



INTRODUCTION

The purpose of this manual is to provide guidelines on a variety of techniques and methods that may enable organizers of *NDR* sanctioned races to conduct a safe and fair competition consistent with the goals of *National Derby Rallies, Inc.*

It is the belief of the *NDR* that uniform methods and conditions between sanctioned races is essential and is the ultimate objective of this publication. As families travel hundreds and sometimes thousands of miles to compete in weekend rallies throughout the racing season, it is only fair that conditions, rules and procedures governing each local race be as uniform as possible. The racing family of today has become more sophisticated and expects to race under first class conditions and procedures.

We urge you to thoroughly review the contents of this manual. Discuss it with your local associates and refer to it often as you plan your race. Although all conditions covered in this manual may not apply to your situation, you should endeavor to follow these procedures as much as possible. Also be familiar with the material in the current *NDR* Rule Book. If conflicts occur between these two publications, the *NDR* Rule Book takes precedence.

You may contact the *NDR* if you have any questions regarding the contents of either of these publications.

Good luck with your local program!

National Derby Rallies, Inc.

The information contained in this publication is intended for use as uniform guidelines in the conduct of a race and is in no way a guarantee against injury to participants or spectators. No expressed or implied warranty of safety shall result from the publication of, or the compliance with these procedures.



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SECTION 1 - APPLYING FOR AN NDR LOCAL RACE SANCTION

Applying for and receiving NDR sanction for your race is an easy process. Nevertheless, there are a few steps to follow and it does take time to process the necessary paperwork. Get an early start by planning and scheduling your race well in advance. *NDR* will promote your local rally by publishing the dates in both the *NDR NEWS LETTER* and the *NDR* website ([HTTP://WWW.NDR.ORG](http://www.ndr.org)). Help us help you by getting your application in early. The steps are as follows:

1. Application for *NDR* sanction of your race must be made on an *NDR* Local Race Sanction Application form (sample copy in APPENDIX 1), along with your sanction fee check, to NDR Records. Be sure to fill out the form where it asks for the quantity of supplies needed for your race. If you are holding more than one race on consecutive days, then the totals requested should be the total amount anticipated for the entire number of races listed on the form. To allow ample time to process your sanction application and timely return of insurance certificates to the parties named on your application, they must be sent in 45 days prior to the race date.
2. Notification of insurance coverage will be sent by US mail or E-Mail directly from the race coordinator to the race director. A certificate will be issued for each party named on your application. Turnaround time for this is typically two weeks or less.
3. Upon request, you will be sent a race packet containing your needed supplies. This packet will typically contain your race sanction application, along with a Race Reporting Procedure sheet listing the latest reporting procedures, additional family membership forms, charts and registration forms. Family membership is important to the health of our organization and we would like your help in signing up new members and reminding old members to renew.
4. Upon completion of your race, you will need to file a report with *NDR* Records on the results of your race. All outstanding fees must accompany the results. This procedure is outlined in SECTION 9 - FINAL REPORTING.

SECTION 2 - RACE SITE AND LAYOUT

Many cities will conduct their races on derby tracks while others will race on city streets. The following considerations should be kept in mind regardless of where your race is held:

1. Remember that many of the families may have never seen your track. A map in your pre-race flyers with directions to the facility or location is a must.
2. Parking accommodations should be thoroughly analyzed and planned. Traffic congestion in the parking area is dangerous and will not be appreciated by participating families. Spectator parking should be planned for convenient movement of vehicles with the least disruption to the race.
3. An organized pre-race sign-in area should be provided.
4. Spectator viewing areas should be located for *maximum safety* as well as view, without allowing spectators to interfere with the movement of racers while preparing to race, racing or returning to the pit area.
5. The pit area should be a controlled area for the racing families only. If assigned pit spaces are used, be sure that assistants are available to guide the participants to their assigned pit space. When racers are delivered to the pit on race morning, be sure to arrange for quick unloading and relocation of the family vehicles to eliminate congestion in the unloading area.
6. Scales should be located topside for weighing just prior to racing or in the pit area just prior to loading the racer for transport topside.
7. Starting ramps should be positioned up the track so that a safe maximum speed is maintained at the finish line.
8. Occasional failures of braking systems can occur and precautions must be taken at the end of the braking area to stop runaway racers. The most proven method is a pit of loose gravel. The pit needs to be level with and at the end of the run out area and of sufficient length to stop a speeding racer. Other methods are rows of tires, foam blocks or hay bales across the end of the run out. Two or three rows may be necessary to stop a racer. In the case of multiple rows, they should be continuous across the track with the rows spaced 10 or more feet apart so as not to stop the runaway racer in one hard contact. Rather, the racer is slowed by the first row, pushing the tire, foam block or hay bale ahead of it until encountering the remaining rows, thereby decreasing its momentum in steps.
9. Additional measures must be taken to protect the driver and his or her racer from any track side and braking area hazards (poles, fire plugs, trees, ditches, signs, glass windows, etc.).
10. Accessibility to restrooms for racing families and participants should be thoroughly planned.

11. Truck tires or other standards must be provided in the wheel swap area.
12. Racer return routes should be well planned and explained to participants at the pre-race meeting.
13. Concession stands should be located close to racing families and spectator locations.
14. Reliable communications between topside, the finish line and the staging and pit area are essential.

In addition to items 1 through 14, the following items should be given attention when races are held on city streets.

15. Many times access to the street cannot be obtained until race morning. In this case, your committee should plan their logistics very carefully in advance of race day.
16. Most city streets slope to either side off the center of the roadway. Using the center line of the street as the dividing line between two lanes, traffic cones or other soft markers should line the outer edges of both lanes 10 feet off of the center line. This disallows excessive drifting to the outside to gain slope advantage and helps to prevent the racers from accidentally encountering the curbing or roadway shoulder. Restricting lane width to 10 feet also allows for meaningful lane calibrations. If no centerline is present, one should be marked using a chalking machine such as the type used to lay out athletic fields.
17. Starting ramps should be at or very close to the same slope as the street surface immediately off of the ramps, both in the down track and cross track directions. This will make the transition from ramp to roadway less abrupt and minimize cross bind to the racer as the front wheels roll onto the roadway.

