 - CDV = _____

RATING = _____

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

DA FORM 5146-R, NOV 82

Figure E-2.

Section Evaluation Summary

For use of this form, see TM 5-623; the proponent agency is USACE.

1. Overall Condition Rating - PCI _____

Rating - PCI	Failed, 0-10	Very Poor, 11-25	Poor, 26-40	Fair, 41-55	Good, 56-70	Very Good, 71-85	Excellent 86-100

2. Variation of Condition Within Section -- PCI

   a. Localized Random Variation — Yes, No
   b. Systematic Variation: — Yes, No

3. Rate of Deterioration of Condition -- PCI

   a. Long-term period (since construction or last overall repair) — Low, Normal, High
   b. Short-term period (1 year) — Low, Normal, High

4. Distress Evaluation

   a. Cause

   Load Associated Distress ____percent deduct value
   Climate/Durability Associated ____percent deduct value
   Other (____) Associated Distress ____percent deduct value

   b. Moisture (Drainage) Effect on Distress — Minor, Moderate, Major

5. Deficiency of Load-Carrying Capacity — No, Yes

6. Surface Roughness — Minor, Moderate, Major

7. Skid Resistance/Hydroplaning Potential — Minor, Moderate, Major

8. Previous Maintenance — Low, Normal, High

9. Comments: _____

_____

_____

_____

_____

_____

_____

DA FORM 5147-R, NOV 82

Figure E-3.

PRESENT WORTH COMPUTATION

For use of this form, see TM 5-623; the proponent agency is USACE.

M & R ALTERNATIVE _____

_____

ANALYSIS PERIOD _____ YEARS INTEREST RATE _____ %

DIFFERENTIAL INFLATION RATE _____ %

YEAR	M & R WORK DESCRIPTION	COST $	f	PRESENT WORTH $
			TOTAL	$

DA FORM 5148-R, NOV 82

Figure E-4.

BRANCH IDENTIFICATION SUMMARY

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation			Date			Up Dates						Total No. of Branches
Code	Name	Location	Mo.	Da.	Yr.	1.			3.			
						2.			4.			
									5.			

Branch Code	Branch Name	Branch Use	Number of Sections	Branch Area Sq. Yd.

Remarks:

DA FORM 5149-R, NOV 82

Figure E-5.

BRANCH IDENTIFICATION SUMMARY
CONTINUATION SHEET

For use of this form, see TM 5-623; the proponent agency is USACE.

PAGE of _

Branch Code	Branch Name	Branch Use	Number of Sections	Branch Area Sq. Yd.

Remarks:

DA FORM 5149-1-R, NOV 82

Figure E-6.

SECTION IDENTIFICATION RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date	Branch Name	Section Area	No. of Sample Units	Section No.
			_____ ft. x _____ ft. _____ sq. yd.		

Traffic Types And Uses				General Information		
				Curb And Gutter	Sidewalks	Surface Type
○ Aircraft ○ Fixed Wing ○ Rotary Wing	○ Runway ○ Taxiway ○ Parking or Pads ○ Apron ○ Other	○ Vehicular ○ Real Property ○ Family Housing	○ Primary ○ Secondary ○ Tertiary ○ Parking - Storage ○ Other	○ Left ○ Right ○ None	○ Left ____ ft. ○ Right ____ ft. ○ None ____	○ PCC ○ AC ○ Surface Treatment ○ Other

Sketch:

On sketch: note any subsurface drainage (type, location) and, secondary structures, such as, manholes, water shut-offs, etc.

DA FORM 5150-R, NOV 82

Figure E-7.

SECTION PAVEMENT STRUCTURE RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date	Branch Name	Section Number

		Material	Material Code	Thickness (in.)	Date Const.	Location (If less than entire section)* From	To
Surface Treatment	Surf. Treat. (3)						
	Surf. Treat. (2)						
	Surf. Treat. (1)						
Overlays	Overlay (3)						
	Overlay (2)						
	Overlay (1)						

		Material	Material Code	Thickness (in.)	Date Const.	Comments
Initial Construction	Surface					
	Leveling					
	Base					
	Subbase					
	Select					
	Compacted Subgrade					
	Natural Subgrade					

**New Section of Branch Must Then Be Identified.*

DA FORM 5151-R, NOV 82

Figure E-8.

SECTION MATERIALS PROPERTIES RECORD

For use of this form, see TM 5623; the proponent agency is USACE.

Installation Name	Date			Branch Name	Section Number

Pavement Layer	Material Properties	Value / Unit	Comments

DA FORM 5152-R, NOV 82

Figure E-9.

SECTION TRAFFIC RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Date			Branch Name	Section Number

Roads or Streets																							
Date of Survey																							
Traffic Type	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f
Volume Index																								

Parking Lots – Airfields – Other	
Date of Survey	Description

DA FORM 5153-R, NOV 82

Figure E-10.

SECTION CONDITION RECORD

For use of this form, see TM 5-623; the proponent agency is USACE.

Installation Name	Branch Name	Date	Section Number

Average PCI _____ Condition Rating _____

Ride Quality G____ F____ P____ Safety G____ F____ P____ Drainage G____ F____ P____

Total No. of Sample Units _____ No. of Random Units Surveyed _____

No. of Additional Units Surveyed _____

PCI Range _____ Minimum of Units to be Surveyed _____

Pavement Type
○AC ○PCC

Section Area
_____ ft. x _____ ft.
_____ sq. yd.

Section Distress Data
○ Extrapolated Quantities ○ Actual Quantities

Distress Type	Severity Level	Quantity	Section Density	Deduct Value	Comments
			Total		

Percent Deducts Structural Related _____ Enviromental _____ Other _____

DA FORM 5154-R, NOV 82

Figure E-11.

BRANCH MAINTENANCE & REPAIR REQUIREMENTS

For use of this form, see TM 5o623; the proponent agency is USACE.

PAGE _ of _

Installation Name	Date	Branch Name	Total No. of Sections

Work Class : M = Maintenance R=Repair C=New Construction Location : R=Roadway PL=Parking Lot A=Airfield O=Other

Section No.	Work Description	Work Class	Loc.	Thickness, inches	Quantity/Unit	Est. Cost	Priority	Date Completed, M/Y

Remarks _____

DA FORM 5155-R, NOV 00

Figure E-12.

SECTION MAINTENANCE AND REPAIR RECORD

For use of this form, see TM 5-623, the proponent agency is USACE,

PAGE _ of _

Installation Name	Date			Branch Name	Section Number
	Mo.	Da.	Yr.		

Work Performed					
Date of M&R	Description of Work	Location	Thickness	Quantity/Unit	Cost

Remarks: _____

DA FORM 5156-R, NOV 82

Figure E-13.