
1 Hot Mix Asphalt Paving Supervision

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CHAPTER ONE:

HOT MIX ASPHALT PAVING SUPERVISION

The purpose of this course is to provide information on how to properly construct Hot Mix Asphalt (HMA) pavements. Emphasis will be on acquiring the skills and knowledge that a HMA Field Supervisor will need to supervise and ensure construction of quality pavements in conformance with the plans and Specifications. The construction of smooth, durable, and safe highways requires careful planning and continuous monitoring.

This manual is intended to provide the best practices for the Certified HMA Field Supervisor. Many of the techniques, procedures, and methods provided are not applicable to all pavement circumstances, and other methods may be used to meet the requirements of the specifications. The manual is not to be considered part of the specifications or override the specifications or contract documents.

TERMINOLOGY

HMA has numerous synonyms. This material has been called bituminous paving mix(ture), bituminous concrete, bituminous mix(ture), asphalt paving mix(ture), asphalt mix(ture), asphaltic concrete or plain "asphalt", among other terms. This manual uses the term "hot mix asphalt" to help standardize the wording and minimize confusion. When the Standard Specifications are referenced in the manual, QC/QA HMA is used for mixtures in accordance with Section **401**, HMA is used for mixtures in accordance with Section **402**, and SMA (Stone Matrix Asphalt) is used for mixtures in accordance with Section **410**.

Asphalt materials include Performance Graded (PG) Asphalt Binders, Asphalt Emulsions, Cutback Asphalt, Utility Asphalt, and Asphalt used for coating corrugated metal pipe. Hot mix asphalt used for INDOT specified pavements requires PG binders to be used for the asphalt material. This manual uses the term "binder" when referring to this material.

PREREQUISITES

A HMA Field Supervisor should have knowledge of the following items prior to taking this course.

- 1) INDOT Standard Specifications
- 2) Indiana Test Methods 580 and 803 (Appendix A)

- 3) HMA paving processes and methods
- 4) Paving equipment operations
- 5) Pavement deficiencies and how to correct these problems
- 6) Plans and contract Special Provisions
- 7) Profilographs
- 8) OSHA 10 or OSHA 30 training course on traffic and safety
- 9) Certified Worksite Traffic Supervisor (CWTS) requirements

DUTIES

The general duties of a HMA Field Supervisor are contained within **Sections 105, 304, 306 and 400**. These duties may be designated to other personnel on the project. The duties are summarized as follows:

- 1) Provide all work and materials in reasonably close conformance with the plans and specifications (Section **105.03**)
- 2) For work conducted in accordance with Sections **304, 306 and 400**, serve as the Contractors “competent superintendent” (Section **105.05**)
- 3) Be responsible to recognize and furnish acceptable materials and perform all work in accordance with the requirements of plans and specifications (Section **105.09**)
- 4) Keep the Project Engineer or Project Supervisor (PE/PS) informed as to the schedule of the work, the progress of the work and the manner in which the work is being performed (Sections **108.04, 108.05, 108.06 and 108.07**)
- 5) Be knowledgeable of the Construction Requirement Sections of **401, 402, 403, 404, 405, 406, 407, 408 and 410**
- 6) Complete the Paving Quality Control Plan (QCP) in accordance with ITM 803 (See Appendix A) and perform the work in accordance with the QCP

- 7) Be knowledgeable of and implement the maintenance of traffic plan in accordance with Section **801.03** for the HMA operations
- 8) Complete the daily project balance sheet for each activity. (See Appendix D)
- 9) Be responsible for road sampling in accordance with ITM 580
- 10) Be responsible for constructing HMA pavements meeting the plans and specifications for the contract and proactively identify and correct issues preventing such construction

CHAIN OF COMMAND

Every organization has a number of management levels, each with their own assigned authority and responsibility. The chain of command within INDOT and the Contractor should be known and followed. Working through the chain usually minimizes problems and maintains cooperation.

INDOT PROJECT/DISTRICT LEVEL

The levels of management in the field include:

- 1) HMA Technician/Inspector
- 2) Project Engineer/Project Supervisor
- 3) District Area Engineer
- 4) District Construction Engineer
- 5) District Deputy Commissioner

When there are major problems on the contract, such as equipment breakdown or non-routine questions or requests, the PE/PS is contacted. If the problem is urgent and the PE/PS is not available, the Area Engineer is contacted.

