



# INDYCAR

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## About the Tutorial

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IndyCar is a car racing league which combines super speed ways, short ovals, road courses, and temporary street circuits. This sport can be played as individuals. This tutorial will give you a brief introduction to IndyCar.

## Audience

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This tutorial provides guidelines for readers who would like to learn how to play IndyCar. The material is suitable for providing the readers with an introductory knowledge about this sport.

## Prerequisites

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Before proceeding with this tutorial, you are required to have a passion for driving cars and an eagerness to acquire knowledge on IndyCar and its rules.

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# 1. Indycar – Overview

IndyCar is a car racing league which includes super speed ways, short ovals, road courses, and temporary street circuits. It thrills the drivers with the most diverse challenge in motorsports. The winner of this championship is rewarded in \$1 million bonus.

These racing cars have single seat with an open-cockpit featuring 2.2 litre, turbo charged, direct injected V-6 engine which is designed to run at 12,000 RPM with approximate 500-700 horse power which completely depends on the turbocharger boost setting. Companies like the Chevrolet and Honda supply consumer related engines which utilizes E85 fuel.



IndyCar is a kind of motorsport that uses ethanol, which burns cleaner, thus less pollution is released in the environment. It's quite interesting to know that more than 85% of the IndyCar equipment are produced by recycled or partially recovered post-consumer waste materials.

The riders ending up with the first three positions are differentiated by ten and five points while those landing from fourth to tenth place are separated by two points. Riders from the eleventh to twenty fifth positions are distinguished by one point and remaining all gain five points.

The riders can also earn some bonus points throughout the race. One point is rewarded for scoring the pole each race excluding Indianapolis, one point for leading at least one lap in a race and two points for leading most of the laps in each race.

Just like any other racing sport, all the riders participating in this sport focus on completing all the challenges within a very short time span and be the winner of the sport. The riders have to be quick and sharp as there have been margin of less than one tenth of a second between the first three finishers.

## A Brief History of IndyCar

The term IndyCar was used as a tagline for championship open wheel auto racing in the United States. The name IndyCar was generated from the genre's fundamental link to the Indianapolis 500 Mile race or the Indy 500, which is denoted as one of the most popular auto races in the world.

The word IndyCar was first used in the 1990 to describe the racing cars sanctioned in the event CART, which used to be the governing body of open wheel racing in the US. In 1992, the IndyCar trademark was registered with the United States Patent and Trademark Office by the Indianapolis Motor Speedway.

This was further renamed as the IndyCar World Series. In 1996, IndyCar had to suffer a lot of legal battles between the president of Indianapolis Motor Speedway and the CART. Later an agreement was reached in and the battle was put to rest once and for all.

The foundation of IndyCar was laid in 1994. It serves as the sanctioning body for the IndyCar Series. The first race was held on 27 Jan 1996 with Indy 200 at Walt Disney World Speedway situated in Lake Buena Vista, Fla. This race was won by Buzz Calkins.

The Indycar Series is considered as the fastest motorsport as compared to any other forms. Total 96 races have been conducted with a winning margin of less than a second. The fastest race was witnessed in 2003 at the California Speedway with an average speed of 207.151mph.

## Participating Countries

The IndyCar Series is opening level of Open Wheel Racing in North America. The United States is the governing body of IndyCar Series. The IndyCar Series has been held at 40 different race tracks from 1996 to 2015 out of which 24 were ovals and rest 16 were permanent or temporary road circuits.

Only five nations have held races for IndyCar. They are:

- United States
- Japan
- Canada
- Australia
- Brazil

In the 2010 Summer Olympic Games, 800 people along with their horses represented 57 countries.

## 2. IndyCar – Basics

The sport is quite simple unlike all other races. The rider who crosses the finish line first is considered as the winner. The beauty of the sport lies in the numerous challenges which the rider has to face. Let us understand the basics of the sport.