SECTION 3 - LOCAL ORGANIZATION

Along with applying for sanction, the other most important element in the success of your race is organization. The following steps are presented to help you cover *all bases*:

1 . You need to determine the number of workers needed to conduct your race and obtain commitments from individuals to fill each job. You should consider the following jobs:

- a. Race Director
- b. Heat line-up person
- c. Wheel and lane steward
- d. Scales steward (if two scales are used, plan for two people)
- e. Staging steward
- f. Starter
- g. Topside communications (one person for communicating with the finish line and the pits - two people if a heat chart is kept topside)
- h. Finish line communications (minimum of two people - one for heat charts and one person for communicating with topside and pits)
- i. Timer operator
- j. Lane judge
- k. P.A. Announcer
1. Braking area coordinators and car loaders (4 minimum)
- m. Racer return drivers - minimum of two
- n. Pit coordination (one if the second heat chart is kept topside - two if it is kept in the pit area)
- o. Protest committee members



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This is a minimum of twenty-one committed workers. In addition, several people are needed for early morning track set-up, registration, calibrations, etc. This can come from your pool of race workers. But be careful not to double up too many duties.

2. A meeting should be held with your committee workers at least one week prior to your race. Assignments should be confirmed and time schedules established. Explain to everyone their job assignments, in detail, including their responsibility to obtain a qualified substitute if something unforeseen prevents them from fulfilling their obligations.
3. Start making arrangements well in advance of race day for a finish line timer (and a back-up if possible), scales, starting ramps, communications equipment, public address system, trophies, etc.
4. The public address systems should be installed prior to race day if possible. If not, specific people should be assigned to do it several hours before the scheduled race start. You will need the P.A. system in operation during racer check-ins, inspections, etc.
5. The finish line timer system should be set up and checked out prior to race day and set up very early on race morning, then checked again.
6. Lane calibrations should be completed before race day with verification runs only early race morning.
7. Race teams should not be expected to provide their own transport of racers between the pits and topside. Nothing can slow a race and open up the possibilities for improper conduct with the racers between phases, than individual race team transport. Therefore, the use of a minimum of two safe trailers and tow vehicles should be arranged in advance of race day. Many organizations have trailers specifically set up for this purpose. Be sure to provide a sufficient number of truck tires or other means of supporting racers during transport, and adequate hold-downs for the racers. Emphasize safety and caution to the drivers pulling transport trailers. They should be driven extremely slow. Unless safe seating (with seat belts) is provided on the trailers, participants should be transported in-side the towing vehicle. And only the driver and one car handler should be transported.
8. First aid or ambulance service should be arranged for several weeks in advance of your race date. If an ambulance service cannot be available throughout the day, advance arrangements should be made for emergency service and several of your key people should have the telephone number of the service. Additionally, outside telephone service arrangements should be made and the availability of that service made known to your key personnel. To this end, a cellular telephone on site is encouraged.

SECTION 4 - REGISTRATION OF CONTESTANTS

NDR sanctioned races are by nature open to all members and other interested racing families. However, the local race director has the option to limit the number of participants allowed on a first come, first served basis.



Therefore, registration of contestants in advance of race day is desirable and will minimize confusion on race morning. Advanced registration will allow you to know in advance the expected number of competitors, the amount of revenue to expect, the number of trophies and awards needed, and the size of the heat sheets and charts you will need. Late entries and drive-ups should be discouraged, but may be allowed at the option of the race director to substitute for no-shows or byes.

Once the NDR has provided sanctioning for a race, an announcement will be placed on the NDR Web Site.

The preparation of your flyer should be carefully considered. It is not uncommon for an NDR family to drive up to a thousand miles only for a weekend race. So all pertinent information should be included in the flyer. Receipt of a flyer by a potential contestant is a personal invitation to that family to compete in your race and can be psychologically meaningful. Be sure to include the following data:

1. City, state, date and directions to the race track.
2. Stress the importance of early registration, registration deadlines, and if you have a maximum limitation on the number of entries. Stress the fact that it is on a receipt of entry confirmation basis (first come, first served). And indicate what divisions will be run.
3. Indicate that it is an NDR sanctioned race and that NDR participation and construction rules will be in effect. See item number 9 below for other issues related to rules.
4. Indicate check-in time and race start time.
5. If you have any social events planned in conjunction with the race, give details and fees, etc.
6. Make suggestions on lodging possibilities and give details like telephone numbers for registrations, rates, etc.
7. Indicate details of the approved wheel program you will use.
8. Indicate the amount of the entry fee and state that the entry fee must accompany the entry coupon to secure a place and to whom the check or money order should be payable. Also indicate if there are any other fees for social events in which the entrant may like to participate. Also indicate if additional fees will be assessed for the run out area or other race supporting activities.
9. Indicate weight distribution limits if different than outlined in the Construction Rules of the current *NDR RULE BOOK*.
10. Indicate method of racer transportation between the pit and topside.



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11. It is not recommended to send an official NDR entry form with the flyer. Instead, provide a coupon that can be clipped and mailed back to you with the entry fee. From these coupons the entry form can be completed in advance of race day by you or a volunteer, then simply signed by the entrant and guardian on race morning. Car numbers and other pertinent information and materials can be handed out at the pre-race sign-in on race morning.

12. It would be advisable to request a birth certificate for all non NDR members.

13. Indicate if your event will run single elimination races.

14. Indicate if your event will be allowing multiple division racing.

At the pre-race sign-in area, NDR Family Membership forms must be available. The appropriate membership fee must accompany any Family Membership applications taken at the registration area. Checks should be made payable to National Derby Rallies. All application fees should be sent to the NDR Treasurer at the time you submit the official results of your race.

Maximum use of pre-registration and effective organization as outlined in Sections 1 and 2 should allow you to start your race promptly at the scheduled time. Moreover, a timely start will put the contestants and families in a good frame of mind, which will hopefully carry through the course of the day. Getting off to a good start is essential to a successful race.