CENTRAL OFFICE

Each District Construction Director has a Central Office Construction Field Engineer to provide guidance concerning HMA operations. The Field Engineers are each assigned a construction specialty and work in the Construction Management Division of INDOT.

CONTRACTOR

Typical Contractor organization may include:

- 1) The crafts -- operators, carpenters, laborers
- 2) Field Quality Control Technicians
- 3) Job Foremen/Paving Foremen
- 4) HMA Field Supervisor (may hold another title in Contractor's actual organization.)
- 5) Job Superintendent
- 6) General Superintendent/Project Manager
- 7) Executive

The HMA Field Supervisor responsible for communication occurring between HMA field operations and HMA plant per QCP.

COMMUNICATION

Construction is always a race against time. You need to beat the rain, lay the mix tomorrow, finish a certain task next week, and be done by August. You worry about contract working days, calendar date completions, hours, days, weeks, months, seasons and years.

You do so because time is money. You worry about profits, incentive/disincentive clauses, liquidated damages, possible losses and acceleration costs. You know that anything you can do to save time can save money.

Accurate communication can save time. Why do you think that the two-way radio is in your truck? Why do you wear a beeper? Why is the first activity at a new job to install a telephone and hook up electricity in the field office? Why does the home office have a FAX machine? A modem? Copiers? Answering machines? The

answer is that these communication devices save time, and time is money. However, for all of these advanced technical innovations, our personal communication skills are not always that advanced as they should be.

As a construction supervisor, you spend much time communicating. You instruct your crew members, report to your supervisors, coordinate with your subcontractors, listen to your inspectors, and answer questions from the landowners. All of these activities require communication skills, and your effectiveness as a supervisor depends, to a large degree, on your effective use of these skills.

Construction supervisors face difficulties with accurate communication, however. You work in an environment which is full of barriers that affect communication. On the job, you may have scattered crew members, traffic within a few feet, and extremely high noise levels. And, let's face it, you are used to thinking more about facts, figures, costs, production, schedules, and deadlines than communication skills.

When you hear a foreman say: "They did WHAT??" "I thought I told you to do that", you know that miscommunication has occurred. You also know that time has probably been lost and costs have probably increased.

Communication is the process of sending and receiving information, thoughts, or instructions from one person to another. The process includes the sender's word choice, voice tone inflection, and body language, as well as the receiver's understanding, feed-back, and, if the process is successful, commitment. Clear and accurate communication is a learned process. No one is born with this ability. To become an effective communicator, you must learn about the process and practice its skills.

By using the information in this session, you will become a more accurate communicator and a better highway construction supervisor. You will be able to give clear instructions, accurate information, and you will know how to verify that your messages have been accurately understood, resulting in a savings of time. By learning to communicate more accurately, you will also enhance your leadership and motivational skills.

ACCURATE COMMUNICATION

Accurate communication is a two-way process: information, thoughts, or instructions are given or sent by one person and received and understood by another.

Accurate communication always involves three components: (1) a sender (2) a message, and (3) a receiver. Communication is accomplished through speaking, listening, and feedback..

Think of accurate communication as an asphalt roadway. The roadway is made up of components: subgrade, base rock, and asphalt pavement. If any of these three components fails, the roadway fails. The same is true of the three components of accurate communication.

The Sender

The sender is the person who has information (a message) to convey to someone else (a receiver). As a construction supervisor, your performance as a sender is critical to your success. Learning to be an effective sender is often considered the most important component of accurate communication.

A sender has many responsibilities in an effective communication process. These include:

- 1) Put the information into words which have a clear meaning and can be easily understood by the receiver. If the words are written, the message must be understood from the words alone, because there is little opportunity to add clarification to the words themselves. If the words are spoken, voice tones, inflections, facial expression and body language (gestures or position which have meaning) may be used to clarify and emphasize, not to confuse and blur, the words of the message.
- 2) Prepare all receivers by reducing or eliminating distractions and then causing the receiver to “tune into” the subject of the message before delivering the message
- 3) Monitor feedback and reactions to make sure each receiver understands the message
- 4) Obtain, in some cases, a commitment from each receiver to undertake an action that is contained in the message

- 5) Finally, and this is a bottom-line responsibility, accept full responsibility for the effectiveness of the entire process.