### IndyCar – Flags

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A total of nine flags are used throughout the race. Each flag has a different sign. The rider must acknowledge all the flags throughout the game and should follow the signs strictly. These 9 flags are:

- **Green(Start)** – This flag signs the beginning of the race, practice session or qualifying attempt.
- **Checkers(Finish)** – This flag signs the end of the race, practice session or qualifying attempt.
- **Blue(Passing)** – This flag signs the rider that a faster car is attempting to pass.
- **White(Last Lap)** – This flag signs that only one lap is left for the race to be completed.
- **Red(Stop)** – This flag signs that the track is not safe and the rider should not process at any speed.
- **Black(Consultation)** – This flag signs that the rider needs to move immediately to the pit area for consulting the officials.
- **Yellow(Caution)** – This flag signs that the track is not safe for racing speeds.
- **Yellow and Red Stripe(Surface)** – This flag signs that some slippery substance like water or oil is all over the track.
- **Black with White Cross(Disqualification)** – This flag signs that the rider has been eliminated from the game.

The rider should remember about the signals given by each flag. Throughout the game, the rider should carefully follow all the signs of the flag in order to play a safe game with fair chance of winning.

### Qualifying Procedures

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As we know the tracks in the IndyCar series are of different shapes. So the qualifying procedures differ according to the race track. Given below are the specifications necessary for qualifying various tracks. However, these procedures are not eligible for Indianapolis 500.

#### Oval Tracks

The sequence of qualifying is made by a blind draw. Each racing car is allowed to have two warm-up laps before the timed qualification laps. If necessary, the race director may allow some additional warm up laps. The qualification round includes two consecutive timed laps.

The total time taken in the two consecutive timed laps is recorded and is considered as the official qualifying time for the car. This is known as the **green flag laps**. Each car is allowed to leave the staging pit only once during the entire race.

## Road/Street Courses

On the first day of track activity, all cars attend the practice sessions where the drivers are allotted to one or two groups. These groups are made on the basis of combined practice times on the day before the qualifications. The racer with fastest time determines the first two qualifying groups.

## IndyCar Segments

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The qualifying round has three segments which eventually determine the winner. These segments are:

- **Segment One** – Two groups get a time slot of 10 minutes. The six fastest cars from both the groups qualify the round and others are ranked 13+. Drivers of group one are ranked oddly (13,15..) while group two are ranked evenly (14, 16..) relying on the fastest lap within the segment.
- **Segment Two** – The fastest 12 cars from Segment One get a 10 minute time slot. The six fastest cars among these qualify for the next round while rest are ranked in between 7-12 on the basis of the fastest lap within the segment.
- **Firestone Fast Six** – The fastest six from Segment Two get a time slot of 10 minutes. They are assured five minutes of green flag. All the cars receive an extra set of Firestone Fire Hawk tires for this round. Cars with the fastest laps during the segment are ranked from 1-6.

## Precautions

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The riders have to take the following precautions while driving the car:

- The riders should keep in mind that if the car causes a red or full course yellow condition in any segment or interrupt with qualifications as mentioned by the Race Director, then car's best two timed laps of the segment will be disallowed. Also, any car interfering will not be permitted to the next segment.
- If a car leads to two red or full course yellow conditions in any segment, then all segment times of the rider are eliminated and is not allowed to take part in any of the qualifying rounds.

## Ties (all courses)

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There will be situations where two or more cars have same qualification times. In this type of scenario, a tie breaker is required to determine the ranks. Here the cars will be ranked according to the sequence in which the attempts for completing qualification occur.

## Earned Poles

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The drivers earn poles for statistical purpose on the **on-track performance** at some particular track. A pole is not earned for statistical purpose when qualifying is aborted and pole is assigned on the basis of point. It is earned when qualifying is aborted but pole is assigned on the basis of practice speed.



# 3. IndyCar – Equipment

In this chapter, we will discuss about the equipment used by the riders of the car.

**Nomex** – It is manmade fiber which is high temperature resistant. It won't allow combustion in air and will never melt due to flames. When they are exposed to heat, it carbonizes and becomes thicker to assure a safe layer between heat source and skin.