SECTION 5 - RACE MORNING PREPARATION

Essential to achieving a good start is to have done a thorough job in planning the set-up of your facility and in the individual assignment of the various jobs. The director should avoid assigning specific assignments to himself in order to be free to handle questions and problems that may arise.

Your facility should be operable by the time scheduled for entries to arrive. Restrooms should be in place, stocked and open. The PA and other communications systems should be ready and operating, the starting ramps in place and operable, the timer system in place and tested, registration and check-in table properly staffed, traffic coordinators ready, lane calibrations started, etc., etc. If you are ready to race as the first contestants begin to arrive, then you are well prepared for the long day ahead.

In the interest of safety, solo trial runs for drivers new to your racetrack and for drivers with new racers should be allowed and encouraged. This is also the time to check for the required sponsor stickers and provide stickers to those contestants without stickers on their racers. This is also a good time to verify that each racer is displaying its NDR assigned 3" tall membership number.



Call a driver's meeting about one-half hour prior to the start of the race to review procedures and logistics and to answer any questions. Immediately following your meeting, begin lining up heats in the staging area. Space permitting, the first round of the heat chart should be staged.

SECTION 6 - SCHEDULING AND TIME CONSIDERATIONS

A number of factors can influence the course of events during a race and will eventually effect how much racing can reasonably be accomplished in one day. The following example shows a breakdown of those limiting factors:

1. Past experience has shown that it takes an average of three minutes per run (phase) even for a well-organized race. Early in the race the time should be under two minutes. But as contestants are eliminated and the remaining contestants race more frequently, there will be delays caused by wheel changes, weight check, brake pad changes, etc., that are not as readily absorbed by the racing of other contestants.
2. In a 48 racer field of double elimination, timer/lane swap racing, there will be a minimum of 188 runs. Adding four runs for run-offs for 7th and 8th, and 4th and 5th places, then two more if the winner of the consolation bracket wins in the heat with the winner of the winner's bracket. In cases of equipment failure and dead heats, etc., this number could be even higher.
3. Using a minimum of 188 runs times three minutes, the result is a minimum of 564 minutes to run such a race, or 9 1/2 hours. The following page has a chart which estimates the hours required to run a race.

This breakdown points out the importance of a good organization and of having everything prepared prior to race day. You will therefore want to take into consideration the time of year (available daylight) and other factors which may effect the time available to run your race, when establishing a number limit for entrants.



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HOURS REQUIRED TO RUN A SBD RACE

Two car heats, double elimination with time differential style of racing

* Data for estimating number of hours required to complete a Soap Box Derby race.

No. of Cars	No. of Heats	No. of Phases	Minutes between phases (see Note 2 and 3)					
			1	1.25	1.5	1.75	2	2.5
8	16	32	32 (.5 hrs)	40 (.7 hr)	48 (.8 hrs)	56 (.9 hrs)	64 (1.1 hrs)	74 (1.2 hrs)
16	32	64	64 (1.1 hrs)	80 (1.3 hrs)	96 (1.6 hrs)	112 (1.9 hrs)	128 (2.1 hrs)	160 (2.6 hrs)
32	64	128	128 (2.1 hrs)	160 (2.6 hrs)	192 (3.2 hrs)	224 (3.7 hrs)	256 (4.3 hrs)	320 (5.3 hrs)
48	96	192	192 (3.2 hrs)	240 (4.0 hrs)	288 (4.8 hrs)	336 (5.6 hrs)	384 (6.4 hrs)	480 (8.0 hrs)
64	128	256	256 (4.3 hrs)	320 (5.3 hrs)	384 (6.4 hrs)	448 (7.5 hrs)	512 (8.5 hrs)	640 (10.6 hrs)
80	160	320	320 (5.3 hrs)	400 (6.7 hrs)	480 (8.0 hrs)	560 (9.3 hrs)	640 (10.7 hrs)	800 (13.3 hrs)
96	192	384	384 (6.4 hrs)	480 (8.0 hrs)	576 (9.6 hrs)	672 (11.2 hrs)	768 (12.8 hrs)	960 (16.0 hrs)
112	224	448	448 (7.5 hrs)	560 (9.3 hrs)	672 (11.2 hrs)	784 (13.1 hrs)	896 (14.9 hrs)	1120 (18.7 hrs)
128	256	512	512 (8.5 hrs)	640 (10.7 hrs)	768 (12.8 hrs)	896 (14.9 hrs)	1024 (17.1 hrs)	1280 (21.3 hrs)
144	288	576	576 (9.6 hrs)	720 (12.0 hrs)	864 (14.4 hrs)	1008 (16.8 hrs)	1152 (19.2 hrs)	1440 (24.0 hrs)
160	320	640	640 (10.7 hrs)	800 (13.3 hrs)	960 (16.0 hrs)	1120 (18.7 hrs)	1280 (21.3 hrs)	1600 (26.7 hrs)

Notes:

1. 1.5 minutes between phases should be used for preliminary estimates.
2. The last six heats of each division will add approximately one hour of time to the total time required to complete the race. Multiple division races can mix final heats to minimize lost time.
3. Every race has delays due to personnel and/or equipment problems. Add one hour for 8 through 32 car races, one and one-half hours for 48 through 96 car races, and two hours for 112 through 160 car races.
4. Estimated times in this Table do not include track setup, opening ceremony, lunch break, awards ceremony or track tear down/clean up.
5. No. of Heats and No. of Phases column do not include runoffs for fifth through eighth.



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6. The first heat of a well-organized race will run at approximately 8:30 am. Most races start at approximately 10:00 am.
7. Maximum number of cars that can be run in one day: approximately 96.

SECTION 7 - RACE PROCEDURES

TIMER/LANE SWAP RACING

Timer/Lane swap racing is the fairest method of elimination available for gravity powered racing because it reduces the affects of the two greatest variables (lanes and wheels), while bringing the most desirable variables (racer quality and driving skills) to the forefront. Timer/ Lane swap racing minimizes the luck factor in racing but does not eliminate it entirely.