The Message

What is the message you are trying to communicate when you give information to someone? What response are you expecting to result from the message you are sending? Are you expecting them to just know the information? Do you expect someone to take a specific action? Is the action to be done at a specific time?

You can use the answers to certain questions, which form the essential elements of information, to be sure every message carries enough information to be understood as you intended. The questions are:

Who? What? When? Where? Why? How?

When giving orders, instructions, or directions, you should not omit any of these six elements. The essential element most frequently omitted is why. Your crew wants to know why plans are changed, or how they fit into the big picture. By explaining why, you can help them understand the goals of the plan better and they will be more willing to commit to the plan.

Unfortunately, people often assume that some elements are already known and they leave them out of the message. But do not forget that every time you make such an assumption, you are increasing the risk of miscommunication. If you omit one of the six elements from a message, make sure you do so on purpose and only after you have asked yourself: "Could anything go wrong if I don't tell them why? or when? or how?"

Messages can be complicated, and many messages simply have too much information in them. People feel confused or frustrated when they are unable to sort out a clear message from a mass of information. A complicated message contains many components and usually consists of many words plus gestures, facial expressions, tone of voice, and other body movements. Each of these components may have a meaning that must be received and understood. It is not hard to understand why it is often difficult to get the real message across if the message is surrounded by unnecessary clutter.

The Receiver

Sometimes, receivers may not be aware of the sender at the start of the communication process. They may be actively at work on the project, and therefore may be caught off guard. A receiver is not a passive party to the communication process. Like a sender, a receiver also has the following responsibilities:

- 1) Give attention to the sender by “tuning in” to the message as quickly as possible
- 2) Actively listen to the message, asking questions to clarify the meaning, i.e., provide feedback
- 3) Respond to the message, including any commitment that the message may contain

Accurate communication, with these three basic parts, may sound simple. If that is so, why are there so many communication problems on the job? Why aren't people better communicators?

One reason is that in a typical job site communication, you are playing out more than one role. At various points in the process, you switch back and forth, some times quickly, from sender to receiver. You instruct your crew (you're a sender); you scan their faces to see if they understand (you're a receiver); during a response from a crew member (you're a receiver), you interrupt to resend your message (you're a sender); while listening to your supervisor (you're a receiver), you ask a question (you're a sender) for clarification.

It all seems so complicated, but you can become a better communicator by improving your skills in the three activities of the communication process.

THE THREE KEY ACTIVITIES OF ACCURATE COMMUNICATION

The three key activities of building an asphalt roadway are base preparation, hot mix asphalt preparation, and placement. Just as these three activities determine the success of a roadway, accurate communication is determined by effective speaking, listening, and feedback.

Speaking

A majority of communication in our industry, especially in the field, is words spoken in person or over the phone. One of the basic rules of speaking is to let your audience (the receivers) know where you are going. In other words, help the receiver follow along while you transmit the message.

You probably know foremen or superintendents who always seem to get people to understand and follow their instructions with a minimum of problems or difficulty. The secret to their success may be the following three-step formula:

- 1) Tell them what you're going to tell them
- 2) Tell them
- 3) Tell them what you told them

With a particularly long message that contains several topics of instruction, this formula can be applied to each topic. Each part of the long messages is treated as a unit or building block for the complete message. This approach will avoid losing or confusing the receivers.

Another procedure that can help improve your oral communication is introduce the subject so your audience knows your objective. ("We have to switch over to the Monroe County job starting tomorrow morning"). Then after you have their attention, provide the information that supports or satisfies that objective (the message). Finally, restate anything important (summarize) to reinforce the objective.

Remember, however, that speaking is only one of three essential activities required for successful communications.

Listening

Listening is the second activity required, and the failure to listen is one of the main problems in communications. Most people think listening is another word for hearing, but that isn't true. Listening is not a passive activity, but an active process requiring your full attention and concentration.