**Helmet** – It was precisely designed for automobile racing. It is round in shape, made of carbon fibre, kevlar or fibre glass shell which is aligned with energy sucking foam and nomex padding.

**Headsock** – It is also referred as **balaclava**. It is made of nomex and worn before wearing helmet.

**Gloves** – They are made of nomex and leather to protect the rider's hand and ensure proper grip.

**Firearm Suit** – It is a one-piece uniform which is fire resistant. It should have the ability to assure exposure to direct flame and heat before the driver suffers from second degree burns.

**Driving Shoes** – It should have a layer of leather or suede from outside and a layer of nomex from inside. Drivers should also wear fire proof socks.



## 4. IndyCar – Tech Inspection

Before conducting the IndyCar Series, all the cars are properly inspected as a safety measure. This inspection is conducted on every weekend. The inspection is based on five rounds. These rounds are **initial, prequalifying, post-qualifying, pre-race** and **post-race**.

### Initial Inspection

Before any track activity, the initial inspection is done. A team of 15 officials carry out this inspection. These officials are known as **inspectors** and are monitored by the **IndyCar Series technical director**. This inspection may take up to eight hours for all cars.

### Pre-Qualifying

During this process, a car's body, mandated safety features, underwing/chassis, engine, fuel cell, height, weight and measurements are inspected to assure that the cars meet the IndyCar Series needs. The inspection process is grounded upon the entrant points.

### Post Qualifying

During the safety inspection, the inspector assures that all the racing cars match the safety demands of the IndyCar Series. The equipment inspected during this session are the SWEMS restraints, seat, headrests, seat belts, fasteners, pedal position, steering wheel release, driver's helmet, earpieces and frontal head restraint, and on-board fire bottle.

### Pre-Race

The inspectors involved in the inspection process use approximately 60 templates at the gauge and template station. These templates are used to measure all the cars and to make sure that each car meets the demands of the IndyCar Series.

### Post-Race

The final station for inspection is the tech pad. In the tech pad, measurements are made for all those cars which need to be levelled and sitting on its reference plane.

## 5. IndyCar – How to Play?

Inside the car, the person has to deal with tremendous heat and still have to concentrate. So below are some of the important things that one should remember before getting his hands into IndyCar racing.

### Braking

A driver has to do braking throughout the whole event effectively. On every lap, there will be three hard braking zones that a driver needs to deal with and during the rest of the race, braking is used on the additional corners.



Some championships have caution period or rest period and some do not have. In that case, a driver needs to focus heavily during the braking because some braking may last for more than one second. The force applied by your foot will be equivalent to 135 pounds.

In 85-lap race, a lap turnover lasts for only 60 seconds. Here a driver has to face three hard braking zones with an interval of 18 seconds. Once you are done with your braking, you are going to face the next difficult thing- steering.

### Steering

Steering the wheel continuously for 1 hour and 39 minutes demands immense strength and control over body and mind. There is no power steering in IndyCar, therefore each turning requires tremendous amount of energy equivalent to 35 pounds of force.

A left hander has to pull down with the left and push up with his right to overcome the tremendous amount of gravity. Similarly, a right hander has to pull down with his right and push up with his left.

## **Breathing**

Breathing is not easy when you brake or take some turns under heavy gravitational force. You should breathe heavily while taking turnings. The strategy is, while taking a turn, hold your breath at the corners, breathe continuously and then brake. Repeat the similar process at all the turnings.

## 6. IndyCar – Timings and Scoring

It is very important to understand how each point is scored during the race and how the timings are measured so accurately. We can understand this part of the racing event by the points given below.

For each car a radio transponder with a unique identification number is installed on the driver's left side. This is placed 33 inches away from the tip of the nose cone.

Numerous detection loop antennas are buried in the track surface positioned around the track record that passes time and ID of the radio transponder attached to every car. This information is captured and delivered to the timing and ranking booth through a trackside decoder connected to each antenna.

The information obtained is processed by servers to conclude the results of the session. This recording consists of the results of each session. All the data from the antenna passings, and all the timings of pre-determined sections are set up in the system. The system stores all the timings to the ten-thousandth of a second.