In practice, timer/lane swap racing gives both contestants in a heat a run with both combinations of lanes and wheels. The procedure is as follows:

1. For a given heat, two racers are brought to the top of the hill and set on the ramps in lanes predetermined by their position on the chart.
2. The two racers are run down the hill in their assigned lanes and the finish is determined with a timing device that measures the time differential between when the nose of the first racer crosses the finish line to when the second racer crosses. Usually this time difference is in the order of hundredths or thousandths of a second. This is the *Phase A* portion of the heat.
3. The wheels are swapped between the racers, spindle for spindle, preserving the direction of rotation, then the racers are returned to the top of the hill where they are set in the opposite lanes in which they raced in Phase A.
4. Both racers are run down the hill for a second time (*Phase B*) and the time difference of the finish is measured again.
5. The overall winner is determined by the net time of both phases.

Example: Rachel Rocket wins Phase A by 0.010 sec. Louie Lane wins Phase B by 0.023 sec. The time difference between the drivers is $0.023 - 0.010$, or 0.013 sec to Louie's favor and he is declared the heat winner.

While timer/lane swap racing is the fairest method for derby racing, other factors should be considered to make best use of the method. With respect to the lanes only, it is desirable to keep the time differences between lanes to a minimum. This can be accomplished by *calibrating* the lanes. Lane calibration is accomplished by repeated runs of a pair of closely matched races, while adjusting the angle of the ramps to reduce the time difference between them to a minimum. Of course this can be a laborious process, for drivers and race workers alike, and it is not necessary to precisely match the lanes anyway, if indeed it is ever



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possible. For that very reason timer/lane swap racing was developed. However, it is more interesting for all concerned if the lanes are reasonably close. So at least a minimum effort to this end should be done.

More important, is that every attempt be made to race both phases of a given heat as close together as possible. Although other rounds should be run in between, Phase B racers need to be given priority topside. The best way to accomplish this is to cue Phase A racers to the outside of the ramp staging lanes, leaving a lane in the center for Phase B racers to *jump the line* as soon as they are returned topside. In any case, delays of more than 20 minutes between phases should not be allowed. Over such a long period of time track conditions may have changed to a point where the Phase A time is no longer relevant and the heat should be re-run from the beginning. However, as race director you must be aware for contestants attempting to cause an unreasonable

delay only because they may not be satisfied with their Phase A time. The best way to prevent this from happening is to keep the racers moving.

Timing System - Naturally, the quality of the timing system is crucial to the success of your race. A timer capable of recording time differences of 0.001 seconds is required. For example, a timer with 0.01 second resolution will not distinguish finish line distances between the noses of two racers traveling at 30 mph, no closer than 5.28 inches,

Timer Swap Forms - In conducting your race, along with maintaining heat charts, two additional functions must be recorded. One function is to record the lane to avoid mix-ups and the second is to record results to determine the winner. APPENDIX 1 gives example forms for these purposes, suitable for photocopying. Form 2 - Heat and Line-up is used to line up racers before the heats and to keep track of the lanes. Form 3 - Heat Results is used to record the official times and winners of each heat.

Re-Run Considerations - In the event of a timer malfunction in which no time is recorded, the race should be re-run as described in SECTION 7 - TIMER/LANE SWAP RACING, under sub-topic: Other Eventualities. Such situations are referred to *as a Non-Heat. A Dead Heat* would exist when the net time of both phases is zero. Remedy for this eventuality is also described under Other Eventualities.

HEAT CHARTS

Careful records of the progress of the heats must be maintained throughout the race. The sample heat charts in APPENDIX 3 are recommended for your use in a double elimination race, timer swap race. These charts are for 4, 8, 12, 16, 24, 32, 48 and 64 racer fields.

The charts for 4, 8, 16, 32 and 64 racers are preferred because they provide perfect brackets with no planned byes. The 12, 24 and 48 racer charts, while less desirable, are sometimes necessary because of time limitations. All charts are for double elimination with maximum separation of contestants so that two



contestants who have raced in an early heat will not race two rounds later. **The NDR requires double elimination races except under extreme extenuating circumstances.**

The NDR will now allow single elimination racing at the discretion of the rally race director and in all cases a single elimination race must be preceded by a double elimination race and the proper sanctioning fees must be paid to the NDR.

In most instances, the number of contestants will not match the available number of possible entrants on the chart. In such instances, the closest heat chart higher than the actual number of contestants should be used and byes inserted as necessary. The heat charts in APPENDIX 2 also list the proper sequence in which the byes should be inserted prior to the heat and lane drawing.

The heat and lane drawing should be a random drawing in full view of all contestants. Heat charts should be maintained in at least two separate locations during the race. One chart should always be located at the finish line where results of each phase can be immediately recorded. The second chart can be topside, in the pits or wherever there is a concentration of interest in the race. Direct communication should be maintained at all times between the two chart keepers so that their records are accurate and consistent. One set of charts (not the finish line) should be accessible to viewing. Needless to say, the participants will want to know where they stand in the brackets and the progress of other contestants. And it must be remembered that a derby race will mean little to the spectators as well, if they have no idea what is happening.

Heat charts should be obtained from the NDR Race Coordinator when you apply for a race. These are the same charts as in APPENDIX 3. They have been printed in size that fits the format of this manual. Do not remove the charts from this manual. They should remain as a part of this manual for reference.

LANE DETERMINATION

Lane assignment for Phase A heats should be determined from the heat charts. The first name in the heat bracket should get Lane 1 in Phase A. Lanes are swapped in Phase B.

LANE JUDGING

A competent, attentive and impartial person should be selected for the Lane Judge. It is best if the Lane Judge has only this one duty to perform during the racing. However, if volunteers are short, then a person with another duty directly associated with the race, for instance someone working at the finish line like the time keeper or perhaps the starting ramp operator, may perform this duty as well.