Sometimes people cannot remember the information given in a message because they do not actively listen. A listener who is thinking of a response cannot concentrate on the sender's message. As a smart listener, first listen actively, then decide what to say in return. This is not easy; however, it is shortsighted to guess what someone is leading up to so you can interrupt them before they finish. Listen instead. Obtain all of the message and get the message right. Ask questions to clarify, if necessary. Remember, the purpose of your first response may be to provide feedback to the sender – feedback that confirms your understanding of the sender's message – without either accepting or rejecting the message itself.

Feedback

Feedback is the third activity in the communication process. This process is used to discover if the sender's message has been completely and accurately understood by the receiver. Feedback is very useful for confirming the accuracy of communication between two people or in small groups, such as crew meetings. Additional benefits are:

- 1) Feedback can confirm the understanding of what was said or felt by both parties
- 2) A sender can prompt feedback by asking a receiver to replay a message in the receiver's own words to show what level of understanding has been achieved, and to reveal if key words actually have the same meaning to both parties.
- 3) Feedback can be used to verify the understanding of specific elements of information in a message (who, what, where, when, why and how).

As a supervisor, you can use feedback to carry out your bottom-line responsibility for the overall effectiveness of the communications process. Often you must use feedback in self-defense to deal with receivers who have poor communications skills and to make sure your message is accurately received and acted upon.

Six ways you can obtain feedback from the people you work with are:

- 1) Ask the receiver to repeat the message in his or her own words: “Randy, what are we supposed to do as you understand it?”
- 2) Watch what receivers do as they receive the message. Are they maintaining eye contact with you? Do they seem to be paying attention? Are they taking notes? Do you see understanding in their faces, or a blank, glassy-eyed look that may mean confusion and uncertainty?
- 3) Listen carefully to their questions about what you have said. The questions people ask often reveal more than the answers they give.
- 4) Ask questions and listen carefully to the answers. If you receive inappropriate answers, or stone silence, you know your message has not been completely and accurately received.
- 5) Share your feelings about the feedback after the message is understood, and do this whether the feedback is positive or negative. This will encourage feedback and help to make the feedback a regular part of your own communication style.
- 6) Monitor the receiver’s actions after they receive the message. When they go back to work, do their actions show they understood the message? If the message called for a commitment and the receivers made that commitment, did they carry it out?

Sometimes it’s smart to carry your bottom-line responsibility for effective communication one step further by assuming that it is *always your responsibility*, whether you are a sender or a receiver. If a sender’s message is not completely and accurately communicated to a receiver, both lose. If this happens to you, it won’t make any difference whether you are a sender or a receiver.

COMMUNICATING IN SPECIFIC SITUATIONS

Whether you are making a speech, instructing a new crew member, conducting a meeting, or telling your family or a friend about your day, you must be aware of your choice of words, tone, and expressions. There are times on the job when communication is

social, but even “chit chat” or “small talk” tells people something about you, and you should avoid making any impression that might interfere with your effectiveness as a supervisor or leader.

In dealing with your crew, it is extremely important to insure their understanding if you are to gain their commitment. Your crew needs to know exactly what to do and when, and you must arrive at a mutual understanding so that they can commit to today’s objectives and the objectives of the project.

WHEN INSTRUCTING YOUR CREW

When instructing your crew, follow these steps:

- 1) Plan your presentation: write down your plan
- 2) Choose the time and place that eliminates environmental barriers and has their attention
- 3) Follow the speaker’s three-step formula:
 - a) tell them what you’re going to tell them
 - b) tell them: and
 - c) tell them what you told them
- 4) Insure understanding by obtaining feedback
- 5) Be patient and positive
- 6) If understanding is incomplete, try again with different words: or give examples, or ,if necessary, demonstrate
- 7) Get commitment from your crew to do what is required

MEETINGS

There is more to a meeting than just sitting around the table with other people. Meetings also require preparation and follow-up to make sure information is effectively communicated and agreed-upon actions are taken.

Preparation for a Meeting

Preparation for a meeting requires the following:

- 1) Before setting up a meeting, ask yourself: Is this meeting really necessary?