Many other systems are used as backup for the main electronic scoring systems. A high-speed camera, which captures picture for every ten-thousandth of a second, saves all start or finish line passings. After every race, it is used to check the finishing order of all the cars in order to check the close crossings.

### Manual Scoring

Apart from this, manual scoring is done by individual serial scorers who give a written record of all passings at the start or finish line. The scoring computers provide live timing information to every team's pit stand through the **Timing and Scoring** stand that is positioned in pit lane at the start or finish line. All data captured at every race event are made available through the internet.

# 7. IndyCar – Rules

Rules for IndyCar Series depend upon the championship. Although most of them are similar but a little bit changes is made in every event. Here basically we will be discussing Verizo IndyCar Series championship.



All the deserving drivers can score point by acknowledging these points.

- An entrant having a license can earn points by challenging with a properly registered car and displaying the précised car number throughout the game.
- The driver starting the race scores points for the car. The relief driver will not receive any points for driving that car.
- If there is a tie, then the winner is determined by the one who finishes the first place first. If tie persists then the most second player finisher, then the most third place finisher is determined and the process continues till there is only one champion.

## 8. IndyCar – Champions

The IndyCar Series is an open wheel car event that started 1994 and has its governing body in North America. It is governed by the ACCUS-FIA (The Automobile Competition Committee of the United States). It consists of four racing championship series.

- The IndyCar Series
- IndyCar Lights
- Pro Mazda Championship
- U.S.F 2000 National Championship

Let us now have brief synopsis on some of the champions of IndyCar.

### Scott Dixon

Scott Dixon is a professional racing driver from New Zealand. He won the IndyCar Series Championship in 2003, 2008, 2013, and 2015. He also won 92<sup>nd</sup> Indianapolis 500 in 2008 from pole position.

With 38 wins, he is the leading driver in the current IndyCar Series. The Autosport magazine named him as one of the 50 greatest drivers ever in Formula one. He was **New Zealand Sportsman of the Year** in 2008 and 2013.

### Ryan Hunter-Reay

Ryan Hunter-Reay is an American professional racing driver. He won the Indianapolis 500 in 2014 and IZOD IndyCar Series Championship in 2002. Currently, he drives the 28 number car in Verizon IndyCar Series.

He is also the winner of Champ World Series and Toyota Grand Prix of Long Beach. In addition to these, he has taken part in many other indycar championships. He also serves as an ambassador for an organization **Racing for Cancer**.

### Dario Franchitti

Dario Franchitti is a retired British racing driver. He won the IndyCar Series Championship in 2007, 2009, 2010, and 2011.

He won the Indianapolis 500 three times in 2007, 2010 and 2012 along with the 24 hours of Daytona in 2008.

Franchitti retired after 31 wins from 265 starts in America Open Wheel racing. He also participated in Formula Vauxhall and Formula Three. He won McLaren Autosport BRDC award in 1992.

### Will Power

Will Power is an IndyCar champion from Australia. He is the member of Team Penske. He won the IndyCar Series in 2014 and was most successful in 2015 as he won 19 times with his partner Scott Dixon.

He started his career by driving a Datsun 1200. In 1999, he participated in Queensland Formula Ford Championship and won the races.

As far as his IndyCar career is concerned, he started his career in 2008 by joining KV Racing Technology. He won the Champ Race in 2008 which was his first IndyCar series win. He joined Team Penske in 2009 and from then he is driving for the team.

## **Dan Wheldon**

Dan Wheldon was a racing car driver from England. He won the IndyCar Series in 2005. He has also won Indianapolis 500 in 2005 and 2011. In his early part of the career, he participated in Open Wheel Racing. Later he left UK and moved to US as the family budget was unable to pay for his career in UK.

In 2002, he was the member of Team Panther and participated in IRL IndyCar Series. In 2004, he won his first IRL Series. In 2006, he won Toyota Indy 300 Championship.

Wheldon died due to head injuries in 2011 while participating in IZOD IndyCar World Championship.