The Lane Judge's duty is to view each phase from start to finish with an eye to the following:



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1. To determine if a lane violation or interference occurs. A driver who in the opinion of the Lane Judge is observed to have interfered with the other contestant during a run should automatically be declared the loser of the heat, regardless of whether the violation occurred in Phase A or B.
2. To watch for lean-forward division drivers ducking their head under the cowling of the racer during a run. If observed, that driver should be given one warning, and if observed doing so again in a future heat, the driver should be declared the loser of the heat. This trick should also be discussed at the drivers meeting.
3. Safety - If the Lane Judge notices extremely erratic or unsafe driving during a race, it is his responsibility to inform the Race Director of his observation. At that point, the Race Director has the option to require the driver to make a solo trial run. If the trial run is not satisfactory, the Race Director may disqualify the driver from further competition. This option should also be discussed at the drivers meeting.
4. The starting ramp operator, whether or not he is the Lane Judge, should be on the watch for body movement of the drivers as the starting blocks drop. *Kick starting* or ducking of the head down, then up in the helmet for senior drivers should be discouraged. If observed, that driver should be given one warning and if observed doing so again in a future heat, the driver should be declared the loser of the heat. These tricks should also be discussed at the drivers meeting.

If any of the above mentioned items are witnessed by a race official, then it is their responsibility to issue an immediate resolution. If the above mentioned items are witnessed and reported to a race official, then an official protest must be filed. If a discussion is generated while the heat is between A/B phases, with or without the use of an official protest and the resolution extends past the 20 minute time limit, then the A phase will be rerun at the discretion of the Race Director.

BYE RUNS

The race director may grant bye runs as he sees fit under the time constraints and conditions of the race. These runs should be provided at the driver's option and during the heat that determines the racer's opponent. If one run is granted, it should occur immediately after Phase B of the heat to determine the opponent. If two runs are granted, the first bye run should occur immediately following Phase A of that heat, followed by the second bye run immediately after Phase B. In that way the bye racer is as hot as the racer he or she will meet.

WARM-UP RUNS

The winner of the winners bracket *is allowed* at the driver's option *two* warm-up runs prior to the race for first place. These runs should occur during the heat that determines the winner of the consolation bracket. The first warm-up run should immediately follow Phase A of that heat, followed by the second warm-up run immediately after Phase B. In that way both racers (winner of winners and winner of consolation) are equally hot for the final races.

LANE INEQUALITIES

Lane equality should be as close as possible for spectator and participant interest, but excessive time should not be spent on race day in calibrating lanes for timer-swap racing. If lane checks are made periodically throughout the course of the race, they should never occur in the middle of a round.

WEIGHT SCALES

It is recommended that two sets of scales be used at each local race. The single greatest tie-up in the morning will likely be the time taken by the contestants on the scales. However, if you use two scales be sure that you assign each division to a specific scale (ex. Stock cars on Scale 1 and Super Stock and Master cars on Scale 2). The use of two scales will reduce the total scale time by 50%. Always weigh racers after racing wheels have been installed. Be sure that the scales are level.

WEIGHT DISTRIBUTION LIMITS

Racers are to be run with the maximum total weight of the racecar and driver as described below. Furthermore, the maximum allowable weight bias is also detailed below.

Stock Division - The maximum overall weight for a Stock Division racer, including driver is 200 pounds. The maximum allowable weight bias in this division is +/- 15 pounds tail weight.

Super Stock Division - The maximum overall weight for a Super Stock Division racer, including driver is 240 pounds. The maximum allowable weight bias in this division is +/- 15 pounds tail weight.

AA Flat Bottom Master Division – The maximum overall weight for an AA Flat Bottom Master Division racer is 255 pounds. The maximum allowable weight bias in this division is +/- 15 pounds tail weight.

NDR Glass Wrap Master Division – The maximum overall weight for a NDR Glass Wrap Master racer is 260 pounds. . The maximum allowable weight bias in this division is +/- 15 pounds tail weight.

To properly measure weight distribution, a jig should be built that will support the front wheels off the scale, but on a level basis with the rear wheels on the scale. The initial measurement of weight distribution is made prior to the start of the race. At this time, the weigh master should insure that the driver is in the racer in the proper driving position. Master Division tail weight should be checked with the driver in racing position without the helmet, so the weigh master can see the driver's eyes. Once the proper balance is achieved, there are a few methods of monitoring weight distribution during a race that will help insure that the racer/driver combination does not change.

1. All racers can be checked for proper tail weight prior to each heat, with the driver in driving position as was done during the initial weight distribution measurement.
2. Racers are spot-checked for weight distribution during the race.
3. During the initial weight distribution measurement, after the racer/driver balance is achieved and certified, the driver then gets out of the racer and the dry (or empty) tail weight is recorded and the racer tagged accordingly. Thereafter, only the tail weight of the dry racer is weighed, usually before each heat. There is no need to weigh the racers that are between phases.

Of the three methods outlined above, 1.) is the most positive method of maintaining proper weight distribution throughout the race. However, it is also the most time consuming and therefore is rarely used. 2.) is far less time consuming, but leaves much to chance. 3.) is a very workable combination and is the method most commonly used.

Regardless of the method used, it is recommended that winning racers be certified for proper overall weight and weight distribution at the completion of each heat. No tolerance is allowed in excess of maximum overall weight. But a maximum of +/-3.0 pounds shift in weight distribution is allowed at the end of a heat to account for variations in individual wheel weight. Any amount over 3.0 pounds *will* automatically result in a loss of the previous heat. In cases of apparent violation of this rule, the final determination should be made with the driver in the racer, in racing position.

WHEEL MANAGEMENT

Other than differences in lanes, differences in wheels are the second most influential factor in racer speed. The two-phase, lane/wheel swap method used to conduct *NDR* sanctioned races is designed to negate both of these inequities. To further insure equality, the *NDR* suggests two different methods for managing wheels:

1 . Wheels Supplied from A Race Organization's Wheel Bank

A. Making a Wheel Bank

In this method a wheel bank is made of wheels available to your local organization. The wheel bank is prepared prior to race day. All wheels are inspected for safety and satisfactory rolling performance as a group. For best uniformity, wheel bearings should be cleaned and oiled with a very light lubricant such as WD-40 or equivalent product, then the outer surfaces wiped dry.

At this point some very involved methods have been devised for matching wheels relative to their rolling performance. However, when using the timer/lane swap method of racing all that is needed is that the wheels



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have reasonable performance and that they are matched randomly. To do this, all of the wheels that have passed the inspection and cleaning process are then randomly divided into sets of eight, four for each racer per heat, and labeled with numbers 1, 2, 3, etc. Then each numbered set is again randomly subdivided into groups of four, labeled A and B. Finally, wheels of each set are once more randomly labeled for their spindle location (ex. RF, LF, RR and LR), with an arrow indicating the direction of rotation they will have when installed on their respective spindle with the labels on the outside.