- 2) Determine the purpose of the meeting by asking yourself:
 - a) Does the problem require discussion?
 - b) Is it likely that a group can solve the problem?
 - c) Could the discussion be handled over the phone?
 - d) Are the required experts on the list of invitees?
- 3) Develop a list of topics to be discussed – an agenda
- 4) Gather information on each agenda item by listing:
 - a) Your thoughts, attitudes and opinions
 - b) Supporting data or rationale
 - c) Your proposed plan of action
 - d) Anticipated positions of others
 - e) Alternative plans where required
- 5) Choose the time and place, establish a time limit, and eliminate distractions
- 6) Notify other attendees such as owners, subs, suppliers, local officials, and other supervisors.

Conducting the meeting

- 1) Stick to the agenda – post it on the wall along with time limits
- 2) Start on time and finish on time
- 3) Obtain everyone's ideas and opinion on each subject
- 4) Clarify decisions and assignments
- 5) Get commitment from all who must support the action

Follow-up

- 1) Immediately document the main ideas and decisions reached
- 2) Send copies of minutes to attendees
- 3) Check later to be sure that agreed-upon actions are taken
- 4) File a copy of the minutes for future reference

TELEPHONE CONVERSATIONS

Telephones have been part of your life since you can remember and are taken for granted as a time-saver in construction. Effective telephone communication, however, doesn't just happen; it is planned and improves with practice. When communicating by phone:

- 1) Plan what you have say
- 2) Plan how you are going to say it
- 3) Be aware of the potential effect of communication barriers
- 4) Be businesslike and give your full attention to the caller
- 5) Make your tone of voice match your objective; remember your emotions will probably show through
- 6) Use a serious tone for bad news or a serious problem
- 7) Use a friendly tone for normal discussion
- 8) Use a business-like tone for reprimands or complaints or use a stern or harsh tone; however, only use this tone if you think this approach will obtain the response you want.
- 9) Be careful in your choice of words, because there is no body language to help understanding or provide feedback
- 10) Obtain feedback to insure understanding - Ask!
- 11) Follow up with a memo or a confirming phone conversation

SAFETY

HMA Field Supervisor is required to be concerned with the safety of the traveling public, INDOT employees, and the Contractor's work force, as well as their own safety. Although many safety devices and procedures have been established to provide a safe construction work zone, various hazards still exist. These hazards are required to be identified and the necessary safety precautions taken to prevent injuries and accidents.

HAZARDS

Safety hazards that are present every day for inspecting HMA paving, include:

Equipment

<u>Type of Equipment</u>	<u>Potential Hazard</u>
Trucks	Dump bed and tailgate operation Climbing on side of bed to check mix
Pavers	Overhead power lines Clothing catches causing injuries Burns Being hit by paver extensions
Rollers	High center of gravity, easily tipped over Being hit or run over Being caught in the pinch points of the roller when turning
Power brooms	Flying debris and dust
Air hammers	Flying debris and dust
Hand tools	Long handles
Propane tank	Fire Explosion Eye irritant
Vehicle and Equipment fires	Burns

Materials

<u>Type of Material</u>	<u>Potential Hazard</u>
Cleaning solvents	Fire
Hot mix material	Burns
Tack coat	Slips and falls

Traffic

<u>Type of Traffic</u>	<u>Potential Hazard</u>
Traveling public through or adjacent to the work zone	Being hit
Construction traffic	Being hit

POSSIBLE INJURIES

Safety hazards may result in accidents which cause injuries or death. The possible injuries that may occur are:

<u>Part of Body</u>	<u>Possible Injury</u>
Eyes	Flying debris and dust
Hands and arms	Cuts and lacerations
	Bruises and abrasions
	Burns
Body	Falls
	Burns
	Bruises
	Electrocution
	Serious, extensive and possibly fatal injuries if run over
Feet	Blisters
	Burns
	Bruises

SAFETY PRECAUTIONS

Dress

Clothing

Regular clothing is worn. Loose jackets, shirts, or pants are never worn because of the danger of getting caught in moving parts.

Shoes

Work type leather boots with non-skid soles and steel toes are required to be worn. The soles of the shoes are required to be reasonably free of tack. Tennis shoes do not provide adequate foot protection and are not worn.

Safety Vests

Type III Fluorescent vests, t shirts, and hardhats, are required to be worn at all times while engaged in operations upon or adjacent to a highway construction and public traffic.

Safety vests and caps are bright colored so that equipment operators and motorists are more likely to see them.