The number of numbered sets needed to conduct a race without delays varies but a good rule of thumb is one set of wheels (A and B groups, eight wheels total) per 4 contestants. Plastic milk delivery crates make good containers for holding groups of four wheels.

The last item you will need is some sort of *Lottery Ball* device to allow the sets to be picked at random during a race. A suggestion is Ping-Pong balls in a quart size metal can. You will need two cans. One can contains balls labeled with numbers to match the set numbers, one ball for each set. The second can contains only two balls, one labeled A for group A wheels of any set number, and accordingly, the other ball is labeled B. It is sometimes possible to simply assign group A wheels to the phase 1 racer in Lane 1 and group B wheels to the phase 1 racer in Lane 2.

B. Racing on the Wheel Bank

Selection of wheel sets to be used in a given heat should be made by random draw with the *Lottery Ball* method described above or some other similar but equally random method. In no case should the contestants be allowed to make a selection on their own. The contestant in Lane 1 draws a ball in the blind from the Number Can for the number of the wheel set to be used while the contestant in Lane 2 draws a ball from the A/B Can, to determine which racers gets Group A and Group B. The ball drawn by the Lane 2 contestant gets the group he or she has drawn and runs the A phase on that group, while the Lane 1 contestants runs on the other group. Between phases all four wheels are swapped between the cars.

Example:

Tommy Topside races Cindy Swift. The heat charts have Tommy in Lane 1 so he draws a ball from the numbered can and gets 8. At the same time Cindy is in Lane 2 and she draws the A ball from the second can. Therefore, Tommy starts Phase A of their heat in Lane 1 with the Set 8-B on his racer, each wheel installed on the spindle corresponding to the individual markings on the wheels. Likewise, Cindy starts Phase A with Set 8-B on her racer, properly installed as well. The 8 ball is retired until their heat is over and the wheels are returned to the wheel bank. However, the B ball is returned to the second can.

At the end of Phase A, all four wheels are exchanged between the racers. Tommy's right front wheel is transferred to Cindy's right front spindle and vice-versa, making sure that the wheel rotation is not reversed and so forth until all wheels are swapped. Phase B is then run in opposite lanes as Phase A.



At the end of the race all wheels are returned to their proper boxes and the 8 ball is put back into the number can.

2. Wheels Supplied By the Contestants

When the contestants supply wheels the approved wheel method is the two-wheel/four wheel method. In its basic form, a contestant shows up with a set of cleaned, properly performing wheels, labeled on the outside of the wheels with the name of their race team, spindle location (ex. RF, LF, RR and LR), and an arrow indicating the direction of rotation. For the first race, the contestants start on their own wheels. However, to assure randomness before the start of Phase A, each of the contestants blindly draw a ball from a can of four. The balls are labeled RF, LF, RR and LR to correspond to wheel positions. The two balls determine which wheels are to be swapped prior to Phase A. Once this is done, each of the racers' wheel sets are randomly broken, so that no contestant starts on a full set of his or her own wheels.

Between phases all four wheels are swapped in the same manner as with the wheel bank method, spindle for spindle, preserving the pre-labeled direction of rotation. So again the sets are broken.

At the end of the heat, and after weight certification of the winner, the wheel sets are restored to their original configuration. However, the wheel set that was on the Phase A, Lane 1 racer before the two-wheel swap are to be on the Phase A, Lane 2 racer and vice-versa. In this way the wheel progress through the pack with the original racer only by chance ever again racing on its own wheels and then (after the initial two-wheel swap) only on two of them at a time.

Example:

Guy Gravity races Down D. Hill for the first heat. Prior to the heat each racer has their own wheels on their labeled spindles. Guy Gravity draws RF ball while Down D. Hill draws the RR ball. Both drivers exchange their right front and rear wheels between their racers before Phase A.

For Phase B, all four wheels are exchanged and Down D. Hill wins by a slim 0.007 sec overall. At this point each racer has two of its own wheels and two from the other racer. After Down's racer is certified the winner on the scales, she replaces her remaining two wheels with the two Gravity wheels on the Gravity racer. Therefore, at the end of the heat the Hill racer has all four of the Gravity wheels on its axles, on the labeled spindles, and in the proper direction of rotation. And for the rest of the day the 2-wheel, 4-wheel swap continues in the same manner with all wheel sets moving in a random fashion through the field.

At the end of the race, because the Gravity and Hill wheels are clearly labeled with their racing team name, the wheels are returned and everyone goes home happy.

Any racer who has been eliminated from the day's competition and wishes to leave the race facility, is allowed to get their wheels back. The eliminated racer should locate his wheels and exchange them for whatever set

was last used on his car. Wheel sets may not be exchanged between phases of a race. Wheels may only be exchanged in between heats and with full sets of wheels.

Although these two options are the most common used, variations to both options exist and are equally effective.

House wheels should be available to substitute for unforeseen conditions such as loose bearings or damaged wheels.

In the event loose bearings or wheel damage is discovered prior to a heat, another wheel may be substituted for that wheel. If such a problem is discovered after Phase A, then the wheel should be replaced and Phase A rerun. If the wheel problem is discovered after Phase B, then both phases should be re-run after the problem is corrected. Car handlers in the run out area should be asked to watch out for loose bearings and excessively wobbly wheels.

After installation of wheels at the beginning of a race, it is recommended that wiping off wheels not be allowed by contestants. If wheels become dirty because of rain or other causes, then a disinterested third party should be asked to wipe the wheels of both contestants as they approach the starting ramps. Drivers or car handlers should not be allowed to touch the wheels when setting the car on the starting ramp.