The vest may get caught on equipment and/or other projections, and should be properly adjusted to minimize snagging.

Safety Equipment

Hard Hats

Hardhats should be worn in accordance with OSHA and Contractor safety policies.

Specifically, hard hats are required to be worn when an employee is on any worksite where overhead equipment, such as cranes, backhoes, loaders, or other large equipment (as deemed necessary by the supervisor), is considered a part of the worksite.

When bending over, the hard hat may fall off or get blown off. Care is taken in making any sudden movement to recover the hat as a safety hazard may exist. A hat strap may be attached to hold the hat on.

Seat Belts

All operators and occupants of Contractor and INDOT vehicles are required to wear the complete seat belt assembly of the vehicle.

Safety glasses

Safety glasses are available and worn when there is any possibility of damaging the eyes.

Gloves

When climbing on the truck and conducting other similar tasks, gloves are worn.

Ear plugs

Ear protection may be needed if jackhammers or other loud noises are prevalent.

Minimizing Exposure

The risk of having an accident that results in injury may be minimized by following these precautions:

- 1) Never get between the paver and a hauling truck backing into the hopper
- 2) Stay back when the truck dump bed is in motion and when the paver hopper wings are in operation
- 3) When collecting weigh tickets from the driver's side, remember that fast moving traffic is only a step away
- 4) When climbing onto a truck or equipment, use the steps and hand holds when they are available with 3 contact mounting and dismounting method
- 5) Do not climb onto truck/equipment, unless absolutely necessary to do so
- 6) Inform the driver/operator before climbing up on the truck/equipment

- 7) Don't talk to the drivers, operators or other individuals unnecessarily
- 8) Horse play and goofing around are not tolerated
- 9) Be alert to changes in the conditions on the contract that affect safety hazards. One example is one-way traffic versus two-way traffic.
- 10) Park vehicles out of the way of the traffic

Pertinent Information

Fires

Fires on the contract or in the field office are not common, but may occur. Basic fire suppression, the locations of fire extinguishers, and how to operate the fire extinguishers is required to be known.

First Aid

The proper treatment of minor cuts and burns not only reduces the irritation but also reduces the chance of infection and more serious complications. Basic methods of treatment and the location of the first aid kit are required to be known.

Emergencies

Emergency situations may arise that require contacting aid. At the start of the contract, the location and phone number or best method to contact a medical facility, an ambulance, the fire department, and the State Police are required to be identified.

Accidents

In the event of an accident on the contract, all available information for possible inclusion in the permanent contract records is recorded. The PE/PS is given information such as the date, time, weather, people present, equipment, vehicle type and identification numbers, and the sequence of events.

TERMS RELATED TO HOT MIX ASPHALT

AASHTO - American Association of State Highway and Transportation Officials

ASTM - American Society for Testing and Materials

Aggregate Spreaders – Machines used for spreading aggregate evenly at a uniform rate on a surface

Air Voids – Internal spaces in a compacted mix surrounded by asphalt-coated particles, expressed as a percentage by volume of the total compacted mix

Asphalt Emulsion – An emulsion of asphalt and water that contains a small amount of an emulsifying agent. Emulsified asphalt droplets may be of either the anionic (negative charge), cationic (positive charge) or nonionic (neutral).

Base Course – The layer in the pavement system immediately below the binder and surface courses. The base course consists of crushed aggregate or other stabilized material.

Binder – Asphalt that is classified according to the Standard specifications for Performance Graded Asphalt Binder, AASHTO Designation MP1. The binder may be either unmodified or modified asphalt.

Certified Material - An aggregate product produced in accordance with the Certified Aggregate Producer Program (CAPP) for Department use

Certified Aggregate Producer - A Plant/Redistribution Terminal that meets the requirements of ITM 211, continues to be under the same ownership, and is approved by the Department

Coarse Aggregate - Aggregate that has a minimum of 20 percent retained on the No. 4 (4.75 mm) sieve

Crack and Seat – A fractured slab technique used in the rehabilitation of PCC pavements that minimizes slab action in a jointed concrete pavement by fracturing the PCC layer into smaller segments. This reduction in slab length minimizes reflective cracking in new HMA overlays.