PROTESTS

Formal protests are allowed under *NDR* rules for perceived infractions of rules or procedures. As a race director, you should give protests immediate attention. But you should not entertain any protest unless they are made in a formal manner. The Official Rule Book precisely describes the protest procedure. The procedure is purposely complex to assure fairness to both parties by discouraging idle complaint. However, if a suspected infraction is observed the process will work in a sportsman-like manner when handled as described. A copy of the Official Protest Procedure is included in the APPENDIX 1 of this manual, from which you can make photocopies. The back of the form also outlines the rule and procedure. Needless to say, the ultimate outcome of an earnest protest could affect the course of your race, so you are encouraged to have your Protest Committee reach a prompt decision.

OTHER EVENTUALITIES

There are a number of other things that may occur during a race and they should be dealt with accordingly:

1. Drivers who do not promptly show when called for a heat can severely delay racing. It is recommended that when a driver does not report within five minutes of first being called, he or she shall automatically lose that heat. However, one must remember that we are dealing with youths and some allowances should be tolerated for genuine reasons for tardiness such as a trip to the restroom, etc.



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2. Drivers should exit their racers as soon as possible after they stop and clear the racer from the braking area. To speed this process, helmets and hatches should be fitted after the racer is out of the way.

3. If a timer malfunction occurs during phase A, then the phase should be rerun using the same lanes and wheels.

4. If a timer malfunction occurs during Phase B, then the phase should be rerun using the same lanes and wheels as well. The Phase A results are not altered. However, if restoring the timer to operation causes a delay of longer than 30 minutes between phases or if the timer sensors are moved in any way, either in repairing a malfunction or by being struck by a racer in between the two phases, then heats affected by this occurrence should be restored to the pre-Phase A condition and the entire heat rerun as if the racers had just been called.

5. A dead heat is called when the combined results of both phases render a 0.000 second differential. In the event of a dead heat, the racers should be restored to the pre-Phase A condition and the entire heat re-run as if the racers had just been called.

6. If the consolation bracket winner defeats the winners bracket winner in their first heat, then one additional heat to determine the overall winner of the rally must be run. For a standard 2-Wheel/4-Wheel swap Phase A of the second heat should be run on the same wheels, but in opposite lanes as the previous Phase B. All four wheels are swapped for Phase B of the final race. When a wheel bank is being used, and the consolation bracket winner defeats the winners bracket winner in their first heat, then a new set of wheels should be drawn for the additional heat. If a dead heat occurs in either of these heats, it should be treated no differently than any dead heat.

7. Racers damaged solely due to driving errors or mechanical errors should be handled as follows:

A. If a racer is damaged during a Phase A run and can not be repaired to a safe racing condition within 30 minutes of the start of Phase A, the heat is a forfeit.

B. If a racer is damaged during a Phase B run and can not be repaired to a safe racing condition within 30 minutes of being called for the next heat, then that heat is a forfeit.

C. If a racer fails to complete a Phase A run under its own gravity induced motion, then there is no need to run Phase B. The heat is a forfeit.

8. Procedure for a race terminated while in progress

In the interest of safety, *NDR* sanctioned races must be suspended or terminated one half-hour after official sunset unless proper nighttime lighting is available. For a two-day race, or a two race meet occurring on consecutive days, a suspended race may be continued on the following day or declared terminated at the



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discretion of the Race Director. For races that must be terminated in progress, positions should be awarded as explained in APPENDIX 2.

In the interest of safety, *NDR* sanctioned races may be suspended or terminated at the discretion of the Race Director due to rain or other hazardous weather conditions. For a two-day race, or a two race meet occurring on consecutive days, a suspended race may be continued on the following day or declared terminated at the discretion of the Race Director. For races terminated, positions should be awarded as explained in APPENDIX 2.

SECTION 8 - SAFETY CONSIDERATIONS

TRACK LAYOUT

Spectator Control - Recommended methods of controlling crowds at races include snow fence, construction barricades, barrier ribbon, police barricades, etc. Make sure that the entire race track (to include the braking area and runaway area) is under visual scrutiny to prevent the possibility of spectators from wondering into the racing area. It must be stressed to the Starter that they MUST visually clear the track before releasing the racers.

Cones - While cones provide an extremely visible method of marking a race track, there are inherent problems when used for this purpose. Drivers pushing the extreme (running too close to the cones) stand a greater chance of losing control of their racers if a wheel clips a cone. Alternative methods of marking tracks should be explored. Plastic milk jugs filled with a couple inches of water work very well, as does 1/2" - 3/4" Styrofoam type material (especially if it is a bright or contrasting color). Remember that cones have the potential of causing greater problems than they alleviate. Cones can and should be used for marking hazards.

Starting Ramps/Gates should have a positive locking mechanism to prevent inadvertent release of race cars. If ramps are used, drivers should be briefed on safe procedures for loading in the cars.

TRACK DANGER/PROBLEM AREAS

Street Races - When racing on streets, it is highly recommended that prior to each day of racing, several individuals or groups of race officials walk each side of the street "track" looking for danger/problem areas. These danger/problem areas may include fire hydrants, signs, curbs, manhole covers, uneven racing surface, cracks, etc. The walk should take place on each side of the track and go up the track as well as down the track. That rationale of having several individuals conduct this walk in both directions is to insure that no item, no matter how seemingly insignificant, is overlooked. Even if races have been held previously at this location, be alert for new construction. Do not look just at the track, but look at the areas away from the racing surface. Bales of hay/straw can be very effective in providing protection for racers and cars from danger areas along the sides of a race course. It is highly recommended that when ever possible, at least 2 rows of bales be used. A space should be left between rows. This will allow the racer to slow down gradually relative to a sudden stop. A major problem encountered when first establishing a street track is ensuring that the track is kept the same dimensions at the bottom side as the topside. While it is nice to give racers as much room as possible, a track that is wider at the top than at the bottom gives racers a false sense of security. They may not be aware of the track narrowing and get caught too far outside. Close attention to ensuring the track is straight is imperative. Even the slightest bow in a track can have serious potential consequences.

Established Tracks - Prior to each day of racing, it is very important to have at least one (preferable 2 or more) race officials walk established tracks, both up and down the track. While the danger/problem areas that may



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be present in street races are not as likely, the racing surface should be checked, guardrails inspected and any other potential problem areas looked at. Ensure that something has not been constructed, moved, or otherwise came to encroach on the race track.

DRIVERS MEETING

Race Director Safety Briefings/Drivers Meeting should address the following as minimum:

1. Insuring new or inexperienced drivers are afforded the opportunity to make a run down the track. This should not just be a "take 'em to top side and let 'em go" type operation. A race official should be designated to inspect the car for safety and then observe each trial run, insuring that the driver is able to safely negotiate the track and stop the racer in the braking area.
2. Drivers maintaining control of the racers (hanging on tight) from start to finish of each race. This includes holding the steering wheel firmly while braking.
3. A short explanation of what is expected of drivers in the event that they experience difficulties. This may include safely stopping the car if they feel they are either loosing control, have already lost control or they are in some form of danger (the other car is about to hit them), Stock and Super-Stock drivers should stay as low as possible (remaining in the driving position with their hands on the steering wheel) until the racer has come to a complete stop, remaining in their car until someone reaches them to assist them out (preventing them from either stepping in front of another car rolling down the hill or letting their car roll on down the track).
4. People staying back from incidents/accidents. Stress to spectators and especially the drivers they need to refrain from rushing over to "help" during any incidents. They can be of greater help by standing by their racers and assisting if called upon.
5. What is expected of the racers and car handlers when being transported between bottom side and topside. This will include what is expected while riding in the return vehicle, like when it is safe to enter/exit the return vehicle.
6. During hotter weather, all participants should be warned of the effects of heat injuries. People should be advised of the warning signs of heat stress. The sponsoring organization should insure that plenty of cool drinking water is made available to all participants.

ON-SCENE MEDICAL COVERAGE

Cellular Phone - With the proliferation of cellular phones, it would be a very unusual event to not have at least one cellular phone at a race. But leave nothing to chance, it is recommended that at least one cellular phone be readily available during the entire race.

Insure that emergency phone numbers are immediately available. Do not rely on using 911 network. Have emergency numbers available for the local fire department, rescue squad (if different from the fire department) and the local hospital. Prior to race day, it is advisable that a race official meets with the fire department and rescue squad. The purpose of this meeting is to insure that the track location is known and



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that the type of activity that will be occurring is completely understood. This will reduce response time in the event that their emergency services are required. At this meeting, the possibility of the fire/rescue personnel making an appearance at the track could be approached. Several tracks have included these agencies in their activities and it has provided benefit to all concerned. At some locations, the response vehicles (fire trucks and/or rescue vehicles help with the opening ceremonies, at others, static displays are set up, providing a form of entertainment during lulls in the racing program. -

BRAKING AREA CONSIDERATIONS

Pea gravel is one to the easiest methods of stopping a run-away racer with the least chance of damage to the car. But it can be relatively expensive, depending on the part of the country you are located in and is not an option when racing on a street, It does require maintenance at the beginning and during the racing season. Prior to the racing season, the pea gravel should be "turned" or loosened. If the pea pit is overgrown with weeds, insure that they are removed. The gravel should be "waved", with waves being formed perpendicular to the direction of travel of the racers. Insure the transition from the racing surface to the pea gravel is smooth.

Cones can be very effective in stopping runaway race cars. Lay the cones down on their sides, pointed end towards the racers. Ideally, three to four rows of cones should be utilized. Try to stagger the rows of cones. The intent is for the driver to put the nose of the car between two cones, letting the cones slide under the axle. This will allow the cars to drag the cones to a safe halt, while minimizing damage to the racer. Cones used in this manner, in conjunction with pea gravel is extremely effective. Cones can be stored for continued use and are relatively inexpensive.

Bales of hay/straw can be very effective in assisting the stopping of a runaway race car. When bales are used, they should be laid out in the same manner as the cones above. Attention should be paid to not leaving spaces between bales so that a car can pass between them. Again, several rows of bales are preferable to a single row. Spacing between the rows allows the car to be slowed to a stop as opposed to a sudden jolt. At a minimum, expect damage to foils/fairings and extensive spindle alignment when cars are stopped by using bales. Again, depending on what part of the country you are in, bales of hay or straw can be relatively expensive and are a real problem when attempting to store from one racing season to another.

Tires, when used like bales of hay/straw, are very effective in stopping cars. As with the bales, extensive damage to racers can be expected.

People working in the braking/run-out area should be made aware of the potential dangers of run-away cars and should avoid getting in front of racers until they have come to a complete stop.

Pre-race safety inspections: Stress primary safety items such as brake systems (to include proper function, pads, etc.) Safety wire properly installed where required, general condition of the race car, etc.

SECTION 9 - FINAL REPORTING

Along with all of the other things you must do in closing out a race day, it is extremely important to make a timely (within five days) report of your final race results to the *NDR* Records. This is an essential step in making your race official. Portions of your report will be used in the *NDR* News publication sent out to all members on a regular basis. But most importantly, your report will be used to determine the points earned by each contestant and logged into the official record. The report will take a few minutes, but if you have good records, compiling the report should not take too long using the forms supplied in your race packet.

You need to file the following:

1. Completed race entry forms for each contestant.
2. A complete set of heat charts for each division run.
3. A completed *Official NDR* Local Race Results form (sample *form in* APPENDIX 1) for each division run.
4. Completed membership forms for each new or renewed membership received at your race, along with the membership payments. (If a competitor joins at any time during your race, they may be listed as a member on your report regardless of what time during the event they actually joined.)
5. An explanation of any unusual occurrences that you feel should be brought to the attention of *NDR*, particularly incidents concerning accidents, injuries or misconduct.
6. Copies of any protest forms filed.
7. Keep all unused (sponsor stickers, blank charts, forms, etc.) for your future use.



8. The sanctioning fees must be paid in full before the race is made official.

If your rally is canceled because of rain or other reasons that prevent the race from being run, you still need to report on the competitors that showed up with the intention of racing that have *registered and paid*. Under *NDR* participation rules, these potential participants are entitled to their participation points. In this case, a report would include only a list of qualified potential participants on the back of the Local Race Results form for each division that was scheduled, along with a note on the front stating that the race was canceled on race morning and the completed entry forms. Racers that intend to keep their participation points would not be entitled to a refund.