Distributor – A truck or a trailer having an insulated tank heating system and distribution system. The distributor applies asphalt to a surface at a uniform rate.

DTE – District Testing Engineer

Emulsifier – The chemical added to the water and asphalt that keeps the asphalt in stable suspension in the water. The emulsifier determines the charge of the emulsion and controls the breaking rate.

Equivalent Single Axle Load (ESAL) – The effect on pavement performance of any combination of axle loads of varying magnitude equated to the number of 80-kN (18,000-lb.) single-axle loads that are required to produce an equivalent effect.

Fine Aggregate - Aggregate that is 100 percent passing the 3/8 in. (9.5 mm) sieve and a minimum of 80 percent passing the No. 4 (4.75 mm) sieve

Fog Seal – A light application of diluted asphalt emulsion used to renew old asphalt surfaces, seal small cracks and surface voids, and inhibit raveling

Intermediate Course – The hot mix asphalt course immediately below the surface course, generally consisting of larger aggregates and less asphalt (by weight) than the surface course

Leveling Course – A course of hot mix asphalt of variable thickness used to eliminate irregularities in the contour of an existing surface prior to placing the subsequent course.

Mechanical Spreaders – Spreader boxes that are mounted on wheels and attached to and pushed by dump trucks. HMA boxes are pulled and chip spreaders are pushed.

Maximum Particle Size - The sieve on which 100 percent of the material will pass

Milling Machine – A self-propelled unit having a cutting head equipped with carbide-tipped tools for the pulverization and removal of layers of asphalt materials from pavements

Nominal Maximum Particle Size - The smallest sieve opening through which the entire amount of the aggregate is permitted to pass

Performance Graded (PG) – Asphalt binder grade designation used in Superpave that is based on the binder’s mechanical performance at critical temperatures and aging conditions

Pneumatic-Tire Roller – A compactor with a number of tires spaced so their tracks overlap delivering a kneading type of compaction

Polish Resistant Aggregates - Dolomite containing less than 10.3% elemental magnesium, crushed limestone, or gravel meeting the requirements of ITM 214. Aggregates meeting these requirements are maintained on the INDOT Approved List of Polish Resistant Aggregates.

Power Sweeper – A power operated rotary broom used to clean loose material from the pavement surface

Prime Coat – An application of asphalt primer to an absorbent surface. The prime coat is used to prepare an untreated base for an asphalt surface. The prime penetrates or is mixed into the surface of the base and plugs the voids, hardens the top and helps bind the mixture to the overlying course.

Quality Control Plan (QCP) - A document written by the Contractor that is contract-specific and includes the policies, and procedures used by the Contractor

Qualified Technician - An individual who has successfully completed the written and proficiency testing requirements of the Department Qualified Laboratory and Technician Program

Reclaimed Asphalt Pavement (RAP) – Excavated asphalt pavement that has been pulverized, usually by milling, and is used like an aggregate in the recycling of asphalt pavements

Rubblization – The pulverization of a Portland cement concrete pavement into smaller particles, reducing the existing pavement layer to a sound, structural base that will be compatible to an asphalt overlay

Steel-Wheeled Static Rollers – Tandem or three-wheel rollers with cylindrical steel rolls that apply their weight directly to the pavement

Steel-Wheel Vibratory Rollers – A compactor having single or double cylindrical steel rolls that apply compactive effort with weight and vibration. The amount of compactive force is adjusted by changing the frequency and amplitude of vibration.

Subbase – The course in the asphalt pavement structure immediately below the base course. If the subgrade soil has adequate support, this course may serve as the subbase.

Subgrade – The soil prepared to support a pavement structure or a pavement system. The subgrade is the foundation of the pavement structure.

Superpave – Short for "Superior Performing Asphalt Pavement", a performance-based system for selecting and specifying asphalt binders and for designing asphalt mixtures

Structural Backfill - Suitable sand, gravel, crushed stone, air-cooled blast furnace slag, or granulated blast furnace slag used to fill designated areas excavated for structures that are not occupied by permanent work

Tack Coat – A relatively thin application of asphalt applied to an existing asphalt or PCC surface at a prescribed rate. Asphalt emulsion diluted with water is the preferred type. Tack coat is used to form a bond between an existing surface and the overlying course.